Early Action Compact Program for Ground-Level Ozone: A Study

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INTRODUCTION

The United States Environmental Protection Agency (EPA) initiated the Early Action Compact (EAC) Program in 2002 to make available an option of early implementation action that provided for cleaner air sooner than might have occurred by otherwise following the timelines in the Clean Air Act (CAA). In exchange for early implementation action for the 8-hour ozone standard, EPA deferred the effective dates of designation for those areas that would have been designated nonattainment for the 0.08 parts per million 8-hour ozone National Ambient Air Quality Standard (NAAQS). (The deferral of the effective date had the effect of also deferring the application of specific CAA requirements in these EAC areas, including the New Source Review (NSR) and Conformity Programs.)
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The program concluded in the spring of 2008. At that time, the EPA designated as 'attainment' those EAC areas that had attained the ozone NAAQS and affirmed a nonattainment designation for the one area that had not attained the NAAQS for ozone.

Following the conclusion of the EAC program, EPA's Office of Policy Analysis and Review and EPA's Office of Air Quality Planning and Standards undertook this study of the EAC program in order to learn what worked well and what did not with this community-based program, including whether EAC Program areas attained the ozone NAAQS early. EPA's intent was then to share that knowledge with leaders of programs that EPA and the states create to improve air quality in communities.

BACKGROUND ON THE EAC PROGRAM

In July 1997, EPA promulgated a revised ozone standard, i.e., the 1997 8-hour standard. EPA designated areas for the 8-hour ozone standard in April 2004. After the standard was promulgated but before areas were designated for it, some state, local and tribal air pollution control agencies expressed a need for added flexibility in implementing the 8-hour ozone NAAQS. One concept was to provide incentives for taking early action to reduce ground-level ozone in exchange for avoiding the stigma of a CAA nonattainment designation and its accompanying requirements (e.g., the NSR and Conformity Programs). This incentive concept became the basis for the development of the EAC program.

Certain environmental groups supported the concept of early action to improve air quality sooner, but had serious concerns about the approach, including, in their view, a weakening of enforcement of the CAA's nonattainment area requirements. Ultimately, EPA worked with these parties to address their concerns by incorporating program elements to help ensure accountability and results.

In 2002, the Texas Commission on Environmental Quality submitted an EAC protocol to EPA. EPA endorsed the protocol and subsequently issued guidance for compact areas. Twenty-nine areas from 12 states submitted signed compact agreements by December 2002. Table ES-1 lists all of the participating areas, only one of which did not complete the program due to an air quality violation (Denver-Boulder-Greeley-Fort Collins-Loveland, Colorado). Fourteen of the areas participated as nonattainment-deferred. This meant that their effective date of designation as nonattainment would have been June 15, 2004; however, EPA deferred this date because of their participation in the EAC Program. The remaining fifteen areas met the ozone NAAQS and were designated attainment, but were close to violating the standard and were looking to voluntarily adopt programs to avoid becoming nonattainment in the future.

Table ES-1: Twenty-Nine Participating EAC Program Areas

Nonattainment Deferred Areas (14)	Attainment Areas (15)
Berkeley and Jefferson Counties, West Virginia*	Austin, Texas*
Chattanooga, Tennessee-Georgia*	Berkeley-Charleston-Dorchester, South Carolina*
Columbia, South Carolina (Central Midlands Area)*	Catawba, South Carolina
Denver-Boulder-Greeley-Fort Collins-Loveland, Colorado*	Longview/Northeast, Texas
Fayetteville, North Carolina (Cumberland County)*	Low Country, South Carolina
Frederick County, Virginia*	Lower Savannah-Augusta, South Carolina-Georgia*
Greensboro-Winston Salem-High Point, North Carolina (Triad Area)*	Mountain Area of Western North Carolina (Asheville)*
Greenville-Spartanburg-Anderson, South Carolina (Appalachian Area)*	Oklahoma City, Oklahoma*
Hickory-Morganton-Lenoir, North Carolina (Unifour Area)*	Pee Dee, South Carolina
Johnson City-Kingsport-Bristol, Tennessee*	San Juan County, NM
Nashville, Tennessee*	Santee Lynches, South Carolina
Roanoke, Virginia*	Shreveport/Bossier City, LA
San Antonio, Texas*	Tulsa, Oklahoma*
Washington County, Maryland (Hagerstown)*	Upper Savannah Abbeville-Greenwood, South Carolina
	Waccamaw, South Carolina

Source: http://www.epa.gov/ttn/naaqs/ozone/eac/index.htm#EAC_Main.
*Indicates the 20 areas included in this study.

INFORMATION COMPILATION APPROACH

This study examined both environmental and program design aspects of the EAC program. The environmental aspects of the program included:

- Changes in air quality;
- Estimated emissions reductions from control measures;
- Estimates made in State Implementation Plan (SIP) air quality modeling; and
- Growth-related issues.

The design aspects of the study of the program included:

- Efficiency of the EAC Program;
- Longer term impact of the program;
- Extent of outreach and stakeholder interaction; and
- Other aspects of the program.

The study examined all 14 "nonattainment deferred" and six of the 15 "attainment" EAC Program areas (see Table ES-1). The six attainment areas were selected based on geographic diversity and the availability of relevant data. As part of the study, EPA gathered information on air quality and control measure emissions reductions, among other data. Discussions were also held with state agencies from all 12 states that participated in the program, as well as local agencies in six of the 14 nonattainment-deferred areas and in three of the 15 attainment areas that also participated in the program. EPA also

consulted with representatives from two non-EAC Program areas and the states in which they are located to provide additional perspectives.

The qualitative information and observations developed from discussions with state and local agencies reflect the views of the individuals consulted. So, in that sense, the information gained was somewhat subjective and should be interpreted in that light. But, to some degree, the information obtained was consistent enough such that it could be generalized to other EAC areas. The program design areas in particular were addressed in a qualitative manner because they did not lend themselves easily, if at all, to quantitative measurement. Ideally, for example, it would have been beneficial to be able to develop a questionnaire to answer some of the study's questions. Because that was not feasible in the time available for the study, EPA held informal discussions, which, though not ideal, yielded useful information. State and local agencies provided insights, positive and negative, on the EAC Program.

LIMITATIONS OF THIS STUDY

This report is not a formal program evaluation and has several limitations. Specifically, the study did not:

- Compare emission reductions of EAC areas versus non-EAC areas in terms of both quantities and implementation timeframes;
- Study air quality for EAC areas past 2007; and
- Rigorously compare EAC areas with non-EAC areas with respect to certain key areas, such as:
    - Program design-related concerns (e.g., program efficiency)
    - Control measure implementation.

KEY OBSERVATIONS RESULTING FROM THE STUDY

Because of the study's limitations, it is difficult to draw hard findings and conclusions. However, the study was able to make a number of observations about emission reductions, changes in air quality, and issues related to program design and process.

Overall, a number of states in the Northeast had serious concerns about the approach. The EAC program was generally popular with participating state and local officials. These officials indicated the EAC Program model provided the right combination of incentives, flexibility, and structure and was used to foster a collaborative environment that:

1) Encouraged local stakeholders to take ownership of the ozone air quality issue and to develop and adopt local measures;
2) Increased awareness of ozone air quality issues with key stakeholders and, to a degree, with the public; and
3) Helped establish working relationships between state environmental agencies and local government that may prove beneficial for future implementation of air quality standards.

Emission Reductions

For the vast majority of the areas included in this study, the EAC Program appeared to successfully encourage the development and adoption of quantifiable, local emission reduction control measures by the December 2005 deadline. Ninety-six percent of the total 388 measures implemented for the 20 areas included in the study were implemented by the EAC December 2005 deadline, according to EAC progress reports and SIPs. Estimated emission reductions from local measures collectively constituted an estimated nine percent or more of quantified nitrogen oxides (NO_x)and volatile organic compounds

(VOC) emissions reductions in seven of 18 EAC Program areas included in this study for which complete emissions reductions data were available (the remaining reductions were achieved from national and state measures). The local measures were "directionally correct" and should assist the areas in maintaining the ozone NAAQS.

According to many state and local officials, the program also resulted in quantifiable emission co-reductions of other pollutants, including particulate matter and/or air toxics.

Air Quality

The study analyzed the air quality improvements experienced by EAC Program areas in the eastern U.S. by comparing them to improvements achieved in nearby nonattainment areas that did not participate in the EAC program. (This could not be analyzed in the Colorado, Oklahoma and Texas EAC areas, because there were not ozone nonattainment areas located near enough to provide a comparison.) The analysis found that the changes in air quality in eastern EAC Program areas were consistent with those observed in non-EAC areas. Additionally, consistent with the expectation that most progress towards ozone attainment in the East would come generally from national measures such as vehicle standards and power plant controls, it appears that, based on air quality data, local EAC measures adopted and implemented in EAC Program areas in the East did not produce an early, demonstrable incremental improvement in air quality. Relative to non-EAC Program areas, the information compiled appears to indicate that, for EAC areas in the East, progress toward meeting the air quality standards on time was not adversely affected by two factors: (1) the absence of some or all of the nonattainment area requirements that traditional nonattainment areas face, or (2) population and vehicle miles traveled growth that most of the areas experienced during EAC Program implementation. Relative to non-EAC Program areas, these two factors also did not appear to adversely affect the ability of EAC areas in the East to attain the NAAQS by December 2007 (or earlier for many EAC areas).

The fact that local measures did not produce an early, demonstrable incremental improvement in air quality can be explained in part by the fact that quantified NO_x and VOC emissions reduction estimates from *local* EAC measures represented a small part of emissions overall: (1) in EAC Program areas; (2) in states in which they are located, and (3) as compared to reductions achieved in each state through the NO_x SIP call. The best way to measure the impact on air quality of the EAC local measures – and whether they contributed to the areas attaining early – would be to conduct incremental air quality modeling of the emissions reductions from those measures. Short of that, the reductions are so small relative to the emission reductions from federal and state measures that their impact is indiscernible.

All but one of the EAC areas did attain the ozone NAAQS by December 31, 2007; in fact, 15 of the 20 EAC areas attained the 8-hour ozone NAAQS by December 31, 2004 – prior to the required 2005 implementation date for the EAC control measures.

This study looked at ozone air quality through 2007. And while almost all the EAC areas met the ozone NAAQS before 2007, it remains to be seen what will happen to ozone air quality levels in these areas as they grow in the next 5 to 10 years. Ozone air quality in many of the areas will continue to be influenced by, among other things, state and national programs to reduce NO_x and VOCs. Some state and local officials believe that local measures should benefit air quality in the future. EAC Program areas were required to develop plans to demonstrate how they would address emissions growth and maintain meeting the ozone NAAQS for five years (to 2012). They did so, and almost all the states in the southeastern U.S (EPA Region 4) with EAC Program areas submitted maintenance plans for 10 years.

The study also looked at whether the air quality modeling provided insight into what degree the "local" EAC measures contributed to additional improvements in air quality, beyond the improvements provided by the state and national measures. The only reliable way to quantify the air quality improvements from the EAC local measures is to model the local measures independently of the state and national measures. But the modeling performed for the EAC SIPs did not provide such an analysis. For this study the information available only allows for a review of whether the actual air quality improvement achieved is consistent with the level of improvement predicted by the model. After making this comparison, this study observes that the estimates in the modeled demonstration are consistent with the air quality achieved. Therefore, the modeling provided reasonable information.

It was beyond the scope of this study to analyze the improvements in short-term or long-term air quality that would have otherwise occurred in the affected EAC areas if they had followed the traditional requirements under the CAA associated with a nonattainment designation. For example, several of the nonattainment-deferred areas experienced new stationary source activity that may have been subject to permitting requirements under the CAA nonattainment NSR program had the same activities been undertaken while these areas had a designation of nonattainment. The proposed emissions increases for some of those sources were controlled under the CAA's Prevention of Significant Deterioration Program. As noted above, this study did not quantify emission changes in EAC versus non-EAC areas and is, therefore, unable to provide information on the impact on emissions of the absence in EAC areas of some or all of the nonattainment area requirements that traditional nonattainment areas face, including those of the Nonattainment NSR Program.

State and local agencies consulted did believe the EAC approach to be well suited for nonattainment-deferred areas that were new to the ozone air quality issue and had ozone air quality levels relatively close to the standard. Those areas did not face the same degree of ozone air quality challenge faced by some of the nation's largest areas and so, in that regard, their air quality problems were more manageable. EAC Program participants in these areas took ownership of their air quality problem in a way that was not likely, in the opinion of the state and local agencies consulted, to have occurred to the same degree under the traditional approach, absent a concerted EAC-type effort or unless the community was already active on environmental issues.

Program Design and Process

Some EAC Program areas did not experience the "collaborative environment" the EAC Program model fostered in other EAC Program areas. Based on the study discussions, several possible reasons emerged to help explain this:

- Insufficient technical support for EAC Program areas from EPA and the states;
- Insufficient state or local agency leadership to help start and/or shepherd the EAC Program process;
- Lack of public interest due to insufficient information about local air quality issues; and
- Ozone air quality problem believed to be solvable due to state and national measures alone so there was not much action perceived to be needed locally.

The state and local agencies implementing the EAC Program reported that, in order to succeed, the EAC program needed (1) the threat of reinstatement of the nonattainment designation as the consequence of failure to meet EAC Program requirements and (2) for the EAC Program to be part of the larger SIP

program. The majority of state and local agencies consulted believed that states and local areas needed motivation to participate in the program for it to succeed.

The EAC Program required as much EPA staff resources or less than the staff resources EPA estimated would have been needed to implement the regular program for the same areas. The question of whether the EAC Program saved estimated human resources varied by EPA region. The study lacked data to assess the resource impact of the EAC program on the participating state and local agencies.

Details on specific quantitative and qualitative observations on environmental impacts and program design-related issues can be found in Section 3.0 of this report.

HOW THIS REPORT IS ORGANIZED

This report contains four sections. Section 1.0 provides background on the EAC Program, including some of its history and why some states supported and other states and environmental groups opposed the program. Section 2.0 describes the quantitative and qualitative information compilation approach used to conduct the study of the program. Section 3.0 presents a summary of the study information, as well as observations based on that information. The appendices include numerous data tables, lists of state and local agencies consulted, and a complete summary of discussions with state and local agency officials.

SECTION 1.0 BACKGROUND ON THE EARLY ACTION COMPACT PROGRAM

This section provides background on the Early Action Compacts (EAC) Program, including: (1) a brief history; (2) why some states supported the program and other states and environmental groups opposed it; and (3) why the United States Environmental Protection Agency's (EPA's) Office of Policy Analysis and Review (OPAR) and Office of Air Quality Planning and Standards (OAQPS) decided to undertake this study.

1.1 Origin of the EAC Program

The Clean Air Act (CAA) establishes a process for air quality management through the National Ambient Air Quality Standards (NAAQS). Area designations are required after promulgation of a new or revised NAAQS. In 1979, EPA promulgated the 0.12 parts per million (ppm), 1-hour ozone standard. On July 18, 1997, EPA promulgated a revised ozone standard of 0.08 ppm, measured over an 8-hour period (i.e., the 1997 8-hour standard.)[1] The 8-hour standard is more protective of public health and, thus, more stringent than the 1-hour standard. In 2008, the Agency further tightened the 8-hour ozone standard. (In this document, when references are made to the 8-hour standard it applies to the 0.08 ppm standard promulgated in 1997.) The 1997 NAAQS rule was challenged by numerous litigants and, in May 1999, the U.S. Court of Appeals for the District of Columbia Circuit (D.C. Circuit) issued a decision remanding, but not vacating, the 8-hour ozone standard. The EPA sought review of two aspects of that decision in the U.S. Supreme Court. In February 2001, the Supreme Court upheld EPA's authority to set the NAAQS and remanded the case back to the D.C. Circuit for disposition of issues the Court did not address in its initial decision. Whitman v. American Trucking Association, 121 S.Ct. 903, 911-914, 916-919 (2001)(Whitman). The Supreme Court also remanded the 8-hour implementation strategy to EPA. In March 2002, the D.C. Circuit rejected all remaining challenges to the 8-hour ozone standard. American Trucking Assoc. v. EPA, 283 F.3d355 (D.C. Cir. 2002).

The process for designations following promulgation of a NAAQS is contained in section 107(d)(1) of the CAA. For the 8-hour NAAQS, the Transportation Equity Act for the 21st Century (TEA-21) extended by one year the time for EPA to designate areas under the 8-hour NAAQS.[2] Thus, EPA was required to designate areas for the 8-hour NAAQS by July 2000. However, House Resolution 3645 (EPA's appropriation bill in 2000) restricted EPA's authority to spend money to designate areas until June 2001, or the date of the Supreme Court ruling on the standard, whichever came first. As noted earlier, the Supreme Court decision was issued in February 2001. In 2003, several environmental groups filed suit in district court claiming EPA had not met its statutory obligation to designate areas for the 8-hour NAAQS. The EPA entered into a consent decree that required EPA to issue the designations by April 15, 2004.[3]

During this period, in the early 2000s, some state, local and tribal air pollution control agencies expressed an interest in added flexibility in implementing the 8-hour ozone NAAQS, including incentives for taking action sooner than the CAA required for reducing ground level ozone. Some of these agencies were particularly interested in early planning and implementation to avoid the nonattainment designation and

[1] "National Ambient Air Quality Standards for Ozone," 62 Federal Register 38856, http://www.epa.gov/ttn/naaqs/standards/ozone/data/19970718_o3naaqs.pdf, July 18, 1997.
[2] CAA section 107(d)(1); TEA-21 section 6103(a).
[3] "Air Quality Designations and Classifications for the 8-Hour Ozone National Ambient Air Quality Standards; Early Action Compact Areas with Deferred Effective Dates," 69 Federal Register 23858-23951, http://www.epa.gov/ttn/naaqs/ozone/eac/fr_69(84)_23858.pdf, April 30, 2004.

the various CAA requirements associated with being designated nonattainment (e.g., Conformity and Nonattainment New Source Review (NSR) Programs) that they were going to face in 2004 with EPA area designations. The concept for an EAC program required local areas to make decisions to achieve reductions in volatile organic compounds (VOCs) and nitrogen oxides (NO_x) emissions sooner than otherwise mandated by the CAA. It was assumed that early planning and early implementation of control measures that improved air quality would provide early protection of public health. Environmental groups supported efforts to improve air quality sooner, but had serious concerns about the EAC Program. Some states, supported efforts that afforded flexibility in achieving their clean air goals but did not support the EAC Program per se. They believed that EPA could not relieve areas of nonattainment area requirements under title I, part D of the CAA when such areas were in violation of the standard at the time EPA designated areas. (These concerns are discussed in greater depth in Section 1.6 below.)

In March 2002, the Texas Commission on Environmental Quality (TCEQ) encouraged EPA to consider incentives for early planning towards achieving the 8-hour ozone NAAQS. The TCEQ submitted to EPA the "Protocol for Early Action Compacts Designed to Achieve and Maintain the 8-hour Ozone Standard (the Protocol)."[4] The Protocol was designed to achieve NO_x and VOC emissions reductions for the 8-hour ozone NAAQS sooner than would otherwise be required under the CAA. The TCEQ recommended that the Protocol be formalized by ''early action compact'' agreements to be developed primarily by local, state and EPA officials. The principles of the compacts, as described in the Protocol, were as follows:

- Early planning, implementation, and emissions reductions leading to expeditious attainment and maintenance of the 8-hour ozone standard;
- Local control of the measures employed, with broad-based public input;
- State support to ensure technical integrity of the early action plan;
- Formal incorporation of the early action plan into the State Implementation Plan (SIP);
- Designation of all areas as attainment or nonattainment in April 2004, but, for compact areas, deferral of the effective date of the nonattainment designation and/or designation requirements so long as all compact terms and milestones continue to be met; and
- Safeguards to return areas to traditional SIP attainment requirements should compact areas fail to meet program terms (e.g., if the area fails to attain in 2007), with appropriate credit[5] given for reduction measures already implemented.

In a letter dated June 19, 2002, from Gregg Cooke, Administrator, Region 6, to Robert Huston, Chairman, TCEQ, EPA endorsed the principles outlined in the Protocol.[6] The Protocol was subsequently revised on December 11, 2002, based on comments from EPA. The Protocol specified certain components that compacts had to address, including the development of local air quality plans and the following elements:

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[4] http://www.epa.gov/ttn/naaqs/ozone/eac/20020619_eac_protocol.pdf

[5] In the EAC context "credit" is discussed in a guidance Q and A that EPA issued under the heading of "SIP credit": "Question: If an area implements controls under an MOA or Compact, will those reductions be able to be counted as control measures under a subsequent attainment SIP, if one is required?
Response: The 8-hour "Compact" is the Memorandum of Agreement. Reductions from any control measures implemented under the 8-hour Early Action Compact and approved into the SIP can be credited towards a subsequent attainment SIP, if one is required (see memorandum from John S. Seitz, Director, Office of Air Quality Planning and Standards, to Gregg Cooke, Regional Administrator, Region VI, dated January 29, 2001, "Near-Term Discretionary Emission Reductions for Ozone NAAQS–Clarification.")," http://www.epa.gov/oar/eac/faq.html.

[6] http://www.epa.gov/ttn/naaqs/ozone/eac/20020619_eac_protocol.pdf

- Completion of emissions inventories and modeling (based on most recent Agency guidance) to support selection of local control measures;
- Adoption of control strategies that demonstrate attainment and that are submitted as a revision to the SIP;
- Completion of a maintenance component to address emissions growth at least five years beyond December 31, 2007, ensuring that the area will remain in attainment of the 8-hour ozone standard during that period;
- Public involvement in all stages of planning and implementation, including public education programs and a process that ensures stakeholder involvement and public participation in planning local strategies and reviewing air quality plans; and
- Semiannual reports detailing progress toward completion of compact milestones.

1.2 What EPA Required of Compact Areas

Based on the Protocol, EPA issued Agency guidance[7] that established parameters for entering into a compact. To be eligible as an EAC area, areas had to be designated attainment for the 1-hour ozone standard[8] and be in attainment with that standard when entering into the compact. Air quality in qualifying EAC Program areas could approach or violate the 8-hour ozone standard[9] at the time of the agreement, but the area would need to demonstrate that it would attain that standard by December 31, 2007.

EPA's EAC guidance memorandum specified that compacts had to be completed, submitted to EPA and signed by local, state and EPA officials by December 31, 2002. Each EPA Regional Administrator (or designee) was a signatory on the compact agreement. Although these compacts alone did not constitute EPA-approved SIP revisions, EPA's signature indicated the Agency's support and willingness to honor the commitments established in these agreements, provided the areas met all components of the Protocol and acted consistently with Agency guidance and schedules. No additional areas were allowed to enter into compacts after December 31, 2002.

The EPA guidance described several features of the EAC Program:

- Laid out the process by which compact areas would select control strategies based on SIP quality modeling that showed attainment of the 8-hour ozone standard no later than December 31, 2007;
- No later than December 31, 2004 states and tribes were to submit to EPA a SIP or Tribal Implementation Plan consisting of the local EAC plan, including all adopted control measures, and a demonstration that the area will attain the 8-hour ozone standard by December 31, 2007;

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[7] (1) Memorandum from Jeffrey R. Holmstead, Assistant Administrator, Office of Air and Radiation, "Schedule for 8-Hour Ozone Designations and its Effect on Early Action Compacts," http://www.epa.gov/ttn/naaqs/ozone/eac/designation_eac_20021114.pdf, November 14, 2002 and (2) Memorandum from Lydia N. Wegman, Director, Air Quality Strategies and Standards Division, Office of Air Quality Planning and Standards, ''Early Action Compacts (EACs): The June 16, 2003 Submission and Other Clarifications,'' http://www.epa.gov/ttn/naaqs/ozone/eac/6-16-2003_eac_milestone_memo.pdf, April 4, 2003.

[8] The 1-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 parts per million is equal to or less than 1 (see 40 CFR part 50.9 and Appendix H).

[9] The 1997 8-hour ozone standard is met when the 3-year average of the annual fourth-highest daily maximum 8-hour average ozone concentration is less than or equal to 0.08 ppm 1 (see 40 CFR part 50.9 and Appendix I).

- Indicated that all compact areas were to submit a local plan by March 31, 2004 that included measures that were specific, quantifiable, permanent, and that, if approved into the SIP by EPA, would be federally enforceable
    - The March 31, 2004 submission had to include specific implementation dates for the local controls, as well as detailed documentation supporting the selection of measures
    - Deadline for plan submission was approximately 30 months earlier than would have otherwise been required by the CAA;
- Local controls were to be implemented by the 2005 ozone season (or no later than December 31, 2005). This deadline was at least 16 1⁄2 months earlier than would have otherwise been required by the CAA; and
- Reports were to be submitted every six months to describe progress toward completion of milestones.
    - In June 2006, compact areas were to submit a report to EPA that described the implementation of control measures, as well as an assessment of reductions in emissions and resultant improvement in air quality.

EPA EAC guidance[10] with respect to the attainment demonstrations due by December 2004 indicated that state and local agencies should do the following:

- Follow the most recent OAQPS modeling guidance ("Draft Guidance on the Use of Models and Other Analyses in Attainment Demonstrations for the 8-hour Ozone NAAQS," May 1999, EPA-454/R-99-004);
- Model most current emissions inventory, preferably 2002 (however, if 2002 was not available, use of a 1999 or later inventory for EAC modeling was acceptable);
- Base 2007 projections on 1999 emissions inventory or later;
- Use MOBILE6 in both the current and future inventories;
- Select episodes representative of the area's ozone problem; and
- Use appropriate assumptions and emissions analysis techniques in quantifying emissions reductions.

Table 1-1 describes the milestones and submissions that compact areas were to complete to continue eligibility for a deferred effective date of the nonattainment designation for the 8-hour ozone standard, which is further described in Section 1.4 below. (The EAC milestones and requirements were issued as a regulation on April 30, 2004.[11])

[10] (1) Memorandum from Lydia N. Wegman, Director, Air Quality Strategies and Standards Division, Office of Air Quality Planning and Standards, ''Early Action Compacts (EACs): The June 16, 2003 Submission and Other Clarifications,'' http://www.epa.gov/ttn/naaqs/ozone/eac/6-16-2003_eac_milestone_memo.pdf, April 4, 2003; (2) "Draft Guidance on the Use of Models and Other Analyses in Attainment Demonstrations for the 8-Hour Ozone NAAQS," U.S. Environmental Protection Agency, EPA-454/R-99-004, May 1999; and (3) "Frequently Asked Questions on Implementing the DRAFT 8-Hour Ozone Modeling Guidance to Support Attainment Demonstrations for Early Action Compact (EAC)," U.S. Environmental Protection Agency, http://www.epa.gov/scram001/guidance/guide/eac-ozone.pdf.

[11] "8-Hour Ozone National Ambient Air Quality Standards; Final Rules," 69 Federal Register 23858-23951, 23875-76, http://www.epa.gov/ttn/naaqs/ozone/eac/fr_69(84)_23858.pdf, April 30, 2004; and 40 Code of Federal Regulations 81.300(e).

Table 1-1: EAC Milestones

Compact Milestone	Submittal Date
Submit Compact for EPA signature.	December 31, 2002
Submit preliminary list and description of potential local control measures under consideration.	June 16, 2003
Submit complete local plan to state (includes specific, quantified and permanent control measures to be adopted).	March 31, 2004
State submits adopted local measures to EPA as a SIP revision that, when approved, will be federally enforceable.	December 31, 2004
Implement SIP control measures.	2005 ozone season (or no later than December 31, 2005)
State reports on implementation of measures and assessment of air quality improvement and reductions in NO_x and VOC emissions to date.	June 30, 2006
Area attains 8-hour ozone NAAQS.	December 31, 2007

Source: "Air Quality Designations and Classifications for the 8-Hour Ozone National Ambient Air Quality Standards; Early Action Compact Areas with Deferred Effective Dates," 69 Federal Register 23858-23951, 23865, http://www.epa.gov/ttn/naaqs/ozone/eac/fr_69(84)_23858.pdf, April 30, 2004.

1.3 Areas that Participated in the EAC Program

Many areas were interested in participating in the EAC Program. Some areas that showed initial interest decided not to pursue participation in the program or were ineligible for different reasons such as the applicant could not meet the deadline (December 2002) for submitting a signed compact agreement or their application did not meet all of the criteria described in EPA guidance. Thirty-one areas from 12 states submitted signed compact agreements by December 2002 and 29 of those areas ultimately participated fully in the program (two areas withdrew from the program prior to submitting an EAC SIP). Table 1-2 lists all of the participating areas at the end of the program. Fourteen of those areas were "nonattainment-deferred" which meant that EPA would have designated them nonattainment with an effective date of June 15, 2004 had they not participated in the EAC Program. Fifteen of the areas that participated were designated "attainment" with an effective date of June 15, 2004. The nonattainment-deferred areas were in the mid-Atlantic and southeastern regions, except for San Antonio, Texas. Nine of the 15 attainment areas were in the southeast, eight of which were in South Carolina. The remaining six areas were spread across Texas, Oklahoma, New Mexico and Louisiana.

Table 1-2: Twenty-Nine Participating EAC Program Areas

Nonattainment Deferred Areas (14)	Attainment Areas (15)
Berkeley and Jefferson Counties, West Virginia	Austin, Texas
Chattanooga, Tennessee-Georgia	Berkeley-Charleston-Dorchester, South Carolina
Columbia, South Carolina (Central Midlands Area)	Catawba, South Carolina
Denver-Boulder-Greeley-Fort Collins-Loveland, Colorado	Longview/Northeast, Texas
Fayetteville, North Carolina (Cumberland County)	Low Country, South Carolina
Frederick County, Virginia	Lower Savannah-Augusta, South Carolina-Georgia
Greensboro-Winston Salem-High Point, North Carolina (Triad Area)	Mountain Area of Western North Carolina (Asheville)
Greenville-Spartanburg-Anderson, South Carolina (Appalachian Area)	Oklahoma City, Oklahoma
Hickory-Morganton-Lenoir, North Carolina (Unifour Area)	Pee Dee, South Carolina
Johnson City-Kingsport-Bristol, Tennessee	San Juan County, NM
Nashville, Tennessee	Santee Lynches, South Carolina
Roanoke, Virginia	Shreveport/Bossier City, LA
San Antonio, Texas	Tulsa, Oklahoma
Washington County, Maryland (Hagerstown)	Upper Savannah Abbeville-Greenwood, South Carolina
	Waccamaw, South Carolina

Source: http://www.epa.gov/ttn/naaqs/ozone/eac/index.htm#EAC_Main.

1.4 Action EPA Undertook To Defer the Effective Date of Nonattainment Designation for the EAC Areas

At the time EPA designated areas for the 8-hour ozone standard in April 2004,[12] EPA took final action deferring the effective date until September 30, 2005 of the nonattainment designation for the 14 participating compact areas that were monitoring a violation of the 8-hour ozone standard. The EPA took action because all terms of the agreement continued to be met up to that point, including timely completion of all compact milestones and reports. Subsequently, through notice-and-comment rulemaking, EPA further deferred the effective date, based upon a determination that the areas continued to meet all compact milestones the time of the action. Table 1-3 provides the deferred effective date adopted in each of the Federal Register actions for the 14 areas.

Table 1-3 also includes the effective dates that were specific to the Denver, Colorado EAC Program area. On November 29, 2006, EPA extended the deferred effective date for Denver from December 31, 2006 to July 1, 2007. In that final rulemaking, EPA noted that it would further extend the deferred effective date to as late as April 15, 2008, which was the then-applicable effective date for the other 13 areas, once Denver addressed certain issues with its EAC. The action extending the deferral to July 2007 was challenged by Rocky Mountain Clean Air Action (RMCAA), which had also challenged the August 16, 2007 deferral as it applied to the Denver EAC Program Area. EPA issued a short further deferral to preserve the status quo as settlement discussion with RMCAA continued, extending the deferral date from July 1, 2007 to September 14, 2007. At the conclusion of settlement discussions, EPA extended the deferral of the effective date to November 20, 2007. Because EPA determined that the Denver area violated the 0.08 ppm, 8-hour ozone NAAQS based on air quality data from 2005 through the first three

[12] "8-Hour Ozone National Ambient Air Quality Standards; Final Rules," 69 Federal Register 23858-23951, http://www.epa.gov/ttn/naaqs/ozone/eac/fr_69(84)_23858.pdf, April 30, 2004; and in subsequent Federal Register notices provided on http://www.epa.gov/ttn/naaqs/ozone/eac/index.htm#RMNotices.

quarters of 2007, the nonattainment designation for the Denver EAC was not further extended and it took effect on November 20, 2007. After concluding that the remaining 13 EAC Program areas had attained the 8-hour ozone NAAQS based on air quality data from 2005-2007, on March 27, 2008 the EPA Administrator signed a final action designating those 13 EAC Program areas as attainment, effective April 15, 2008.[13]

Table 1-3: EPA Actions Deferring Effective Date of Nonattainment Designation

Deferral	Final Rule Date (EPA Administrator Signature)	Deferred Effective Date
1st	April 15, 2004	September 30, 2005
2nd	August 16, 2005	December 31, 2006
3rd	November 22, 2006	April 15, 2008 July 1, 2007 (Denver, Colorado)
4th	June 22, 2007	September 14, 2007 (Denver, Colorado)
5th	September 14, 2007	November 20, 2007 (Denver, Colorado)

Source: http://www.epa.gov/ttn/naaqs/ozone/eac/index.htm#EAC_Main.

1.5 How EPA Addressed Compact Areas Attaining the 8-Hour Ozone Standard in April 2004

Compact areas not violating the 8-hour ozone standard based on the most recent air quality data available (generally data from 2001–2003) were designated unclassifiable/attainment in the April 2004 designation action and the unclassifiable/attainment designation became effective on June 15, 2004. EPA encouraged unclassifiable/attainment areas that had joined the EAC Program to continue to develop clean air plans and to remain committed to the compact program to ensure air quality remained clean. Seventeen such areas decided to participate in the program; however, two areas (Haywood County, Tennessee and Putnam County, Tennessee) later withdrew from the program. If an area designated unclassifiable/attainment in April 2004 participating in the EAC Program subsequently violated the 8-hour ozone standard during the term of the compact, EPA had the discretion (under section 107(d)(3) of the CAA) to redesignate the area to nonattainment, as it does with any unclassifiable/attainment areas following designations.

1.6 Concerns About and Legal Challenges to the EAC Program

A number of environmental groups and states had significant concerns with the EAC program. This section describes concerns expressed by outside parties in formal comments on EPA Federal Register actions, EPA's response to them and the chronology of events concerning legal challenges to the EAC program.

Many commenters on EPA's initial designations notice expressed support for the compact process, the goal of clean air sooner, the incentives and flexibility the program provides for encouraging early reductions of ozone-forming pollution, and the deferred effective date of nonattainment designation.[14]

[13] "Final 8-Hour Ozone National Ambient Air Quality Standards Designations for the Early Action Compact Areas," 64 Federal Register 17897, http://www.epa.gov/ttn/naaqs/ozone/eac/fr20080327_eac.pdf, April 2, 2008.

[14] "Deferral of Effective Date of Nonattainment Designations for 8-Hour Ozone National Ambient Air Quality Standards for Early Action Compact Areas," 68 Federal Register 70108-70119, http://www.epa.gov/ttn/naaqs/ozone/eac/fr_68(241)_70108.pdf, December 16, 2003. See "Response to Public Comments—Early Action Compacts for Implementing the 8-hour Ozone National Ambient Air Quality Standards for Early Action Compact Areas," Docket No. OAR-2003-0090-0278, April 15, 2004.

However, a number of commenters opposed the EAC program. Several of these commenters expressed concern about the legality of the program and primarily about the deferral of the effective date of the nonattainment designation for these areas. Although all of these commenters were supportive of the goal of addressing proactively the public health concerns associated with ozone pollution, the commenters stated that the EAC program was not authorized by the CAA. All of these commenters indicated that EPA lacked authority under the CAA to defer the effective date of a nonattainment designation. In addition, these commenters stated that EPA lacked the authority to enter into EACs and lacked authority to allow areas to be relieved of obligations under title I, part D of the CAA while these areas were violating the 8-hour ozone standard or were designated nonattainment for that standard.

In response, EPA continued to believe that the compact program, as designed, will give local areas the flexibility to develop their own approach to meeting the 8-hour ozone standard, provided the participating communities are serious in their commitment to control emissions from local sources earlier than the CAA would otherwise require. By involving diverse stakeholders, including representatives from industry, local and state governments, and local environmental and citizens' groups, a number of communities were discussing for the first time the need for regional cooperation in solving air quality problems that affect the health and welfare of its citizens. EPA stated that people living in these areas that realize reductions in pollution levels sooner will enjoy the health benefits of cleaner air sooner than might otherwise occur. In the April 2004 rule EPA codified the specific requirements in part 81 of the CFR to clarify what is required of compact areas to be eligible for deferral of the effective date of their nonattainment designation and what actions EPA intends to take in response to areas that meet the milestones and areas

In addition, in response to environmental groups' concerns, the EPA entered into discussions with those environmental groups. The EPA sought to address their concerns by incorporating several safeguards into the program to ensure the accountability of EPA and participating state and local agencies. The safeguards included: bi-annual progress reports; periodic milestones; and, requiring state and local agencies to identify measures that would produce meaningful emissions reductions.

Several parties filed a lawsuit claiming EPA had not designated areas within the timeframe required by the CAA. In a March 13, 2003 consent decree between EPA and the parties who filed the challenge, the EPA agreed to sign a notice by April 15, 2004 promulgating the 8-hr ozone designations and to publish that action by April 30, 2004. In addition, the environmental groups and EPA agreed to meet periodically to discuss ways to encourage areas that approach or monitor minimal exceedances of the 8-hr standard to develop and implement early action plans offering a more expeditious time line for achieving emission reductions.

Upon promulgation of the 8-hour area designations, several environmental groups and some of the Northeastern states filed suit challenging EPA's deferral of the effective date of designation for the EAC areas. American Lung Assoc., et al., v. EPA (D.C. Cir. No. 04-1275). These same parties challenged each of the subsequent actions further deferring the effective date of designation and those subsequent cases were consolidated with the first. In addition to these actions by national environmental groups and Northeastern states noted above, RMCAA sued EPA specifically on the deferral for Denver, Colorado from November 29, 2006 to July 1, 2007. RMCAA v. EPA (D.C. Cir. 07-1012). As noted above, on November 29, 2006, EPA deferred designations for 13 EAC areas until April 15, 2008. EPA deferred the designation for Denver only until July 1, 2007, as it had not yet completed all of the necessary rulemaking. Subsequently, the measures were adopted. EPA settled the suit with RMCAA in 2007, by

which time Denver had measured a violation that ultimately resulted in the nonattainment designation taking effect on November 20, 2007. RMCAA had several comments[15] on EPA's proposed deferral of Denver's nonattainment designation, including:

- 2006 ozone levels have risen to unhealthy levels;
- Denver EAC has fallen short of achieving reductions in ozone precursors;
- Nowhere does the CAA allow deferrals of nonattainment designations; and
- If Denver violates the 8-hour ozone NAAQS in 2007, there is nothing that triggers an automatic nonattainment designation.

1.7 Federal Emissions Control Programs that Have Helped Improve Air Quality in EAC Areas

Amid the concerns and challenges discussed in the prior section, the EAC Program moved forward and was implemented with all but one of the 29 participating areas attaining the 1997 ozone NAAQS by the December 2007 deadline. The EAC areas were aided in reducing their ozone levels to a significant degree, as is true for many other ozone areas in the country, by implementation of several Federal programs to reduce emissions of NO_x, and to some degree VOCs. These programs include:

- NO_x SIP Call[16]
  - Compliance dates 2004-2007, depending on the state
  - Set NO_x budgets for electrical generation units, large industrial boilers, cement kilns and turbines in 20 Eastern states and Washington, D.C.
  - NO_x reductions of 880,000 tons per ozone season by 2007;
- Tier 2 Vehicle and Gasoline Sulfur Program[17]
  - Compliance dates 2004 for gasoline sulfur content and 2004–2009 for phase-in of new vehicle standards by model year
  - Covered gasoline sold nationwide and cars, light-duty trucks, and certain size sport utility vehicles sold outside California
  - Reduces NO_x and VOC emissions; and
- New Source Performance Standard and Emission Guidelines for Waste Combustion[18]
  - Compliance date 2005
  - Covered certain incinerators and municipal waste combustors nationwide
  - Reduced NO_x emissions by 16,283 tons per year in 2006.

These and other Federal programs helped to reduce ozone in the EAC Program areas – both locally-formed and transported ozone. Figure 1-1 provides a visual display of the benefit to ozone air quality for

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[15] "Final Extension of the Deferred Effective Date for 8-Hour Ozone National Ambient Air Quality Standards for the Denver Early Action Compact: Proposed Rule," http://www.epa.gov/ttn/naaqs/ozone/eac/fr_20070301_72(40)_9285_eac_4extend_deferred_date.pdf , March 1, 2007; Docket No. EPA–HQ–OAR–2003–0090, comment submitted by Jeremy Nichols, Director, Rocky Mountain Clean Air Action, April 2, 2007.

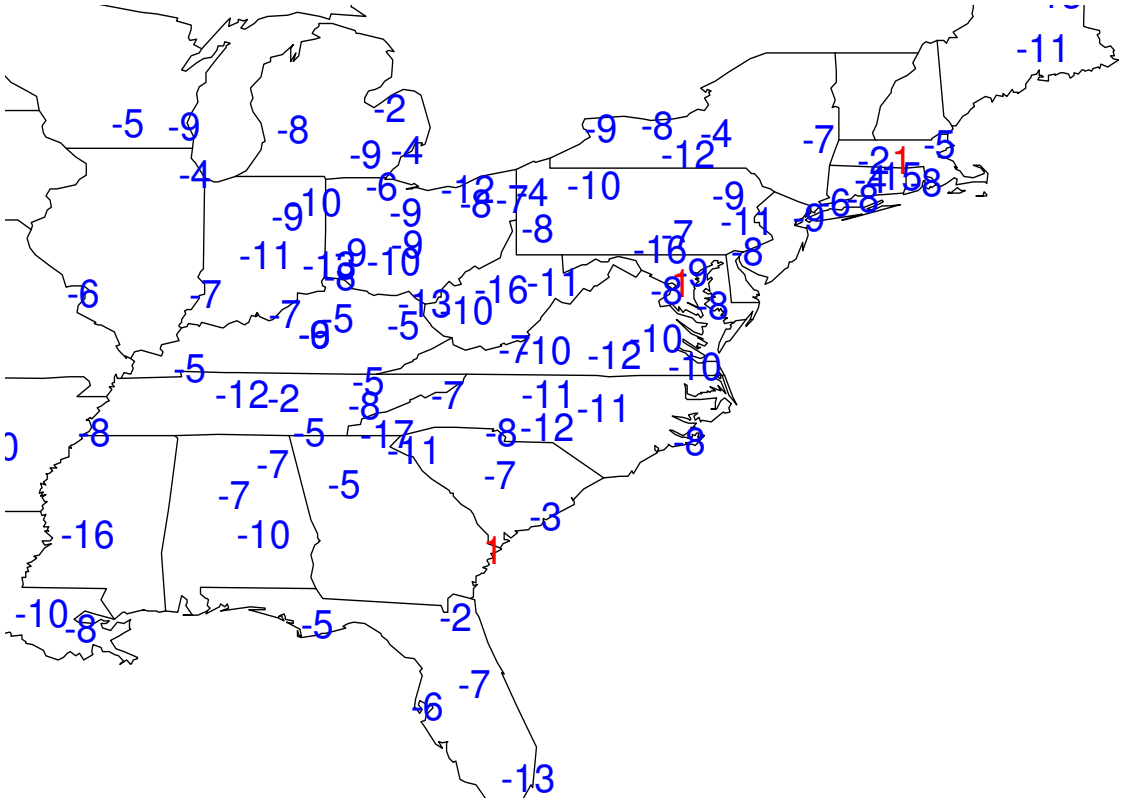
[16] "Finding of Significant Contribution and Rulemaking for Certain States in the Ozone Transport Assessment Group Region for Purposes of Reducing Regional Transport of Ozone," 63 Federal Register 57356, http://www.epa.gov/ttn/naaqs/ozone/rto/sip/index.html, October 27, 1998.

[17] "Control of Air Pollution From New Motor Vehicles: Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control Requirements," 65 Federal Register 6698-6870, http://www.epa.gov/tier2/finalrule.htm, February 10, 2000.

[18] "Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources: Other Solid Waste Incineration Units; Final Rule," 70 Federal Register 74870-74924, http://www.epa.gov/ttn/oarpg/t3/fr_notices/30600oswi_fr_note.pdf, December 16, 2005.

areas in the Eastern U.S. due, in part, to these control programs, particularly the NO_x SIP Call. The figure shows the change in seasonal 8-hour ozone averages adjusted for weather[19] from 2000-2002 to 2005-2007. The map shows the wide range of change across the East. The range spans a one percent deterioration in the seasonal 8-hour ozone average to a 17 percent improvement in the seasonal 8-hour ozone average. The impacts of NO_x reductions in the East have been assessed in three NO_x Budget Trading Reports that have been issued from 2003 to 2006.[20] See also Figure 3-1, which compares ozone reductions in EAC and non-EAC areas.

Figure 1-1: Percentage Change in Seasonal 8-Hour Ozone Average Air Quality from 2000-2002 to 2005-2007, Adjusted for Weather



Source: Analysis by the Air Quality Assessment Group, OAQPS, using the method described in Camalier, L., Cox, W., Dolwick, P., 2007. The effects of meteorology on ozone in urban areas and their use in assessing ozone trends. Atmospheric Environment 41, 7127-7137.

[19] The methodology used to adjust for weather is explained in section 3.1.1.
[20] http://www.epa.gov/airmarkets/progress/progress-reports.html.

SECTION 2.0 INFORMATION COMPILATION APPROACH

This section describes the study's information compilation approach, both quantitative and qualitative. It is important to note that the information compilation approach has several limitations because this report is not a formal program evaluation. Specifically, the study did not:

- Compare emission reductions of EAC areas versus non-EAC areas in terms of both quantities and implementation timeframes;
- Study air quality for EAC areas past 2007; and
- Rigorously compare EAC areas with non-EAC areas with respect to certain key areas, such as:
    - Program design-related concerns (e.g., program efficiency)
    - Control measure implementation.

2.1 Decision to Conduct EAC Study

Following the conclusion of the EAC program, EPA's OPAR and EPA's OAQPS undertook this study of the EAC program in order to learn what worked well and what did not with this community-based program, including whether EAC Program areas attained the ozone NAAQS early. EPA's intent was to then share that knowledge with leaders of programs that EPA and the states create to improve air quality in communities.

2.2 Scope of the Study

EPA staff, consulting with EPA management, determined that the quantitative component of the study should address all 14 of the "nonattainment deferred" and six of the 15 "attainment" EAC areas. The six attainment EAC Program areas were selected based on geographic diversity and availability of meteorological data. The attainment EAC Program areas were located in the Southeast and Southwest – EPA Regions 4 and 6 – so areas were selected from these two parts of the country for which meteorological data were available. (The availability of meteorological data was important for the air quality information compilation because it was needed in order to be able to remove the effects of weather when examining changes in seasonal 8-hour ozone air quality. Section 2.3.1 below provides a description of how the meteorological adjustments were made.) Qualitatively, the study addressed all 29 areas primarily by consulting state and local agencies from all 12 states that participated in the program, as well as six of the 14 nonattainment-deferred areas and three of the 15 attainment areas that also participated in the program. Information and observations from these discussions have been generalized and extrapolated to all EAC Program areas. To provide a qualitative comparison for these areas, two non-EAC Program areas and the states in which they are located were also consulted.

Table 2-1 provides a list of the 20 areas that were included in the study, along with their 2001-2003 8-hour ozone design values (DVs), 2001 population and vehicle miles traveled (VMT) and a breakout of NO_x and VOC emissions. (Appendix D also provides a brief profile of the 20 areas. More detailed information on population and VMT for the states in which these 20 areas are located can be found in Appendix B, Tables B-27 to B-30.)

Of the 14 nonattainment-deferred areas, some are rural with lower populations, such as Frederick County, Virginia, while others are medium sized – Chattanooga, Tennessee – and yet others are larger – Denver, Colorado and San Antonio, Texas. Eight-hour ozone DVs for 2001-2003 for the 14 areas were relatively close to the level of the 1997 standard with only one area above 0.090 ppm: Greensboro, North Carolina at 0.093 ppm. The mix of NO_x and VOC emissions varies from area to area.

Of the six attainment areas, one is rural with lower populations – Mountain Area of Western North Carolina (Asheville) – while three others are medium sized – Lower Savannah-Augusta, South Carolina-Georgia – and yet two others are larger – Austin, Texas and Oklahoma City, Oklahoma. Eight-hour ozone DVs for 2001-2003 for the six areas were at or below the level of the 1997 standard with two areas at 0.072 ppm or less. The balance among NO_x emissions sources and among VOC emission source types varies from area to area.

2.3 Refining the Study Scope

As the study scope was determined, EPA staff, consulting with EPA management, refined it by identifying the key areas the study would address. The following two subsections capture the essential issues that the study included.

2.3.1 Environmental Aspects of Study

Changes in Air Quality

The study analyzed changes in air quality in EAC Program areas (improvements or deteriorations), both not controlling and controlling for meteorology. One of the purposes of the study was to determine whether those changes were more, less, or the same as neighboring areas. The study also sought to determine what accounted for the changes.

Estimated Emissions Reductions from Control Measures

This study looked at to what degree "local" EAC measures contributed to any improvements in air quality in EAC Program areas. In addition, the following issues were investigated:

- What control measures (and how many of the total) had emissions reductions associated with them (and which did not) and how large were they;
- Which measures provided the greatest or least for overall emission reductions and the modeled attainment demonstration;
- Were all control measures actually implemented as required of the states;
- Were there environmental benefits as a direct result of the EAC activities for pollutants other than ozone; and
- Did areas implement temporary control measures that were later discontinued.

Table 2-1: Population, 8-Hour DVs and Emissions Information for the 20 Areas Included in this Study for Which Quantitative Information was Compiled

EAC Program Area	2002 Population*	2002 VMT*	2001-2003 DV (ppm)	2002 Emissions		
				NO_x	VOC	Source Type
Nonattainment Deferred Areas						
Berkeley and Jefferson Counties, West Virginia	126,357	1,279	0.086	30%	3%	Point
				7%	52%	Area
				37%	33%	Highway Vehicles
				27%	12%	Off Highway Vehicles
Chattanooga, Tennessee-Georgia	466,775	4,976	0.088	9%	6%	Point
				6%	44%	Area
				63%	37%	Highway Vehicles
				22%	13%	Off Highway Vehicles
Columbia, South Carolina (Central Midlands Area)	611,932	7,208	0.089	35%	9%	Point
				6%	50%	Area
				46%	27%	Highway Vehicles
				13%	13%	Off Highway Vehicles
Denver-Boulder-Greeley-Fort Collins-Loveland, Colorado	2,970,672	24,081	0.087	28%	37%	Point
				5%	26%	Area
				49%	26%	Highway Vehicles
				18%	12%	Off Highway Vehicles
Fayetteville, North Carolina (Cumberland County)	304,094	2,780	0.087	7%	9%	Point
				5%	40%	Area
				73%	42%	Highway Vehicles
				15%	9%	Off Highway Vehicles
Frederick County, Virginia	87,282	1,136	0.085	4%	16%	Point
				17%	40%	Area
				63%	23%	Highway Vehicles
				16%	21%	Off Highway Vehicles
Greensboro-Winston Salem-High Point, North Carolina (Triad Area)	1,471,869	16,351	0.093	47%	14%	Point
				3%	50%	Area
				40%	27%	Highway Vehicles
				10%	9%	Off Highway Vehicles

Table 2-1: Population, 8-Hour DVs and Emissions Information for the 20 Areas Included in this Study for Which Quantitative Information was Compiled

EAC Program Area	2002 Population*	2002 VMT*	2001-2003 DV (ppm)	2002 Emissions		
				NO_x	VOC	Source Type
Greenville-Spartanburg-Anderson, South Carolina (Appalachian Area)	1,053,490	10,887	0.087	13%	8%	Point
				10%	58%	Area
				59%	23%	Highway Vehicles
				18%	11%	Off Highway Vehicles
Hickory-Morganton-Lenoir, North Carolina (Unifour Area)	348,968	3,003	0.088	60%	37%	Point
				3%	31%	Area
				27%	23%	Highway Vehicles
				9%	9%	Off Highway Vehicles
Johnson City-Kingsport-Bristol, Tennessee	408,857	3,887	0.086	67%	33%	Point
				3%	36%	Area
				23%	24%	Highway Vehicles
				8%	7%	Off Highway Vehicles
Nashville, Tennessee	1,269,605	15,876	0.086	21%	13%	Point
				4%	36%	Area
				58%	35%	Highway Vehicles
				18%	16%	Off Highway Vehicles
Roanoke, Virginia	235,494	2,487	0.085	14%	6%	Point
				14%	53%	Area
				58%	34%	Highway Vehicles
				14%	7%	Off Highway Vehicles
San Antonio, Texas	1,654,839	14,967	0.089	28%	2%	Point
				8%	50%	Area
				49%	34%	Highway Vehicles
				15%	14%	Off Highway Vehicles
Washington County, Maryland (Hagerstown)	134,700	1,886	0.086	30%	5%	Point
				7%	51%	Area
				48%	33%	Highway Vehicles
				15%	12%	Off Highway Vehicles

Table 2-1: Population, 8-Hour DVs and Emissions Information for the 20 Areas Included in this Study for Which Quantitative Information was Compiled

EAC Program Area	2002 Population*	2002 VMT*	2001-2003 DV (ppm)	2002 Emissions		
				NO_x	VOC	Source Type
Attainment EAC Program Areas						
Austin, Texas	1,347,464	13,088	0.084	14%	2%	Point
				7%	48%	Area
				57%	34%	Highway Vehicles
				22%	17%	Off Highway Vehicles
Berkeley-Charleston-Dorchester, South Carolina	562,579	5,649	0.072	48%	10%	Point
				3%	46%	Area
				20%	23%	Highway Vehicles
				29%	21%	Off Highway Vehicles
Mountain Area of Western North Carolina (Asheville)	285,431	3,115	0.083	44%	12%	Point
				3%	38%	Area
				43%	35%	Highway Vehicles
				9%	15%	Off Highway Vehicles
Oklahoma City, Oklahoma	1,107,167	13,793	0.080	13%	4%	Point
				12%	45%	Area
				59%	39%	Highway Vehicles
				15%	11%	Off Highway Vehicles
Lower Savannah-Augusta, South Carolina-Georgia	594,875	6,790	0.067	46%	11%	Point
				6%	55%	Area
				37%	26%	Highway Vehicles
				11%	9%	Off Highway Vehicles
Tulsa, Oklahoma	819,321	10,639	0.083	43%	4%	Point
				10%	52%	Area
				35%	30%	Highway Vehicles
				12%	13%	Off Highway Vehicles

Source: U.S. Census, 2002 National Emissions Inventory, and Air Quality System
*For four areas the population and VMT estimates are for whole counties even though only a partial county was part of the EAC Program: Mountain Area of Western North Carolina (Asheville); Columbia, South Carolina (Central Midlands Area); Denver-Boulder-Greeley-Fort Collins-Loveland, Colorado; and Hickory-Morganton-Lenoir, North Carolina (Unifour Area).

Air Quality Modeling for EAC SIPs
The study addressed three issues with respect to the air quality modeling work states performed as part of their EAC SIPs:

- Whether the modeling could provide any insight into what degree "local" EAC measures contributed to any improvements in air quality in EAC Program areas;
- Did the air quality modeling predict attainment with or without the local EAC measures; and
- Were the air quality improvements projected in the state's EAC modeling achieved or did the observed air quality improvements exceed the air quality improvements projected in the state's EAC modeling.

Growth-Related Aspects of the Study
There was interest in studying the impact on EAC Program areas of not requiring the Nonattainment NSR and Conformity Programs in EAC areas, both of which address growth in emissions. However, because of the complexity of the programs, it was decided such an analysis was beyond the scope of this effort and that it would require a separate study. So, instead, the study focused on a limited scope:

- Determining whether the extent of new source activity that occurred in the 14 nonattainment-deferred EAC Program areas that may have been subject to the Nonattainment NSR Program had the areas been designated nonattainment;
- Determining which of the 14 nonattainment-deferred EAC Program areas were subject to the Conformity Program for other reasons even though they were participating in the EAC Program for ozone; and
- Displaying changes in estimated population and VMT during EAC Program implementation.

2.3.2 Program Design Aspects of the Study

Efficiency of EAC Program
The study addressed the issue of whether the EAC model is just as efficient at producing clean air as the traditional nonattainment designation approach. This issue was approached by: (1) studying the resource aspect of this question for EPA regions and headquarters, and for state and local agencies; and, (2) asking whether all states and areas met their process-related goals and requirements. This study also addresses whether the compact agreements gave local areas flexibility to develop their own approach to meeting the 8-hour ozone standard. Additionally, the study asks whether the program would have succeeded without the threat of nonattainment designation for those areas with deferred nonattainment designations.

Longer Term Impact
The study addressed whether EAC activities: (1) will result in longer-term emission reductions or continued reductions in ozone and air quality improvement activities and policies into the future; and, (2) provide for or create a local "infrastructure" for further or continued action in the future through, for example, the creation of an organizational entity in the local area.

Outreach and Stakeholder Interaction
The study addressed whether the compacts were successful at engaging and involving stakeholders at the local level. In addition, the study addressed whether there were any intangible information from

stakeholder engagement. It was also important to gain an understanding of how successful the outreach programs were in EAC Program areas.

Other Aspects of the Program
The study also addressed how the requirements for the EAC Program areas compare to the requirements the areas would have faced as traditional nonattainment areas.

2.4 Information Compilation

Table 2-2 provides a breakout of the EAC Program aspects and areas included in the study and whether it was quantitative or qualitative. To understand the table, it is important to note that the study's quantitative information focused on 20 areas (of the 29 total EAC areas), while the qualitative information addressed all 29 areas. The qualitative study was conducted through discussions with all 12 states in the program and nine of the 29 EAC Program areas. The information from those discussions was generalized to all 29 areas.

The following two subsections provide an overview of how the study was conducted for the 14 nonattainment-deferred EAC Program areas and the six attainment EAC Program areas that were included.

2.4.1 Quantitative Information Compilation

For environmental aspects of the study, the quantitative information addressed:

- Changes in air quality;
- Estimated emissions reductions from control measures;
- Air quality modeling for EAC SIPs; and
- Growth-related aspects of the study.

For design aspects of the study, the information compiled addressed the efficiency of the EAC Program.

Changes in Air Quality
The air quality information gathered came from EPA's Air Quality System submitted by the states to EPA. The study looked at changes in air quality from 2001-2003 to 2005-2007 on three bases: 8-hour ozone DV; Air Quality Index (AQI) days above 100; and seasonal averages of daily maximum 8-hour ozone (not controlling and controlling for meteorology) (see Appendix B, Tables B-1 to B-4). Seasonal averages for meteorology were "controlled" or adjusted. The study performed meteorological adjustments for the 15 EAC Program areas that are located in the East (except for a few cases where data were not available), and, for comparative purposes, for 18 non-EAC metropolitan areas that are generally in the same region as these EAC Program areas. The non-EAC Program areas are a mix of attainment and nonattainment areas. In the Southwest, air quality comparisons were difficult to make because of a

Table 2-2: EAC Program Aspects and Areas Included in the Study, Breakout of Information Compiled, and Whether it was Quantitative or Qualitative

Program Aspect	Quantitative Information Compiled	Qualitative Information Compiled	Areas
EAC Program Environmental Aspects of Study			
Changes in air quality	Yes	No	• Quantitative information: all 20 areas (except for cases where meteorological data were not available)
Estimated emissions reductions from control measures	Yes	Yes	• Quantitative information: all 20 areas • Qualitative information: all 29 areas (able to generalize information to all areas by consulting all 12 states in the program and nine of the 29 EAC Program areas)
Air quality modeling for EAC SIPs	Yes	No	• Quantitative information: all 20 areas
Growth-related aspects of the study	Yes	Yes	• Quantitative information: all 20 areas • Qualitative information: 14 of the 20 areas
EAC Program Design Aspects of the Study			
Efficiency of EAC Program	Yes	Yes	• Qualitative information: all 29 areas (for estimation of EPA resources for EAC Program versus traditional approach) • Qualitative information: all 29 areas (able to generalize information to all areas by consulting all 12 states in the program and nine of the 29 EAC Program areas)
Longer term impact	No	Yes	• Qualitative information: all 29 areas (able to generalize information to all areas by consulting all 12 states in the program and nine of the 29 EAC Program areas)
Outreach and stakeholder interaction	No	Yes	• Qualitative information: all 29 areas (able to generalize information to all areas by consulting all 12 states in the program and nine of the 29 EAC Program areas)
Other aspects of the program	No	Yes	• Qualitative information: all 29 areas (able to generalize information to all areas by consulting all 12 states in the program and nine of the 29 EAC Program areas)

lack of monitoring sites with meteorologically controlled air quality data that were close enough to the EAC Program areas. Therefore, the study was not able provide a review of how those air quality gains in that region compare to other non-EAC ozone areas in the same region. The study did not compare two individual cities because it is very difficult to determine if they are comparable. Comparing the range of reductions between two groups is more reasonable, as the study did for areas in the East.

Meteorological adjustments of the data pertain to how weather differences from day-to-day and across years can cause substantial differences in monitored ozone concentrations, even when emissions are not changing. This can obscure the changes in ozone that are rightly attributable to emissions reductions achieved by control strategies like those included in the EAC and standard ozone SIPs. Therefore, it is useful to adjust monitored ozone concentrations for meteorological effects. The methodology uses a generalized linear model is used to describe the relationship between daily ozone and several meteorological parameters. The model also accounts for the variation in seasonal ozone across different years by correcting for meteorological fluctuations between those years. The most important meteorological parameters considered in this model are daily maximum 1-hour temperature and midday (10 a.m. to 4 p.m.) relative humidity. This model is estimated or fitted for individual metropolitan areas of interest, where the necessary ozone and meteorological data sets were both available. Once the parameters (i.e., coefficients) have been estimated using daily data, the model produces an estimate of what the seasonal average daily 8-hour maximum would have been in a given year if that year had had typical weather conditions combined with its actual emissions. This methodology and the subsequent ozone estimates are provided by EPA's OAQPS, Air Quality Assessment Division.[21]

Estimated Emissions Reductions from Control Measures
The emission reductions information compilation had two features:

First, information was gathered from the EAC SIPs in several areas to compile a complete list of measures, including any prospective emission reduction estimates provided by the states in their SIPs for local, state and national (Federal) measures (see Tables B-6 to B-26). For this part of the study, local measures were defined as measures adopted locally by a local body or authority, as well as measures adopted by the state that applied specifically to that area. (State measures were measures adopted by states that apply in more than one area in a state and national (Federal) measures were measures adopted by EPA that apply nationally or in a sub-region of the country.) In addition, where possible, the quantified emission reduction from each EAC SIP measure was compared as a percentage to the total reductions for all such measures in the same SIP, as well as to the total 2002 NO_x and VOC emissions in the EAC Program areas from the 2002 National Emissions Inventory. This was done in an attempt to convey the relative air quality importance of the various measures.

There are at least two important limitations to what can be discerned from the estimates in Tables B-6 to B-26:

1) Estimating emissions reductions is inherently uncertain.

[21] The method used is described in: "The effects of meteorology on ozone in urban areas and their use in assessing ozone trends," Atmospheric Environment 41, 7127-7137, Camalier, L., Cox, W., Dolwick, P., 2007. See additional resources on meteorological adjustment of ozone air quality on: http://www.epa.gov/air/airtrends/weather.html.

- For the local measures, the limitations include the inherent uncertainty of estimating emissions reductions from non-traditional sources and strategies on which the EAC Program areas relied for local measures.

2) The percentages must be studied carefully when comparing the reductions for each measure (or groups of measures) to total reductions for all the measures. In some of the EAC SIPs, the denominator for the percentages (total quantified emissions reductions from listed EAC SIP measures) may not be a completely consistent benchmark because it may not reflect every state and national measure that contributed to air quality improvement.
    - For the Federal measures, the study calculated a rough estimate of the emissions reductions from Federal measures. This is reflected in Tables B-6 to B-26 (or "other" Federal measure emission reductions in the case of the two areas where some Federal measures were quantified).
        - The study employed an approach for developing the estimates that is described in Appendix C.
    - The approach was to calculate the total emissions reductions assumed in the modeled attainment demonstration and to subtract from that the quantified state and local measures in the attainment demonstration (as well as some national measures that were quantified in two areas).
    - Providing the *estimates* of Federal measure emission reductions helps to address the concern with respect to the percentages by making the denominators more reflective of all the measures that benefited the areas.
    - Having as accurate a denominator as possible is important to avoid overstating or understating the percentage contributions of local, state and national measures.
    - In an extreme case, a hypothetical SIP that explicitly listed only one small local measure would calculate that measure's percentage as 100 percent of total quantified emissions, possibly giving the impression that the measure was important to air quality progress in the area when it may not have been.
    - Another example of the misimpression that can be taken from these percentages is the hypothetical case of a SIP that contains 100 local measures each with equal and large emissions reductions; those measures would each only score 1 percent.

Second, the study also put the magnitude of the emission reductions in the EAC Program areas' SIPs into perspective by comparing the total quantified NO_x and VOC emission reductions estimates in the EAC SIPs to:

- Total 2002 NO_x and VOC emissions in the EAC Program areas;
- Total 2002 NO_x and VOC emissions in the state in which the area is located; and
- Total NO_x reductions from the NO_x SIP call within the state in which the area is located (for states that were part of that program).

The 2002 NO_x and VOC emissions estimates for the EAC Program areas and for the state in which the area is located come from the 2002 National Emissions Inventory. The quantified NO_x and VOC emissions estimates in the EAC SIPs used for comparative purposes are for local measures, state/national measures, and the two combined.

Air Quality Modeling for EAC SIPs
To answer the questions posed with respect to air quality modeling, the study addressed the modeling information from EAC SIPs and then compared the information to observed air quality values.

Growth-Related Aspects of the Study
The study also reviewed information concerning estimates of population and VMT change from 2001 to 2006. The population estimates came from the U.S. Census. The VMT numbers come from the National Emission Inventory's VMT estimates, which are derived from the Highway Performance Monitoring System (HPMS). It is important to note that they are subject to significant uncertainty that can cause over or underestimates. HPMS was designed to collect statewide data to populate a national database that would be used to: (1) assess the performance and condition of the nationwide transportation system; and, (2) help guide national investment priorities. The sampling techniques were designed for these purposes. They may not be appropriate for estimating small changes in VMT in smaller geographic areas such as the areas included in this study. While the margin of error at the statewide and national level is acceptable for the purposes that HPMS was designed for, it is unclear whether the margin of error at the nonattainment areas scale would render the study inconclusive.[22]

Other Aspects of the EAC Program
For design aspects of the study, the quantitative information addressed the efficiency of the EAC Program by estimating the resources expended by EPA headquarters and regional offices for the EAC Program. This was compared to the level of estimated resources that would have been necessary had the EAC Program areas not participated in the EAC Program but instead pursued a traditional approach after being designated nonattainment or attainment (estimates do not include state and local agency resources). The resource estimates encompassed Full Time Equivalent (FTE) and the number of Federal Register actions and pages (including costs). Federal Register costs were calculated using the current rates due to the difficulty of determining historical Federal Register costs and of determining what costs apply to which Federal Register actions. Table B-31 provides the methodology used to develop them. The resource estimates for the traditional approach assume that: (1) the 14 nonattainment-deferred areas would have been Subpart 1 areas; and (2) the resource estimates vary depending on the size of the area. Because the regional resource estimates varied for the traditional approach, a range of numbers is presented.

2.4.2 Qualitative Information Compilation
For environmental aspects of the study, the qualitative information compiled addressed qualitative aspects of (1) control measure emissions reductions and (2) growth-related aspects of the study (i.e., new source activity, and Conformity Program applicability in the 14 nonattainment-deferred EAC Program areas during the implementation of the EAC Program).

For design aspects of the study, the compilation of qualitative information addressed:

- Efficiency of EAC Program;
- Longer term impact;
- Outreach and stakeholder interaction; and
- Other aspects of the program.

[22] For more information about HPMS, visit: http://www.fhwa.dot.gov/policy/ohpi/hpms/abouthpms.htm.

These four program design areas were addressed in a qualitative manner because they did not lend themselves easily, if at all, to quantitative measurement. Ideally, for example, it would have been beneficial to measure the impact of the EAC Program on state and local resources by developing a questionnaire that measured the impact on state and local agency FTE and budgetary outlays. However, that was not feasible in the time given for the study, so an alternative informal discussion method was employed, which, nonetheless, yielded useful information.

Information for the qualitative part of the study came from four sources:

- The progress reports and SIPs submitted by the states and local agencies;
- EPA and state permitting databases containing information on new source activity;
- The four EPA regional offices that implemented the program; and
- Discussions with staff and managers at the state and local agencies that implemented the program.

The discussions were held with all of the air planning agencies for the 12 states involved in the EAC Program and with local agencies for six of the 14 areas involved in the nonattainment-deferred EAC Program. Appendix A provides a list of the individuals consulted. In addition, two non-EAC ozone 8-hour nonattainment areas – Rocky Mount, North Carolina and Knoxville, Tennessee – and the air agencies for the states in which they are located were consulted to provide a comparison to the responses received with respect to the EAC Program areas. Appendix E provides a complete summary of the discussions that can reasonably be generalized to other EAC areas. The discussions reflect people's views so, in that sense, the information gained is the view of the respective local or state agency. Because the state and local agency names are included in Appendix E, the individual discussion notes were shared with the individuals consulted as a courtesy and to provide an opportunity for any corrections. The discussions provided useful insights, both positive and negative, on the EAC Program.

SECTION 3.0 INFORMATION COMPILED AND OBSERVATIONS

In this section the information compiled as part of the study is described and observations stemming from the information are provided.

3.1 Information Compiled

3.1.1 Quantitative Information

The study produced quantitative information for both the environmental and program design aspects of the study.

Environmental Aspects of the Study

The study produced information in four areas:

- Changes in air quality;
- Estimated emissions reductions from control measures;
- Air quality modeling for EAC SIPs; and
- Growth-related aspects of the study.

Changes in Air Quality

Ten of the 14 nonattainment-deferred areas attained the 8-hour ozone NAAQS by December 31, 2004, prior to the required 2005 implementation date for the EAC control measures. All of the 14 nonattainment-deferred areas, except Denver, Colorado, attained the 8-hour ozone NAAQS by December 31, 2007. Five of the areas had 2005-2007 8-hour DVs at or below 0.079 ppm, while 11 were at or below 0.083 ppm. All of the areas showed an improvement in ozone air quality from 2001-2003 to 2005-2007 and five areas showed a 10 percent or greater improvement in their DVs. All of the areas reduced the number of AQI days above 100 from 2001-2003 to 2005-2007, while 10 showed a greater than 60 percent improvement on an AQI day basis. Thirteen of the 14 nonattainment-deferred areas showed an improvement in air quality from 2001-2003 to 2005-2007 on an 8-hour, meteorologically controlled seasonal average basis (Denver was excluded due to a lack of meteorological data). Eight of the 14 areas showed a 10 percent or greater improvement on that basis. (For a summary, see Table 3-1 and, for more details, see Tables B-1 to B-3 in Appendix B.)

Five of the six attainment areas attained the 8-hour ozone NAAQS by December 31, 2004, prior to the required 2005 implementation date for the EAC control measures. All six attainment areas included in the study attained the 8-hour NAAQS as of December 31, 2007 and all had 2005-2007 8-hour DVs at or below 0.080 ppm. Three attainment areas showed an improvement in ozone air quality from 2001-2003 to 2005-2007 on an 8-hour DV basis. One of the six attainment areas showed deterioration in air quality from 2001-2003 to 2005-2007 on the same basis, while two of the six showed no change. When areas were studied on an AQI day basis, four of the six areas showed an improvement from 2001-2003 to 2005-2007. Two of these areas showed a greater than 80 percent improvement. One area showed an increase, while another showed no change. Four of the six attainment areas show an improvement in air quality from 2001-2003 to 2005-2007 on an 8-hour, meteorologically controlled seasonal 8-hour average basis. One area showed an increase, while another showed no change. (For a summary, see Table 3-1 and, for more details, see Tables B-1 to B-3 in Appendix B.)

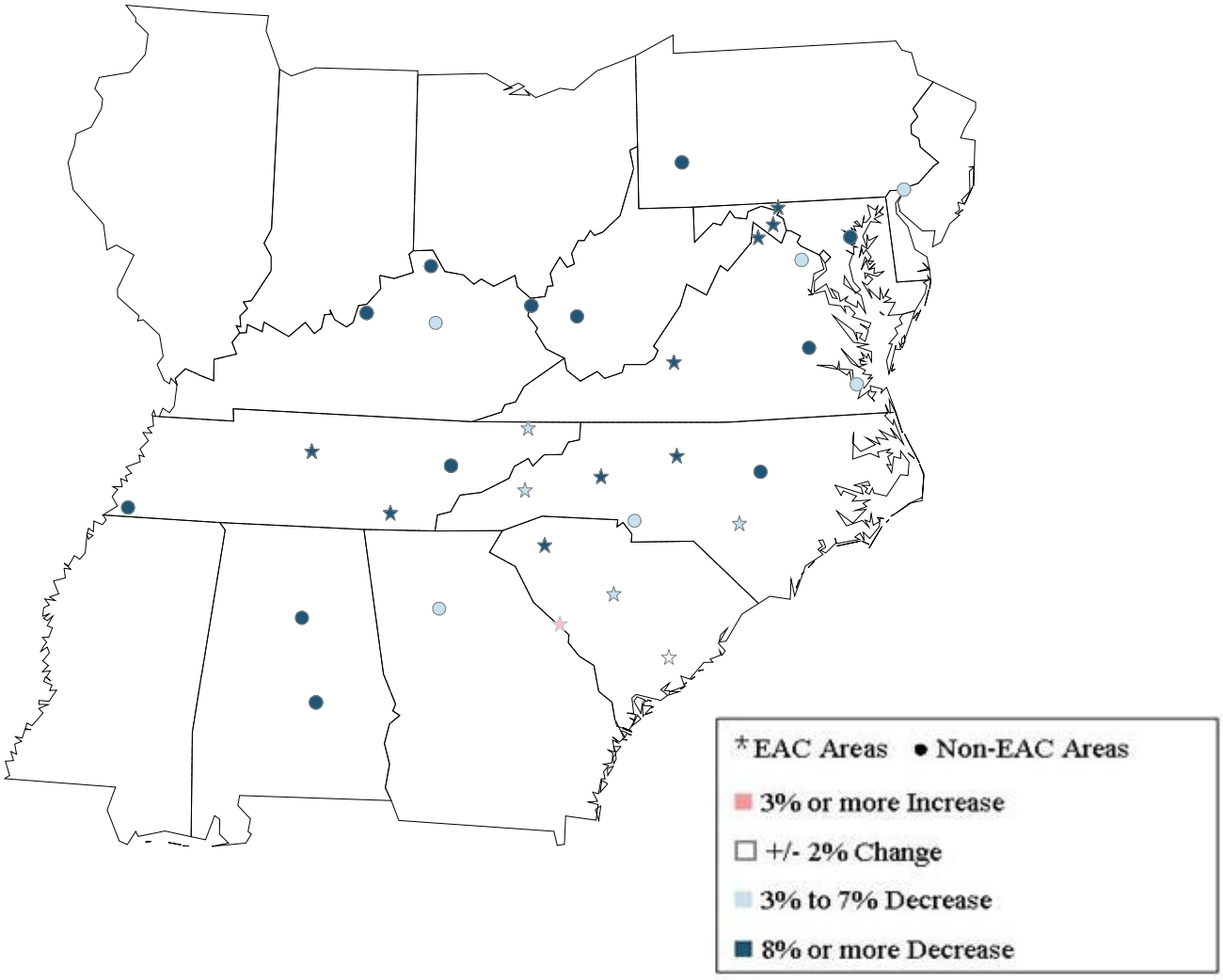
For the 12 nonattainment-deferred areas in the East, the improvement in ozone air quality on a meteorologically controlled seasonal 8-hour average basis from 2001-2003 to 2005-2007 ranges from 4 percent to 12 percent, with an average 9 percent improvement. For the three attainment areas in the East, the change in ozone air quality on a meteorologically-controlled, seasonal 8-hour average basis from 2001-2003 to 2005-2007 ranges from a 6 percent improvement to a 3 percent deterioration, with an average 1 percent improvement. The air quality deteriorated in Lower Savannah-Augusta, South Carolina-Georgia. Savannah is located on the perimeter of the NO_x SIP call region (due to its location on the border between Georgia and South Carolina, a state that was part of the NO_x SIP Call). It is also not located in the normal downwind area in the East that would benefit from NO_x reductions in the Midwest and Southeast. Overall, the average improvement in air quality was 8 percent for the 15 nonattainment-deferred and attainment areas in the East.

For comparative purposes, the range of improvement in ozone air quality on a meteorologically controlled seasonal 8-hour average basis for 18 non-EAC, 8-hour ozone nonattainment areas in the East from 2001-2003 to 2005-2007 was from 5 percent to 14 percent. Overall, for the 18 non-EAC Program areas in the East the average improvement in air quality was 8 percent.

Figure 3-1 is a map that shows the 15 EAC Program areas in the East that were included in the study and the 18 non-EAC, 8-hour ozone nonattainment areas in the East that were used for comparison. The map indicates the percentage reduction in ozone from 2001-2003 to 2005-2007. Figure 3-2 is a box-plot of the same areas that illustrates the means, medians and the 90th and 100th percentiles of the percentage reductions. (As indicated in Figure 3-2, the dots represent the means of the areas represented, the line inside the box represents the median, the ends of box represent the 10th percentiles and the ends of the "whiskers" represent the 90th percentiles. The length of the "whiskers" represents the spread of the data.) The means and the medians are close, while the 90th and 100th percentiles are farther apart, particularly at the deterioration end of the range. However, the percentiles are within the 2 percent margin of error. The meteorological adjustment analyst considers this difference to be within the range of uncertainty (or close to it), with the exception of the 100 percentile where the EAC air quality change is greater at the deterioration end of the range. Table B-4 in Appendix B contains the air quality data and percentage changes from 2001-2003 to 2005-2007 for the 15 and 18 areas.

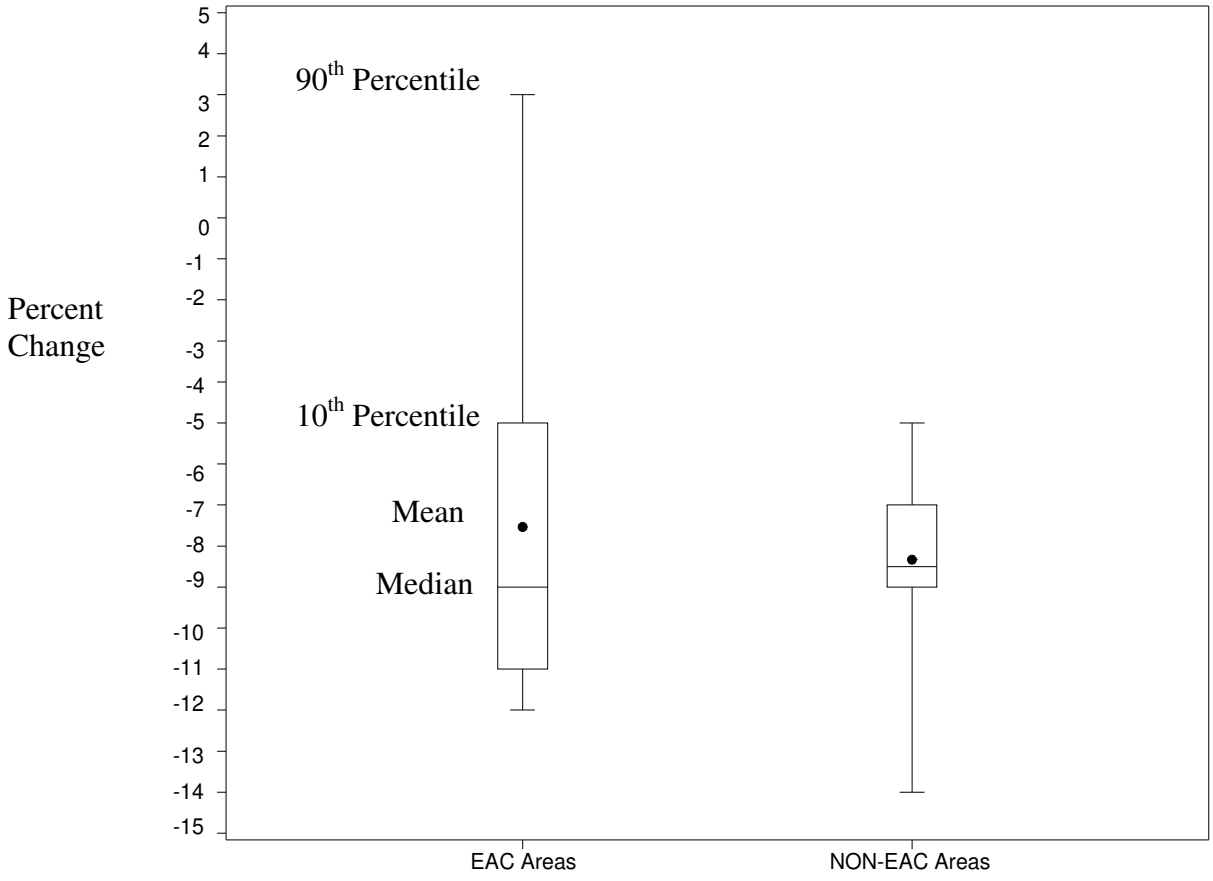
In addition to these figures and tables, Figure 3-3 shows the difference in ozone air quality (seasonal average adjusted for weather) over time from 2001 to 2007 for the 15 EAC Program areas in the East that were included in the study and the 18 non-EAC, 8-hour ozone nonattainment areas in the East that were used for comparison. While the graph shows consistently better air quality in the EAC areas versus the non-EAC areas, the difference is within the margin of error and, thus, not significant. In addition, the degree to which the two trend lines track so closely indicates the degree to which air quality levels recorded at monitors across the East are uniformly influenced by regional air pollution emissions reductions from programs such as the NO_x SIP call.

Figure 3-1: Map Showing Percentage Changes in Average Summertime Daily Maximum 8-hour Ozone Concentrations in EAC and Non-EAC Program Areas in the East Between 2001-2003 and 2005-2007, After Adjusting for Weather



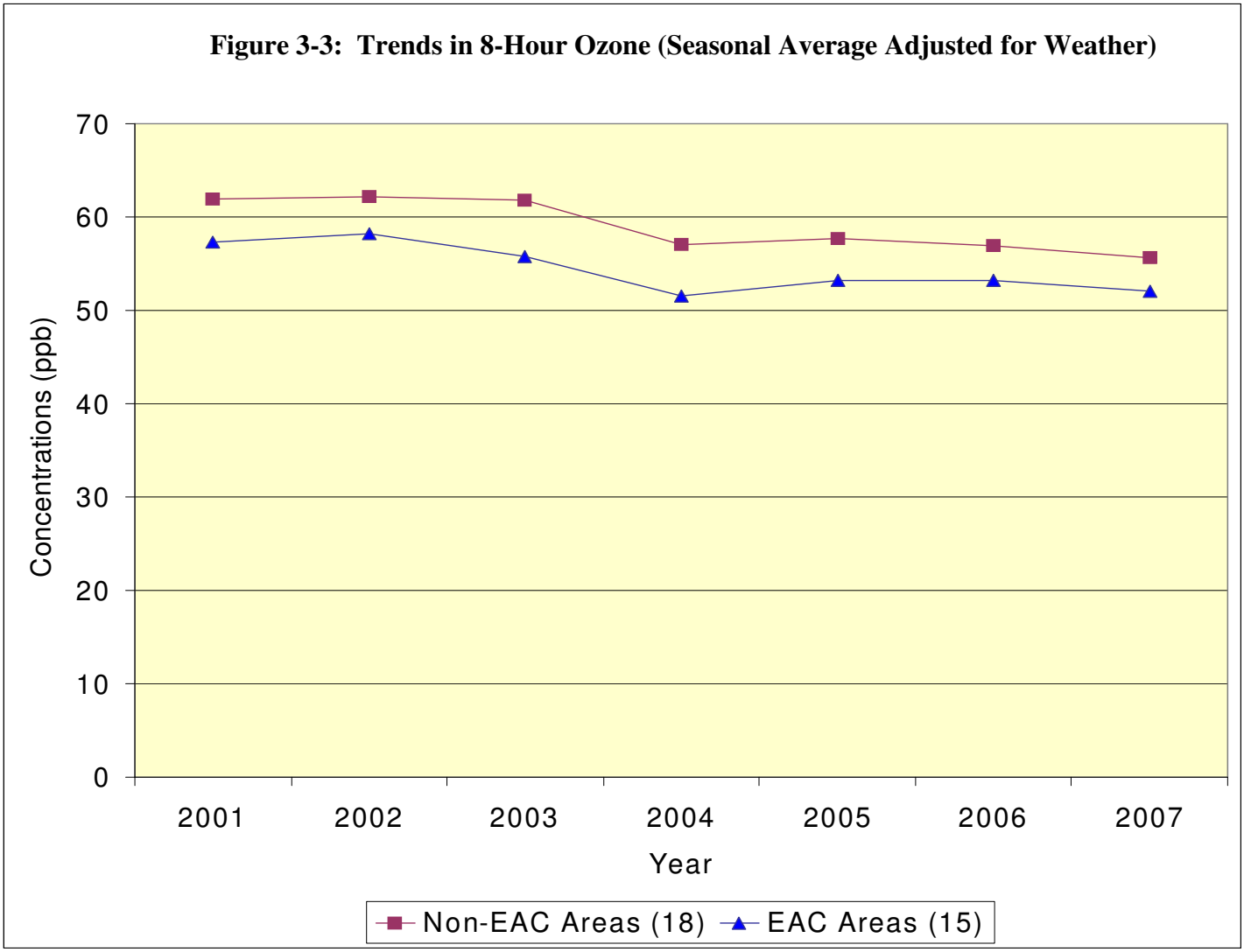
Source: Analysis by the Air Quality Assessment Group, OAQPS, using the method described in Camalier, L., Cox, W., Dolwick, P., 2007. The effects of meteorology on ozone in urban areas and their use in assessing ozone trends. Atmospheric Environment 41, 7127-7137.

Figure 3-2: Box Plot Showing Percentage Changes in Average Summertime Daily Maximum 8-hour Ozone Concentrations in EAC and Non-EAC Program Areas in the East Between 2001-2003 and 2005-2007, After Adjusting for Weather



Source: Analysis by the Air Quality Assessment Group, OAQPS, using the method described in Camalier, L., Cox, W., Dolwick, P., 2007. The effects of meteorology on ozone in urban areas and their use in assessing ozone trends. Atmospheric Environment 41, 7127-7137.

Figure 3-3: Trends in 8-Hour Ozone (Seasonal Average Adjusted for Weather)



Source: Analysis by the Air Quality Assessment Group, OAQPS, using the method described in Camalier, L., Cox, W., Dolwick, P., 2007. The effects of meteorology on ozone in urban areas and their use in assessing ozone trends. Atmospheric Environment 41, 7127-7137.

Table 3-1: Summary of Air Quality Study Information

	Percent Improvement In 8-Hour DV (2001-2003 to 2005-2007)	Percent Improvement In AQI Days (2001-2003 to 2005-2007)	Change In Number of Average AQI Days (2001-2003 to 2005-2007)	Percent Improvement In Seasonal Ozone Average, Meteorologically Controlled (2001-2003 to 2005-2007)
Nonattainment-Deferred EAC Program Areas				
Berkeley and Jefferson Counties, West Virginia	-13%	-77%	-3.3	-12%
Chattanooga, Tennessee-Georgia	-5%	-72%	-9.3	-9%
Columbia, South Carolina (Central Midlands Area)	-8%	-48%	-3.7	-6%
Denver-Boulder-Greeley-Fort Collins-Loveland, Colorado	-2%	-47%	-5.0	NA
Fayetteville, North Carolina (Cumberland County)	-6%	-62%	-5.3	-4%
Frederick County, Virginia	-14%	-93%	-4.7	-12%
Greensboro-Winston Salem-High Point, North Carolina (Triad Area)	-11%	-76%	-14.7	-10%
Greenville-Spartanburg-Anderson, South Carolina (Appalachian Area)	-5%	-77%	-11.0	-10%
Hickory-Morganton-Lenoir, North Carolina (Unifour Area)	-11%	-100%	-5.0	-11%
Johnson City-Kingsport-Bristol, Tennessee	-3%	-45%	-3.3	-5%
Nashville, Tennessee	-2%	-24%	-2.7	-11%
Roanoke, Virginia	-11%	-91%	-3.3	-8%
San Antonio, Texas	-8%	-64%	-5.3	-13%
Washington County, Maryland (Hagerstown)	-8%	-84%	-7.0	-10%

Table 3-1: Summary of Air Quality Study Information

	Percent Improvement In 8-Hour DV (2001-2003 to 2005-2007)	Percent Improvement In AQI Days (2001-2003 to 2005-2007)	Change In Number of Average AQI Days (2001-2003 to 2005-2007)	Percent Improvement In Seasonal Ozone Average, Meteorologically Controlled (2001-2003 to 2005-2007)
Attainment EAC Program Areas				
Austin, Texas	-5%	-11%	-0.3	0%
Berkeley-Charleston-Dorchester, South Carolina	3%	0%	0.0	-1%
Mountain Area of Western North Carolina (Asheville)	-5%	-81%	-4.3	-6%
Oklahoma City, Oklahoma	0%	143%	3.3	-6%
Lower Savannah-Augusta, South Carolina-Georgia	0%	-100%	-0.3	3%
Tulsa, Oklahoma	-4%	-22%	-1.3	-6%

Source: AQS and meteorological analysis by the Air Quality Assessment Group, OAQPS, using the method described in Camalier, L., Cox, W., Dolwick, P., 2007. The effects of meteorology on ozone in urban areas and their use in assessing ozone trends. Atmospheric Environment 41, 7127-7137.

Estimated Emissions Reductions from Control Measures

This section provides information for EAC areas on the estimated emission reductions from state and local EAC measures and overall from Federal measures. Federal measures include programs such as EPA rules for motor vehicle standards (i.e., Tier 2 and non-road diesel engines). State measures include programs such as inspection and maintenance (I/M), lower Reid vapor pressure, and Reasonably Available Control Technology (RACT) controls for VOCs. It is important to keep in mind that many EAC local measures were implemented that could not be easily quantified, if at all. They were implemented with the goal of effecting lifestyle and other changes that could, in turn, help reduce emissions contributing to ozone levels. Examples of these measures are:

- Bike racks and trails at work sites (Chattanooga, Tennessee-Georgia);
- Encouragement of carpooling (Columbia, South Carolina (Midlands Area));
- Energy efficient buildings (Fayetteville, NC);
- Timing of refueling vehicles (Roanoke, Virginia); and
- Truck stop anti-idling program (San Antonio, Texas).

This subsection discusses five areas relating to control measures:

- Measures Implemented in Nonattainment-Deferred EAC Program Areas;
- Measures Implemented in Attainment EAC Program Areas;
- Control Measure Emissions Reductions in Perspective;
- Control Measure Implementation; and
- Non-Ozone Air Quality Benefits.

Measures Implemented in Nonattainment-Deferred EAC Program Areas

The 14 nonattainment-deferred areas implemented a range of state and local measures, spanning from as few as four in Denver, Colorado[23] to as many as 35 in Greenville-Spartanburg-Anderson, South Carolina (Appalachian Area). In the 14 areas, the number of *local* measures that were implemented ranged from zero in Denver, Colorado to as many as 35 in the Greenville-Spartanburg-Anderson, South Carolina (Appalachian Area). Across all 14 nonattainment-deferred EAC Program areas, 258 state and local measures were implemented. (See Table 3-2 and Appendix B, Tables B-5 to B-25.)

All 14 of the nonattainment-deferred areas implemented state and local measures that had estimated emissions reductions associated with them. Of the local measures, the percentage that had quantified emissions reductions associated with them ranged from zero percent in Denver-Boulder-Greeley-Fort Collins-Loveland, Colorado that had no local measures to 100 percent in Berkeley and Jefferson Counties, West Virginia. Five of the 14 areas had one percent or less of quantified NO_x and VOC emissions from local measures. Four of the 14 nonattainment-deferred areas had 10 percent or greater of their quantified NO_x and VOC emissions from local measures. Six areas had 10 percent or greater of their quantified NO_x and VOC emissions from state measures. All 14 areas had 35 percent or more of their quantified NO_x and VOC emissions from Federal measures, while twelve areas had 50 percent or more and 8 areas had 80 percent or more. The 14 nonattainment-deferred areas relied largely on state and national measures for their modeled attainment demonstrations.

[23] These were State of Colorado, federally-enforceable measures adopted as rule revisions, resulting in permanent emissions reductions of 58,765 tons per year of VOC and 6,935 tons per year of NO_x (see Appendix B, Table B-8).

Table 3-3 contains a list of the eight local EAC measures in the four of the 14 nonattainment-deferred area SIPs that individually contributed 5 percent or greater of their quantified NO_x and VOC emissions reductions to their respective SIPs.

Measures Implemented in Attainment EAC Program Areas

The six attainment areas included in the study implemented a range of state and local measures, spanning from as few as one in Tulsa, Oklahoma to as many as 44 in Lower Savannah-Augusta, South Carolina-Georgia. In four of the six areas, the number of *local* measures that were implemented ranged from zero in Mountain Area of Western North Carolina (Asheville) to 42 in Lower Savannah-Augusta, South Carolina-Georgia. Across all six attainment EAC Program areas, 130 state and local measures were implemented. (See Table 3-2 and Appendix B, Tables B-5 to B-25.)

Four of the six attainment areas included in the study implemented measures that had emission reductions associated with them. Of the local measures, the percentage that had quantified emissions reductions associated with them ranged from zero percent for Berkeley-Charleston-Dorchester, South Carolina and Mountain Area of Western North Carolina (Asheville) to 100 percent for Tulsa, Oklahoma. One of five of the six attainment areas included in the study had 21 percent of its quantified NO_x and VOC emission reductions from local measures, while the remainder had two percent or less. These five had 4 percent or less of their quantified NO_x and VOC emission reductions from state measures. Of four of the six attainment areas included in the study, one had 78 percent of its quantified NO_x and VOC emission reductions from national measures, while the remainder had 96 percent or more. The six attainment areas included in the study relied largely on estimated NO_x and VOC emissions reductions from state and national measures for their modeled attainment demonstrations.

Table 3-4 contains a list of the three local EAC measures in two of the six attainment EAC area SIPs that individually contributed five percent or greater of their quantified NO_x and VOC emissions reductions to their respective SIPs.

Table 3-2: Summary of Control Measure Emission Reduction Study Information

Geographic Area	Number of Measures Implemented		Emission Reductions				
	Local	State	Percentage of Local Measures Quantified	Percentage of Estimated Quantified NO_x and VOC Emissions From:			Of the Quantified NO_x and VOC Emissions, Percentage From State or National Measures that Were Modeled
				Local Measures	State Measures	National (Federal) Measures	
Nonattainment-Deferred EAC Program Areas							
Berkeley and Jefferson Counties, West Virginia	7	0	100%	65%	0%	35%	35%
Chattanooga, Tennessee-Georgia	14	6	57%	9%	18%	73%*	91%
Columbia, South Carolina (Central Midlands Area)	27	2	37%	13%	0%	87%	87%
Denver-Boulder-Greeley-Fort Collins-Loveland, Colorado	0	4	0%	0%	54%	46%*	100%
Fayetteville, North Carolina (Cumberland County)	24	2	17%	4%	8%	88%	96%
Frederick County, Virginia	7	3	57%	10%	7%	83%	89%
Greensboro-Winston Salem-High Point, North Carolina (Triad Area)	27	2	41%	1%	2%	97%	99%
Greenville-Spartanburg-Anderson, South Carolina (Appalachian Area)	35	0	20%	24%	0%	77%	77%
Hickory-Morganton-Lenoir, North Carolina (Unifour Area)	12	3	33%	0%	5%	95%	99%
Johnson City-Kingsport-Bristol, Tennessee	2	5	50%	1%	10%	89%	99%
Nashville, Tennessee	11	4	100%	4%	3%	93%*	96%
Roanoke, Virginia	24	5	46%	3%	16%	81%	98%
San Antonio, Texas	10	3	70%	9%	38%	52%	91%
Washington County, Maryland (Hagerstown)	12	7	83%	1%	32%	66%	82%

Table 3-2: Summary of Control Measure Emission Reduction Study Information

Geographic Area	Number of Measures Implemented		Emission Reductions				
	Local	State	Percentage of Local Measures Quantified	Percentage of Estimated Quantified NO_x and VOC Emissions From:			Of the Quantified NO_x and VOC Emissions, Percentage From State or National Measures that Were Modeled
				Local Measures	State Measures	National (Federal) Measures	
Attainment EAC Program Areas							
Austin, Texas	39	2	21%	21%	1%	78%	79%
Berkeley-Charleston-Dorchester, South Carolina	39	0	0%	0%	0%	Insufficient data	100%
Mountain Area of Western North Carolina (Asheville)	0	2	0%	0%	4%	96%	100%
Oklahoma City, Oklahoma	3	0	66%	0%	0%	100%	100%
Lower Savannah-Augusta, South Carolina-Georgia	42	2	2%	Insufficient data			
Tulsa, Oklahoma	1	0	100%	4%	0%	96%	96%

*The estimates of the percentage contributions of national (Federal) measures are higher than they should be because they reflect emissions reductions for one state measure for each area that the study was unable to subtract out due to insufficient information. See Appendix C for more details.

Table 3-3: Four Nonattainment-Deferred EAC Program Areas with Five Percent or Greater of Quantified NO_x and VOC Emissions Reductions from Eight Individual Local Measures

Nonattainment-Deferred EAC Program Area	Local Measure	Percent of Quantified NO_x and VOC Emissions Reductions
Berkeley and Jefferson Counties, West Virginia	Ozone action day program	17%
	Public awareness program	26%
	Bicycle/pedestrian measures	5%
	Voluntary -ground freight industry	14%
Columbia, South Carolina (Central Midlands Area)	Reduce NOx emissions from South Carolina Electric and Gas - 2 coal fired boilers	11%
Greenville-Spartanburg-Anderson, South Carolina (Appalachian Area)	Develop stakeholder group - regulatory development	14%
	Transco (gas pipeline company) - early implementation of Phase 2 emission reductions	5%
San Antonio, Texas	Reduced Stage I vapor recovery exemption level from 125k gal/mo to 25k gal/mo	6%

Table 3-4: Two Attainment EAC Program Areas with Five Percent or Greater of Quantified NO_x and VOC Emissions Reductions from Three Individual Local Measures

Nonattainment-Deferred EAC Program Area	Local Measure	Percent of Quantified NO_x and VOC Emissions Reductions
Austin, Texas	I/M Onboard Diagnostics & Low Income Repair Program	6%
	Degreasing controls	5%
Lower Savannah-Augusta, South Carolina-Georgia	Open burning ban -ozone season (Georgia)	Insufficient data*

*Using the data the study had available, this percentage is 48 percent. However, due to insufficient data for this area, the study could not include a complete quantification of the emission reductions benefitting the area in this report. Therefore, the 48 percent overstates the measure's contribution and would be lower if we had more complete information on emission reductions.

Control Measure Emissions Reductions in Perspective

For the 20 EAC Program areas included in the study, the study compared quantified NO_x emissions reduction estimates for local measures to (1) 2002 NO_x emissions in the area, (2) 2002 NO_x emissions in the state in which the area is located, and (3) the emission reduction achieved in that state through the NO_x SIP call. For 17 of the 20 areas the ratio of the emissions for all three of these comparisons represented five percent or less (See Table B-26, Appendix B). The three areas for which one or more of the ratios is above five percent are:

- Berkeley and Jefferson Counties, West Virginia;
- Columbia, South Carolina (Central Midlands Area); and
- Greenville-Spartanburg-Anderson, South Carolina (Appalachian Area).

For 15 of the 20 areas the NO_x emissions reductions for local measures represent 2.5 percent or less than the respective point of comparison. The two areas with one or more comparisons between 2.5 and 5 percent are:

- Austin, Texas and
- Frederick County, Virginia.

The study also compared quantified VOC emissions reduction estimates for local measures to 2002 VOC emissions in the area and in the state in which the area is located. For 18 of the 20 areas the ratio of the emissions for the two comparisons represented five percent or less. The two areas for which one or both of the ratios is above five percent are:

- Austin, Texas and
- Berkeley and Jefferson Counties, West Virginia.

For 15 of the 20 areas, the VOC emission reductions for local measures represented two and a half percent or less. The three areas with one or more comparisons between 2.5 and 5 percent are:

- Chattanooga, Tennessee-Georgia;
- Frederick County, Virginia; and
- San Antonio, Texas.

Control Measure Implementation

According to the EAC progress reports and SIPs, all measures committed to by the states in the 20 areas included in the study but 14 were implemented by December 2005.[24] The 14 measures not implemented by December 2005 are listed in Table 3-5 and are also included in Appendix B, Tables B-5 to B-25. The 14 measures represent 4 percent of the total 388 state and local measures implemented for the 20 areas included in the study with seven in nonattainment-deferred areas and seven in attainment areas. As Table 3-5 indicates, seven of the 14 measures were implemented after 2005. Only one of the measures was modeled in an area attainment demonstration.

[24] For purposes of EAC measures, implementation meant that areas committed, at a minimum, to begin implementing measures no later than December 2005. Considering the variety of programs and technologies adopted into the SIPs, EPA recognized that certain measures required phased implementation on a specific schedule and that all of those activities were not expected to occur by December 2005.

Table 3-5: EAC Program Area Measures Not Implemented by December 2005

EAC Program Area	Control Measure	State or National Measure?	Implementation Date	Emissions Reductions Quantified	Measure Modeled?
Nonattainment-Deferred EAC Program Areas					
Chattanooga, TN-Georgia	Accelerated replacement of on-road vehicles	No	2006*	No	No
Denver, Colorado	Reduce flash VOC emissions from condensate collection at various natural gas facilities	Yes	December 31, 2007	Yes	Yes
Greenville-Spartanburg-Anderson, South Carolina (Appalachian Area)	Encourage community schools	No	Insufficient information to determine date	No	No
	Improve landscape at county facilities	No	Insufficient information to determine date	No	No
	School bus retrofits	No	2006	Yes	No
Roanoke, Virginia	Ethanol alternative fuel vehicles	No	2007	No	No
	Biodiesel ready trucks	No	2007	No	No
Attainment EAC Program Areas					
Austin, Texas	Power Plant Reductions--enforceable commitments by area power plants	No	December 31, 2006	No	No
Berkeley-Charleston-Dorchester, South Carolina	Educational programs	No	Insufficient information to determine date	No	No
	Schools-add sidewalks, increase bus usage; restrict vehicle idle times	No	Insufficient information to determine date	No	No
	Educate public - festivals, lecturer, brochure	No	Insufficient information to determine date	No	No
Lower Savannah-Augusta, South Carolina-Georgia	Seek information on alternative fuels	No	Insufficient information to determine date	No	No
	Replace vehicles with latest emission reduction vehicles	No	Insufficient information to determine date	No	No
	Install Intelligent Transportation Systems equipment along major routes	No	Post 2007**	No	No

*While this measure was implemented in 2006, as approved by the SIP, procedures were in place in 2005 to accelerate replacement of non-road vehicles. Actual replacement occurred in 2006.
**A master plan for this area was completed in May 2002 that contained plans to install Intelligent Transportation Systems equipment along major routes. When EPA approved the SIP in 2004, the equipment installations were not expected until post 2007.

Non-Ozone Air Quality Benefits

The study lacked data regarding non-ozone air quality benefits so these benefits were not quantified. However, according to 12 of the individuals consulted EAC Program activities directly generated environmental benefits in addition to ozone reduction. Seven of the individuals consulted stated that the EAC Program has reduced $PM_{2.5}$ (generally referring to particles less than or equal to 2.5 micrometers) through such programs as alternative fuels, open burning bans, freight partnership, diesel and school bus retrofits, and idling reduction. The EAC Program has also led to efforts to reduce $PM_{2.5}$ that are underway in three additional areas. In addition, EAC Program activities are also responsible for generating reductions in air toxics, NO_x, and VOCs.

Air Quality Modeling for EAC SIPs

The study reviewed the SIP modeling demonstrations to determine whether the air quality modeling predicted attainment with or without the local EAC measures. The attainment demonstrations did rely largely on state and national measures for their attainment demonstrations and not local measures.

The study addressed whether the modeling could provide any insight into what degree "local" EAC measures contributed to any improvements in air quality in EAC Program areas. Because the states for the most part did not include local measures in their modeling, the study determined that the only reliable way to quantify the air quality impacts of EAC local measures would be to model the incremental contribution of those measures. The study did not possess the resources to perform that modeling and, thus, could not reliably answer that question.

For the question of how the air quality improvements projected in the state's EAC modeling compare to the observed air quality improvements, actual 2007 air quality data (on an 8-hour DV basis) was compared to predicted 2007 air quality data, based on air quality modeling in the EAC SIPs. Eighty-five percent of the EAC Program areas that were included in the study predicted better or the same air quality for 2007 as was observed, as shown in Table 3-6. In projecting from their base years to 2007, the state-submitted EAC modeling projections had an average error of about 0.003 ppm. Where the model projections deviated from what was observed, the eventual air quality tended to be cleaner than what was predicted; that is, the modeling projections tended to be conservative (average projection bias was 0.0014 ppm). Where the model projections overestimated the amount of air quality improvement, the areas still came into attainment in 2005-2007, although in some cases only by very small amounts (e.g., Nashville predicted 0.082 ppm, actual was 0.084 ppm). Overall, the level of ozone improvement anticipated was achieved.

Table 3-6: Comparison of Projected Air Quality Improvements Projected by EAC SIP Modeling to Monitored Air Quality Measured as 8-hour Ozone Concentrations, From 2001-2003 to 2005-2007, 14 Nonattainment-Deferred EAC Program Areas and Six Attainment EAC Program Areas

EAC Program Area	2007 SIP Predicted DV (ppm)	Observed 2005-2007 DV (ppm)	Observed Air Quality Cleaner Than Predicted?*
Nonattainment-Deferred EAC Program Areas			
Berkeley and Jefferson Counties, West Virginia	0.082	0.075	Yes
Chattanooga, Tennessee-Georgia	0.084	0.084	Same
Columbia, South Carolina (Central Midlands Area)	0.080	0.082	Same
Denver-Boulder-Greeley-Fort Collins-Loveland, Colorado	0.085	0.085	Same
Fayetteville, North Carolina (Cumberland County)	0.078	0.082	No
Frederick County, Virginia	0.082	0.073	Yes
Greensboro-Winston Salem-High Point, North Carolina (Triad Area)	0.084	0.083	Same
Greenville-Spartanburg-Anderson, South Carolina (Appalachian Area)	0.084	0.083	Same
Hickory-Morganton-Lenoir, North Carolina (Unifour Area)	0.075	0.078	No
Johnson City-Kingsport-Bristol, Tennessee	0.084	0.083	Same
Nashville, Tennessee	0.082	0.084	Same
Roanoke, Virginia	0.080	0.076	Yes
San Antonio, Texas	0.084	0.082	Same
Washington County, Maryland (Hagerstown)	0.081	0.079	Same
Attainment EAC Program Areas			
Austin, Texas	0.083	0.080	Yes
Berkeley-Charleston-Dorchester, South Carolina	0.071	0.074	No
Mountain Area of Western North Carolina (Asheville)	0.077	0.079	Same
Oklahoma City, Oklahoma	0.080	0.080	Same
Lower Savannah-Augusta, South Carolina-Georgia	0.077	0.067	Yes
Tulsa, Oklahoma	0.084	0.080	Yes

Source: AQS and EAC SIPs

*Assume "same" if observed and predicted values are within 0.002 ppm or "yes" or "no" if difference is greater than 0.002 ppm.

Growth-Related Aspects of the Study

All but one of the 14 nonattainment-deferred areas – Fayetteville, North Carolina (Cumberland County) – had population growth from 2002 to 2006 during EAC Program implementation. Two of the nonattainment-deferred areas experienced a greater than 10 percent increase. Seven of the 14 areas experienced estimated growth for the period equal to or greater than the rest of the state in which the area is located, the region in which it is located, and the U.S. as a whole. All of the six attainment areas experienced population growth from 2002 to 2006. Four of the attainment areas experienced a five percent or greater increase. Two of the areas experienced estimated population growth for the period equal to or greater than the rest of the state in which the area is located, the region in which it is located, and the U.S. as a whole.

All but two of the 14 nonattainment-deferred areas – Berkeley and Jefferson Counties, West Virginia and Frederick County, Virginia – were estimated to have experienced VMT growth from 2002 to 2006 during EAC Program implementation. Three of the areas experienced a greater than 10 percent increase. Three of the 14 areas experienced estimated growth for the period equal to or greater than the rest of the state in which the area is located, the region in which it is located and the U.S. as a whole. All of the six attainment areas experienced VMT growth from 2002 to 2006. Three experienced a nine percent or greater increase. Three of the areas experienced estimated VMT growth for the period equal to or greater than the rest of the state in which the area is located, the region in which it is located and the U.S. as a whole. (See Figure 3-3 and Appendix B, Tables B-27 to B-30.)

The percentage changes in Figure 3-3 for the South and the West consist of the following states:

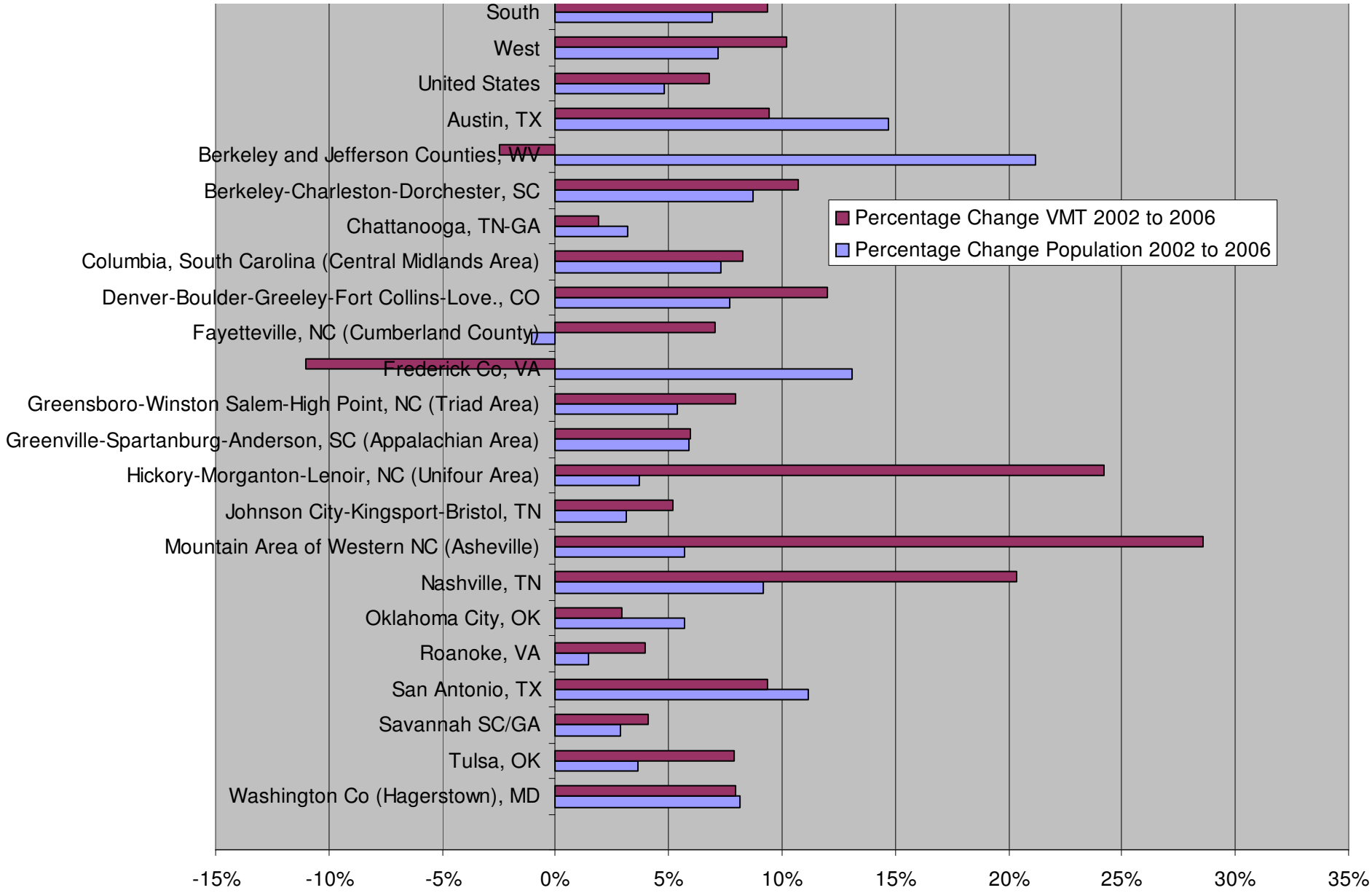
Western States

- Alaska;
- Arizona;
- California;
- Colorado;
- Idaho;
- Montana;
- Nevada;
- New Mexico;
- Oregon;
- Utah;
- Washington; and
- Wyoming.

Southern States

- Alabama;
- Arkansas;
- Delaware;
- District of Columbia;
- Florida;
- Georgia;
- Kentucky;
- Texas;
- Virginia;
- West Virginia;
- Louisiana;
- Maryland;
- Mississippi;
- North Carolina;
- Oklahoma;
- South Carolina; and
- Tennessee.

Figure 3-4: Percentage Change in Population and VMT from 2002 to 2006 for 20 EAC Program Areas, the U.S. and the South and West



Program Design Aspects of the Study
The study produced quantitative information in one area regarding program design: other aspects of the EAC Program related to EPA resources. The methodology and information from the study of the EPA resource estimates for the EAC Program versus the traditional approach are summarized in Table 3-7 (and described in detail in Table B-31). These are estimates made after completion of the EAC program, as resources expended on the program were not specifically tracked during its implementation.

Table 3-7 indicates that the study estimate for FTE to implement the EAC Program is 23.8. Table 3-7 also indicates that the study estimate for FTE to implement the traditional approach for the EAC areas is 24.6 to 57.3. The FTE estimates for implementation of a hypothetical traditional approach vary because of the differences across the regions in the FTE estimates for implementation of such an approach. Based on these estimates, since 23.8 and 24.6 are roughly comparable and 57.3 is well above those two numbers, the study information indicate that the EAC Program is as resource intensive (or less, depending on the EPA region) as a hypothetical traditional program for FTE.

Table 3-7 indicates that the study estimate for Federal Register actions to implement the EAC Program is 55. Table 3-7 also indicates that the study estimate for Federal Register actions to implement the traditional approach for the EAC areas is 28 to 46. The reason for the variability in the Federal Register actions for implementation of a hypothetical traditional approach is because of the variability across the regions in the estimates of the implementation of such an approach. According to these estimates, because 55 exceeds 46, the EAC Program is more resource intensive for Federal Register actions than the hypothetical traditional program. This is due partly to the fact that the EAC Program necessitated that EPA headquarters issue a number of Federal Register notices.

The estimates in Table 3-7 also indicate that the EAC Program is less resource intensive for Federal Register cost than the traditional program. This is due to the fact that the EAC Program's Federal Register actions were shorter than those of the traditional approach, despite being more numerous.

Table 3-7: EPA Resource Estimates for the EAC Program versus the Traditional Approach

Resource	Traditional Approach	EAC Program
FTE	24.6 to 57.3	23.8
Number of EPA Federal Register Actions (pages)	28 actions (715 pages) to 46 actions (1,085 pages)	55 actions (561 pages)
Federal Register Cost*	$349,635 to $530,565	$274,329

Source: EPA headquarters and regional office Staff estimates made retrospectively after the EAC Program ended, not during the EAC Program.
*Assumes current Federal Register of $489/page.

3.1.2 Qualitative Information
The study produced qualitative information for both the environmental and program design aspects of the study.

Qualitative Information for Environmental Aspects of the Study
The study produced information in one area: growth-related aspects of the study. Specifically, the discussion of study information in this area covers NSR Program activity and Conformity Program applicability.

NSR Program Activity
There are fundamental limitations to the ability to do a full quantitative analysis of the environmental benefits, or loss of opportunity for benefits, from Nonattainment NSR Program requirements due to implementing an EAC versus a traditional program. An analysis of this type would rely upon the ability to estimate the effects that the Nonattainment NSR Program would be expected to have on emissions over time, and compare that to the effects that occur absent the Nonattainment NSR Program. Although the study had available some limited information about some permit actions in some EAC areas, it cannot quantify, with a reasonable level of specificity, the differences in emissions for a given pollutant or pollutants, if any, that result from Nonattainment NSR Program requirements not being in place for EAC areas since it is not known:

- Whether a given project that went forward in the EAC area would have gone forward in the nonattainment area;
- If the Nonattainment NSR Program would create incentives for sources to relocate outside the nonattainment area, or to redesign or resize projects to avoid the Nonattainment NSR Program; and
- What the outcome of a nonattainment permitting process would have been (i.e., would the control technology determination have been different under Lowest Achievable Emission Rate (LAER) than under Best Available Control Technology (BACT), and from where would the offsets have come).

Because of these and other difficulties, it is very difficult to model the likely changes in emissions or air quality that could have occurred as a result of Nonattainment NSR Program requirements being in place. Therefore, the study considered qualitative observations more appropriate when looking at EAC programs and the potential emissions that may have been averted if Nonattainment NSR Program requirements had been in place in these areas. Nonetheless, specific permit information can provide a useful supplement to these conclusions when data is available. For that reason, the study provides the information below. However, the study is not able to make a quantitative estimate based on this information. While the Nonattainment NSR Program requirements have more stringent requirements in many cases, EPA cannot assume a direct comparison between hypothetical Nonattainment NSR Program and what actually occurred (i.e., between hypothetical LAER and actual BACT, or hypothetical major NSR Program and actual minor NSR Program) for these individual sources is valid.

The study identified two categories of NSR Program permitting activity in the 14 nonattainment deferred areas:

- Projects where the Prevention of Significant Deterioration (PSD) Program applied (projected emissions greater than either 250 tons per year or a PSD emissions significance rate) and the Nonattainment NSR Program may have applied because the projected emissions exceeded 100 tons per year (Category 1); and

- Projects that were not subject to the PSD Program (projected emissions less than 250 tons per year) but the Nonattainment NSR Program may have applied because either the projected emissions exceeded 100 tons per year or met another Nonattainment NSR Program emissions applicability test (Category 2).

The study addressed permitting activity from June 15, 2004 until April 15, 2008 by consulting with EPA regional and, where appropriate, state permitting staff. In five of the 14 areas the study found that there was no new source activity that triggered the PSD program requirements or that would have triggered the CAA's Nonattainment NSR Program requirements had the areas been designated nonattainment. The areas are:

- Berkeley and Jefferson Counties, West Virginia;
- Denver-Boulder-Greeley-Fort Collins-Love, Colorado;
- Frederick County, Virginia;
- Nashville, Tennessee; and
- Roanoke, Virginia.

Four of the 14 areas had eight new source permitting actions under Category One (plus one application submitted) in which the applicant was subject to the PSD Program but may have been subject to the Nonattainment NSR Program instead had the areas been designated nonattainment. The areas (and the associated activity) are:

- Columbia, South Carolina (Central Midlands Area)
    - Lexington County
        - Permit issued in 2007 – Michelin Corporation - major PSD Program source for VOC – increased VOC emissions by 110.9 tons per year, exceeding the PSD Program significance rates for VOCs of 40 tons per year;
- Greensboro-Winston Salem-High Point, North Carolina (Triad Area);
    - Forsyth County
        - Permit issued in 2005 – R.J. Reynolds - major PSD Program source for VOC – increased VOC emissions by 3,495 tons per year, exceeding the PSD Program significance rates for NO_x of 40 tons per year;
- Greenville-Spartanburg-Anderson, South Carolina (Appalachian Area)
    - Anderson County
        - Permit issued in 2005 – Santee Cooper - major PSD Program source for NO_x – increased NO_x emissions by 217.2 tons per year, exceeding the PSD Program significance rates for NO_x of 40 tons per year
        - Permit issued in 2006 – Duke Energy Corporation - major PSD Program source for NO_x – increased NO_x emissions by 84.1 tons per year, exceeding the PSD Program significance rates for NO_x of 40 tons per year
    - Greenville County
        - Permit issued in 2007 – Michelin Corporation - major PSD Program source for VOC – increased VOC emissions by 260 tons per year, exceeding the PSD Program significance rates for VOCs of 40 tons per year; and

- San Antonio, Texas
    - Bexar County
        - 2004 permit issued - Toyota Motor Manufacturing of Texas - major PSD Program source of VOC – increased VOC emissions by 75.6 tons per year, exceeding PSD Program significant rates for VOC of 40 tons per year
        - 2005 permit issued - City Public Service Spruce Power Unit No. 2- new major PSD Program source – increased NO_x emissions by 1,752 tons per year, exceeding PSD Program major source threshold for NO_x of 250 tons per year
    - Comal County
        - 2006 application submitted - Chemical Lime No. 1 – proposed NO_x increase of 711 tons per year - permit not issued to date
        - 2007 permit issued - TXI Operations, Hunter Plant - new major PSD Program source – increased NO_x emissions by 1,224 tons per year, exceeding PSD Program major source threshold for NO_x of 250 tons per year.

Two of the 14 areas had three new source permitting actions under Category Two in which the applicant was not subject to the PSD Program but may have been subject to the Nonattainment NSR Program had the areas been designated nonattainment. The areas are:

- Chattanooga, Tennessee-Georgia
    - Hamilton County
        - 2005 permit issued - Caraustar Mill Group, Inc. (d/b/a Chattanooga Paperboard) - major Nonattainment NSR Program source of NO_x – increased NO_2 by 145.69 tons per year, which would have exceeded Nonattainment NSR Program major source threshold for NO_x of 100 tons per year
        - 2005 permit issued - Aerisyn LLC - major Nonattainment NSR Program source of VOC – increased VOC emissions by 120 tons per year, which would have exceeded Nonattainment NSR Program major source threshold for NO_x of 100 tons per year; and
- Johnson City-Kingsport-Bristol, Tennessee
    - Sullivan County
        - 2005 permit issued - Aurora Hardwoods, Inc. - major Nonattainment NSR Program source of VOC – increased VOC emissions by 249.9 tons per year, exceeding Nonattainment NSR Program major source threshold for VOCs of 100 tons per year.

For six of the 14 areas the study lacked sufficient information to determine whether there was any activity under Category Two:

- Columbia, South Carolina (Central Midlands Area);
- Fayetteville, North Carolina (Cumberland County);
- Greensboro-Winston Salem-High Point, North Carolina (Triad Area);
- Greenville-Spartanburg-Anderson, South Carolina (Appalachian Area);
- Hickory-Morganton-Lenoir, North Carolina (Unifour Area); and
- San Antonio, Texas.

For Washington County, Maryland (Hagerstown), no activity in Categories 1 and 2 were identified as they would have not been subject to the Nonattainment NSR Program because Maryland is in the Ozone Transport Commission and would have had to meet NSR Program requirements regardless of participation in the EAC Program because it is treated as a moderate nonattainment area for NSR Program purposes.

Conformity Program Applicability

Although they were participating in the EAC Program, six of the 14 nonattainment-deferred EAC Program areas were subject to the CAA Conformity Program requirement during the EAC Program (from June 14 2004 to April 15, 2008) for pollutants other than the 8-hour ozone NAAQS. Those pollutants were: the 1-hour ozone NAAQS, the PM_{10} NAAQS, the $PM_{2.5}$ NAAQS and the carbon monoxide NAAQS. Table 3-8 provides information on each area's Conformity Program status.

Federal actions in these areas may also have been subject to the environmental review process under the National Environmental Policy Act (NEPA), which has some overlap with the Conformity Program for certain analyses. The NEPA requires Federal agencies to integrate environmental values into their decision making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions.[25]

Table 3-8: Conformity Program Status of Nonattainment-Deferred EAC Program Areas during Implementation of EAC Program

Nonattainment-Deferred EAC Program Areas	Was the Conformity Program in Effect for At Least Part of EAC Program Implementation?	What NAAQS Pollutant(s)?
Berkeley and Jefferson Counties, West Virginia	No	• Not applicable
Chattanooga, Tennessee-Georgia	Yes	• $PM_{2.5}$ NAAQS because area designated nonattainment for $PM_{2.5}$ (effective April 5, 2005)
Columbia, South Carolina (Central Midlands Area)	No	• Not applicable
Denver-Boulder-Greeley-Fort Collins-Loveland, Colorado	Yes	• 1-hour ozone NAAQS (approved maintenance plan in place with budgets for NO_x and VOCs) • PM_{10} NAAQS (approved maintenance plan in place with budgets for PM_{10} and NO_x) • Carbon Monoxide NAAQS (approved maintenance plan in place with budget for Colorado)
Fayetteville, North Carolina (Cumberland County)	No	• Not applicable
Frederick County, Virginia	No	• Not applicable
Greensboro-Winston Salem-High Point, North Carolina (Triad Area)	Yes	• 1-hour ozone NAAQS (to be revoked after April 15, 2009) • $PM_{2.5}$ NAAQS because area designated nonattainment for $PM_{2.5}$ (effective April 5, 2005)
Greenville-Spartanburg-Anderson, South Carolina (Appalachian Area)	No	• Not applicable

[25] http://www.epa.gov/compliance/nepa/index.html

Nonattainment-Deferred EAC Program Areas	Was the Conformity Program in Effect for At Least Part of EAC Program Implementation?	What NAAQS Pollutant(s)?
Hickory-Morganton-Lenoir, North Carolina (Unifour Area)	Yes	• $PM_{2.5}$ NAAQS because area designated nonattainment for $PM_{2.5}$ (effective April 5, 2005)
Johnson City-Kingsport-Bristol, Tennessee	No	• Not applicable
Nashville, Tennessee	Yes	• 1-hour ozone NAAQS (will be revoked after April 15, 2009)
Roanoke, Virginia	No	• Not applicable
San Antonio, Texas	No	• Not applicable
Washington County, Maryland (Hagerstown)	Yes	• $PM_{2.5}$ NAAQS because area designated nonattainment for $PM_{2.5}$ (effective April 5, 2005)

Source: EPA regional office Conformity Program staff.

Qualitative Information for Program Design Aspects of the Study
The study produced information in four areas:

- Efficiency of EAC Program;
- Longer term impact;
- Outreach and stakeholder interaction; and
- Other aspects of the program.

Efficiency of EAC Program
Ten of the state and local agency officials consulted believe the EAC Program model is a more efficient way to deliver clean air than the traditional nonattainment designation approach. The EAC Program is considered by the individuals consulted to be more efficient because it is thought to generate cleaner air quicker than the traditional approach. EAC Program areas are perceived to have an incentive to address air quality issues earlier than they would otherwise. Individuals consulted believe that is why participants preferred to take a proactive approach rather than a retroactive response to air quality problems in their areas.

In addition, the individuals consulted believe the traditional nonattainment approach can create resentment between states and localities. States bear criticism for administering the mandatory measures required under nonattainment designation. The individuals consulted observed that local stakeholders preferred to have some control over the types of measures that would be applied in their areas. Also, localities are not believed to make an effort to improve air quality if they think that the area will be designated nonattainment anyway.

Most importantly, the individuals consulted expressed the view that the EAC Program establishes better working relationships between states and local stakeholders than occur in the traditional approach. As a result, stakeholders appeared to focus better on developing and implementing control measures. They also developed ownership of the air quality issues in their community. These factors contributed to the perceived efficiency of the program.

The majority of the individuals consulted would like EPA to establish an EAC-type program for the 2008 ozone standard. The reasons for wanting to participate in another EAC Program, include:

- Strong incentives to come into attainment;
- Ability to build on lessons learned during the first EAC experience;
- Positive collaboration with educated stakeholders; and
- Need to obtain emissions reductions from local measures.

Five of the individuals consulted believed that the efficiency of the EAC Program model depends on the circumstances of individual programs. First, they regard the EAC Program to be a more efficient method for improving air quality for areas that are relatively close to the standard. In these situations, a few local measures, coupled with state, regional, and national programs, are all that is needed to bring the area into attainment. But, the EAC Program is not considered to be the right approach for areas further from the standard that need more measures to reach attainment. Second, the individuals consulted stated that the efficiency of the EAC Program model must be studied on an area-by area basis. They found that the extent of local involvement in a program has a major influence on the efficiency of an EAC Program. Local measures may be more efficient in concept but will not work if stakeholders are not engaged in the process.

One local agency could not determine whether the EAC Program is more efficient because it had never participated in the traditional approach. However, it believed the EAC Program did speed up the pace of emissions reductions in the area. Local stakeholders attempted to clean up the air as quickly as possible.

One individual consulted stated that the EAC Program is not more or less efficient than the traditional approach. Even so, the agency believed the EAC Program did produce benefits. The EAC Program's collaborative approach did make the program effective. The public also became aware that it could play a role in improving air quality.

One state agency noted that the EAC Program produced positive and negative impacts. The EAC generated the following positive impacts: additional funding for ozone modeling; better outreach on ozone action days; and, greater public air quality awareness. On the negative side, the agency became frustrated with the procrastination of local areas in submitting required data for the state to complete EAC progress reports to EPA.

A state agency implementing the traditional approach did not believe it was a more efficient approach in a nonattainment area. The traditional approach did not generate support for environmental measures. Conversely, the agency believed the EAC approach would have helped to change attitudes and generate local support in the area. The CAA is considered to be punitive because the agency had to obtain unnecessary VOC reductions under the traditional approach.

A local agency participating in the traditional approach in this state could not compare the two approaches because it is not familiar with the EAC process. But, it noted that the redesignation process takes a very long time under the traditional approach. The agency believed that shortening this time period would greatly benefit local areas.

Rather than follow the traditional approach, five areas in another state decided to pursue voluntary EAC-type activities. The state agency administering this program believed the traditional model is a less efficient method of improving air quality. This is due to the restrictive nature of the traditional

program. The agency believed that the EAC Program provided areas with the opportunity to utilize control measures that work best for local conditions without imposing the regulatory burden. The collaborative dialogue among participants provided for a more efficient method of reaching attainment status. In addition, the agency believed that the selection criteria made the EAC a more efficient approach than the traditional model because only areas that are likely to succeed are accepted into the program.

EAC Program Resources versus Traditional Approach

Six of the individuals consulted believed that local areas spent more resources in the EAC Program than they would have in the traditional program. This is because local stakeholders would not have been as involved in the traditional method. The individuals consulted noted that industry would likely have been the only stakeholder involved in the traditional process.

Four of the individuals consulted stated that the EAC Program did cost more time and resources initially. However, they believed that the benefits from the EAC Program outweighed the costs by:

- Saving resources in the long run;
- Developing control measures that accommodate economic growth;
- Developing good will among stakeholders;
- Providing local control over program activities; and
- Avoiding nonattainment status.

One of these individuals consulted did comment, however, that comparing resource expenditures is not an appropriate method to study the EAC Program. The benefits of participating in the EAC were considered to have outweighed the costs.

Five of the individuals consulted found it difficult to compare resource allocations under the two different approaches. One state agency reportedly saved money and staff time while planning the EAC Program but still had to allocate resources to SIP development. Another state agency believed that the EAC Program approach required fewer resources at the state level than would be needed to conduct rulemaking for a traditional SIP. However, it noted that the EAC Program required more resources at the local level to engage stakeholders.

An agency in a different state noted that its EAC effort required more work and resource allocation up front. However, it believed that the traditional approach would have required more state resources over time. This is because local areas were more willing to contribute resources in the EAC approach because they had greater responsibility for the program. In comparison, nonattainment areas had to rely more heavily on the state for resources. So, the agency found it difficult to say whether one approach was more costly overall than the other.

An agency in another state reported that staff responsibilities were redirected from technical SIP work to working with local EAC Program areas. No additional state resources were committed to the EAC program. In one respect, though, the agency believed that the EAC Program reduced the resource burden. In its experience, more people became involved in "bureaucratic exercises" in the traditional nonattainment process. Because the EAC Program did not contain comparable requirements, the agency found that EAC participants were able to focus resources on implementing "air quality improvement efforts". The agency considered this a more efficient use of limited resources.

Instead of hiring any additional staff for the EAC Program, one County agency also added air quality duties to the workload of existing staff. It also found that the EAC Program approach did make more resources available than would have been available through the traditional approach. Local stakeholders stepped up, took ownership of the program, and tried to implement control measures.

Three of the individuals consulted stated that the EAC Program did not save money or resources over the traditional approach. One state agency noted that it had to allocate more staff time for the EAC Program approach. An agency in another state said that additional resources were needed to complete the EAC requirement for ongoing progress reports. It considered the reporting requirement burdensome and very similar to the SIP approach.

Two of the individuals consulted stated that EPA needed to provide additional technical assistance and education for participants to fulfill EAC Program requirements. Three of the individuals consulted reported that they did not have the funding and/or technical expertise needed to complete modeling requirements or implement local measures. One state agency pointed out that it could not have performed the ozone modeling needed for the EAC areas without funding from their State Department of Transportation. EPA Section 105 funding enabled the state to develop a modeling capability but it did not provide the capacity to refine the system for the EAC Program Areas. The agency believed that funding limitations, particularly for technical assistance, may have prevented interested parties from participating in the EAC Program.

One local agency participating in the traditional approach found the process to be time consuming but a great learning experience as well. Although it found that more staff time is required in the traditional approach, the resource burden was not overtaxing. The state agency administrating the traditional approach noted that this approach required fewer state resources initially to deal with a local nonattainment area. In contrast, it found that the EAC process required a lot of resources up front but has long-term benefits.

The local agency participating in a voluntary program rather than the traditional approach stated that the voluntary measures cost the same as the traditional approach. The resource cost was sizeable but unavoidable. In general, however, it considered that more local resources would be required for a locally-driven, EAC-type approach than in the traditional approach. The state agency administering this voluntary program believed that the resource allocation was burdensome but required by law. Since modeling would have been required under the traditional approach, the modeling aspect of the voluntary program was not considered to be more or less burdensome than the traditional model. Although the voluntary EAC approach cost a little bit more upfront, however, the agency thought it produced a greater yield of benefits.

EAC Program Flexibility

Fifteen of the individuals consulted believed the EAC Program gave local areas the flexibility to develop their own approach. According to one state agency, the EAC Program's flexibility created an intergovernmental dynamic that would not likely have occurred under the traditional approach. This dynamic is credited with bringing a more willing and receptive response from the local area to the program. A County agency stated that local flexibility was a strong selling point for bringing a skeptical community showing resistance to an unknown program. Another state agency believed that

the opportunity for flexibility in local decision making was critical for obtaining support for the program.

The EAC Program areas in two states would have come into attainment through national measures alone. By participating in the EAC Program, however, the states believed they had the flexibility to develop control measures that were appropriate for their own areas. For example, an area may have been interested in pursuing an anti-idling program originally to save fuel. Because the anti-idling program would also provide air quality benefits, it may have made it easier politically for the area to implement the program in the context of the EAC Program. In addition, the flexibility of the EAC Program was considered to have provided an opportunity for local programs to include controversial measures such as lowering the speed limits for truckers.

One local agency commented that the EAC Program's flexibility allowed localities to focus on specific industries of interest. As a result, it did not have to spend resources on all sources in the area. A local agency in another EAC Program area noted that the flexibility provided an opportunity to develop measures that would be best for each individual source or sources. It believed that the local control measures adopted in EAC Program areas could not have been mandated by states.

Three of the individuals consulted believe it is possible that the EAC Program may have provided flexibility to local areas. Although more flexibility may have been available, one state agency maintained that its EAC Program areas did not take advantage of the added flexibility. A local agency stated that there was not much it could do at the local level. It believed that whatever emissions reductions it generated would be a drop in the bucket compared to those coming from all the federal and state programs.

The local agency and state agency that followed the traditional approach agreed that it does not give local areas flexibility to develop their own approach. However, the local agency stated that it is difficult for local areas to develop alternative approaches to complex issues when state government already has a good approach.

A local agency participating in a voluntary program rather than the traditional approach believed that the traditional approach does not provide flexibility to local areas. The state agency that administered this approach noted that the CAA does not provide local flexibility in the traditional approach.

Threat of Nonattainment Designation as Incentive

Sixteen of the individuals consulted stated that the EAC Program would not have succeeded without the threat of nonattainment designation or without the program being part of the larger SIP effort. They believed that states and local areas needed motivation to participate in the program. Moreover, EAC Program participants indicated that they entered the program to avoid the NSR and Conformity Program requirements of nonattainment designation. They were also concerned about the impact of a nonattainment designation on economic development. In addition, the individuals consulted thought it would be difficult to get local stakeholders to participate in the program without the threat of nonattainment.

Four of the individuals consulted were not certain whether the EAC Program would have succeeded without the threat of nonattainment. They believed that some areas might have participated under the right circumstances.

One state agency commented that one of its EAC Program Areas would have participated without the threat of nonattainment because it is a very environmentally-motivated area. The local agency agreed that it would have participated in the EAC without the threat of nonattainment.

EAC Program Process-Related Goals and Requirements

Based on information contained in the bi-annual progress reports from the 14 nonattainment-deferred and six attainment areas, all of the areas studied met their progress-related requirements. However, one attainment area was late with some of their bi-annual progress reports.

Six of the individuals consulted stated that EPA should streamline the EAC biannual reporting process. They believe that less frequent reporting would have the same or greater value than a biannual exercise. In addition, EPA is encouraged to develop a simplified reporting process such as: a more quantitative approach; a standard checklist; or a standard electronic form. However, six other individuals consulted felt that the reporting requirements were not more burdensome than the traditional approach.

Longer Term Impact

EAC Provision for Longer Term Emission Reductions or Continued Action In The Future

Based on information contained in the progress reports from the 14 nonattainment-deferred and six attainment areas, these areas have entities that will continue the EAC Program activities beyond April 2008.[26]

Nineteen of the individuals consulted stated that the EAC Program activities did provide for longer term emission reductions or create a local "infrastructure" for further or continued action in the future. Several of the individuals consulted noted that the EAC control measures would remain in place for the foreseeable future. There are several reasons for this. They include the following:

- EAC control measures may have been adopted without expiration dates or are intended to be permanent;
- Control measures that are included in SIPs will remain in effect as long as necessary;
- Local areas may value the benefits of air quality measures put in place during the EAC Program; and
- Due to the anti-backsliding provision, it may be necessary to retain EAC Program control measures to comply with the SIP.

The EAC is credited with creating an infrastructure for continued action in the future. One state agency reported that air quality is among the elements in the smart growth principles adopted by planning districts during the EAC Program. These measures have and will continue to remain in place after the EAC Program. The agency believed it was important that the program was being implemented by government entities that will remain in place long term.

An agency in another state noted that an EAC Program task force created during the EAC Program's development and implementation formed a successor group after the program ended. About 80 members attend the regularly scheduled meetings. The new task force has already developed a

[26] To clarify, the EAC control measures are part of the SIP and are, therefore, Federally enforceable and are to continue to be implemented in the future regardless of whether an entity has been designated to continue EAC Program activities.

document of control measures for planning agencies in the state. The agency stated that this document prepared the groundwork for the next ozone standard.

Local areas in another state have indicated they are committed to keeping air quality programs going. Financial support and the new standard will help keep those commitments alive. One local area, for example, wants to expand air quality measures beyond ozone to address $PM_{2.5}$ and greenhouse gases (GHG). Another community has inquired about funding for woodstove changeout programs. A different area has developed a website, conducted significant outreach, and committed to funding an air quality coordinator.

An agency in another state believed that the EAC Program did provide a learning experience. It also is credited with facilitating inter-state collaboration on air quality issues, particularly $PM_{2.5}$ emissions. However, the local EAC Program activities did not provide much capacity for continued action in the future.

One local agency participating in the traditional approach believed that this approach created a close working relationship between local stakeholders and the state. The relationship has proven to be beneficial. In addition, local stakeholders learned from the experience. The state agency administering this program believed that the EAC approach provided these benefits to a greater extent. It believed the traditional approach is more short sighted and does not get local long-term emissions reductions.

According to a local agency participating in a voluntary program rather than the traditional approach, the public received a great deal of information about air quality. This generated an awareness of air quality issues. The EAC-type activities are credited with generating advocacy for increased bus routes, especially to outlying areas. The state agency administering this voluntary EAC program noted that the traditional approach locks in control measures and contingency measures for an extended period of time. The traditional approach also provides for continued and more concrete control measures. Under the voluntary approach, however, the agency notes that it created a Clean Air Coalition of regional stakeholders that continues to function.

EAC Activities and Continued Reductions in Ozone

Sixteen of the individuals consulted believed that EAC Program activities resulted in continued reductions in ozone and air quality improvement activities/policies that were not foreseen initially as the EAC Program was implemented. Two of the individuals consulted could not determine at this time whether unforeseen reductions would continue. Two other individuals consulted reported that EAC Program activities did not lead to continuing unforeseen air quality benefits.

Four states maintained that the EAC Programs led to the development of policies and projects that yielded continuing benefits that would not have occurred otherwise. These included:

- A school bus anti-idling program;
- Increased use of biodiesel;
- Alternative modes of transportation;
- Carpooling;
- Expanded bus routes;
- Policies requiring sidewalks and green-spaces;
- Local capacity building;

- Cement kiln voluntary reductions;
- Airport reductions;
- Lawn mower trade-in programs;
- Retrofits for compressor engines; and
- A green building program.

In another state, the EAC Program established an atmosphere that helped create alliances to push the oil and gas industry for emissions reductions. As a result, the EAC Program is credited with generating large emissions reductions than would not have occurred without the program. The state agency continues to ask for additional reductions from the oil and gas industry. It plans to ask for more reductions from the industry in the future as well.

Three local areas reported that the EAC Program provided ongoing unforeseen air quality benefits such as: a regional ride share website for twenty-two participating counties; an ozone watch/warning system; greater use of greenways, bikeways and similar measures; closer and more trusting inter-governmental relationships; and greater public awareness of air quality issues.

A local agency participating in the traditional approach stated that the traditional approach increased public awareness of air quality issues. It believed that the growing awareness may lead to vehicle emissions reductions if the public changes personal behavior patterns by driving less or filling up at appropriate times. The state agency administering this traditional program did not think that there would be any additional unforeseen reductions.

A local agency participating in a voluntary program rather than the traditional approach did not think there would be additional unforeseen reductions. Most of the voluntary activities have already concluded. The agency reported that one criticism of the voluntary approach is that it keeps initial momentum going but falters once the initial catalyst has been removed. According to the state agency administering the voluntary EAC program, desulfurization will result in mercury reductions that were not foreseen. This will help improve mercury-impaired waters.

Outreach and Stakeholder Interaction

EAC Air Quality Task Forces

Based on information contained in the bi-annual progress reports, the 20 areas included in the study did have air quality task forces except for three of the attainment areas: Mountain Area of Western North Carolina (Asheville); Oklahoma City, Oklahoma; and Tulsa, Oklahoma. The Mountain Area had a group but it included only government representation. For the areas that had task forces, all had diverse representation from at least three sectors except for Chattanooga, Tennessee-Georgia and Nashville, Tennessee. Chattanooga addressed their task force needs through the public transportation planning organization, which did not have representation from least three sectors.

Ozone Awareness Outreach

Based on information contained in the bi-annual progress reports from the 14 nonattainment-deferred and six attainment areas, the 20 areas included in the study did conduct ozone awareness and all but one – Chattanooga, Tennessee-Georgia – had a coordinator.

Stakeholder Engagement

Seventeen of the individuals consulted stated that the EAC Program did engage local stakeholders in the program. The diverse range of local stakeholders included local governments, elected officials, the media, councils of governments, industry, local businesses, utilities, chambers of commerce, environmentalists, and other organizations. One state agency noted that it had to reach out to stakeholder groups, which are not customarily involved in air quality issues. Another state agency maintained that public engagement in the process was the largest benefit of the EAC Program. A local agency stated that the program generated a greater level of engagement from a wider range of local stakeholders than found in other issues. Another local agency summarized the importance of engaging local stakeholders in the process. It stated that, in general, suggestions from local stakeholders are better received than ideas from government. The EAC is credited with improving the working relationships between states and local stakeholders. It is believed that the improved relationships and the flexibility given to local areas provided opportunities to consider measures that would not have been discussed outside of the EAC Program.

The individuals consulted believed that the EAC Program produced the following additional benefits.

1. Prior to the EAC Program, local stakeholders were considered to have a limited awareness of air quality issues. Because of the EAC Program, however, elected officials, citizens, and other local stakeholders became more aware of air quality issues. The increased level of public awareness may not have occurred under the traditional approach. One state agency noted that local stakeholders are now discussing air quality issues amongst themselves. It also credited the EAC Program for creating clean air advocates at the local level.

   The EAC also is credited with increasing the involvement of local stakeholders in air quality issues. Stakeholders had to take part in the initial stages of the program to meet the EAC schedule. Besides getting involved more quickly, stakeholders also participated in air quality issues to a greater extent than they would have under the traditional approach.

   A local agency noted that citizens now discuss aspects of air quality that they would not have known about prior to the EAC Program. At stakeholder meetings, for example, citizens are aware of particulates, the new standards, and other air quality issues. In addition, the public is aware that personal actions, such as exchanging gas cans and lawn mowers, can improve air quality.

2. The EAC Program process is credited with strengthening the relationship between states and local stakeholders. One state agency maintained that its relationship and communication with local stakeholders was not nearly as strong prior to the EAC Program. Another state agency acknowledged that it had an outreach program to local areas prior to the EAC Program. However, the EAC Program enhanced its outreach effort. The EAC generated broad stakeholder representation in each of the participating areas. As a result, the agency believed the state's outreach efforts are better now.

   One state agency believed that its enhanced relationship with stakeholders has already provided important benefits. The state legislature must approve all proposed regulations. Before receiving legislative approval, however, the state has to demonstrate stakeholder support for a regulation. The agency was able to tighten the open burning ban and NO_x reduction regulations.

But, the agency stated that it would have not have been able to obtain the stakeholder support needed to get the regulations passed without the improved relationships from the EAC Program.

3. The EAC Program is credited with creating an infrastructure for stakeholder involvement in future air quality issues. Seven of the individuals consulted noted that stakeholder groups remain involved in air quality issues. Three of the stakeholder groups are working with states on implementation of the $PM_{2.5}$ standard. One local agency stated that its entire metropolitan area has been working proactively on $PM_{2.5}$ issues for the past year. Many of the same people who were involved in the EAC are now working on $PM_{2.5}$. The relationships established during the EAC Program are credited with making collaboration on $PM_{2.5}$ much easier.

One County agency stated that it could not have afforded to pay for the technical expertise provided by stakeholders participating in the EAC Program. Technical experts from industry and the state continue to help the County with EPA guidance, other air quality issues, and community events.

One state agency maintained that the infrastructure developed through the EAC Program will help it meet the new ozone standard quicker. It plans to do more of the same activities developed during the EAC Program to meet the new standard. Moreover, the state is very interested in developing the EAC Program concept. It is exploring whether states and localities can build upon previous programs to continue the EAC.

Two of the individuals consulted found it difficult to determine whether the EAC Program increased stakeholder involvement. According to one individual consulted, local stakeholders participated extensively in the EAC Program. However, air quality issues were already important to stakeholders before the areas became involved in the EAC Program. The other individual consulted did not track stakeholder involvement.

Due to the rural nature of the region, one EAC Program area did not have much stakeholder participation. The local agency stated that air quality issues were not that important to the general public.

One local agency in one area participating in the traditional approach stated that it engaged local stakeholders. Participants included metropolitan planning organization committees, local government, and business. However, there was not much public participation. The state agency administering the traditional program noted that the approach did not engage stakeholders in the same area but not in another. The lack of stakeholder engagement in that area was thought to be due to the lower level of resources spent by the state in the area.

A local agency that participated in an EAC-type voluntary approach rather than the traditional approach stated that the voluntary approach brought together elected officials and various other stakeholders. The state agency that administered the voluntary EAC-type approach agreed that local stakeholders were engaged in the process.

Other Aspects of the Program

EAC Requirements versus CAA Nonattainment Area Requirements

Table B-32 lays out in detail the requirements for EAC Program areas alongside the requirements the 14 nonattainment-deferred areas could have faced had they not pursued the EAC Program and instead

were designated nonattainment. Specifically, the table presents an outline of the general Subparts 1 and 2 requirements of the CAA. The presentation of the requirements in the table and the discussion here serves historical purposes only. Following the April 2004 area designations, the implementation program for the 8-hour standard had to be revised in light of a court decision that affected how areas were classified. This may have affected some of the EAC Program Areas if they had been designated nonattainment in April 2004 instead of participating in the EAC Program. Most of the Subpart 1 requirements in Table B-32 no longer apply to the areas that were originally placed under Subpart 1. EPA is currently developing rulemaking to address the requirements for the areas that were originally placed under Subpart 1. However, for historical purposes only the study performed a comparison of Subpart 1 nonattainment area requirements versus EAC area requirements, which is presented here. (The Marginal Subpart 2 areas are not included in the comparison here but can be found in Table B-32.)

In some respects, the EAC Program required more stringent requirements than a Subpart 1 nonattainment program. In other respects, however, the Subpart 1 program required more stringent requirements. And, in yet other ways, the requirements for the two types of areas were comparable.

Here are the major differences in requirements:

In a few respects, the EAC Program required more stringent requirements than a Subpart 1 nonattainment program:

- Earlier date for submission of an attainment demonstration SIP;
- Earlier attainment date;
- Earlier date for compliance with emission reductions needed for attainment; and
- Planning milestones such as progress reports for planning, which, if not met, would have caused the termination of the EAC deferral of the nonattainment designation.

In many respects, the Subpart 1 nonattainment program required more stringent requirements than the EAC Program:

- Nonattainment area NSR;
- General Conformity Program;
- Transportation Conformity Program including, but not limited to, the following requirements:
    - Consultation between air quality and transportation agencies on both the SIP and the transportation plan and Transportation Improvement Program
    - Transportation and emissions modeling requirement
    - Build/no build test
    - Hot spot test
    - Emission budget tests
    - “Freezes” if certain requirements are not me;
- RACT;
- Attainment had to be achieved as “expeditiously as practicable”;
- Failure to submit a SIP would ultimately result in sanctions and Federal Implementation Plans; and
- Longer period (10 years) for showing of maintenance with the standard if state/area requested redesignation to attainment.

- EAC Program areas only required to demonstrate maintenance of the standard for five years (although states for almost all of the EAC Program areas in the Southeast (EPA Region 4) submitted maintenance plans for 10 years).[27]

In two respects, the requirements for Subpart 1 and EAC Programs were comparable:

- An attainment demonstration using photochemical grid modeling, although the EAC modeling required that fewer episodes are modeled and
- Preparation of a revised SIP if the area failed to attain by its attainment date.

In addition, the Subpart 2 nonattainment classification would have been more stringent than the EAC Program in the case where an area (such as a marginal area) failed to attain by its attainment date. In that instance, it would have been reclassified to at least the next highest classification. The area would then have been subject to additional mandatory source control measures and planning requirements. However, a marginal area would not have been required to submit an attainment demonstration or to have satisfied other planning requirements.

Finally, it is worth noting that, pursuant to authority under Section 110 of the CAA, EPA has long required states to submit emission inventories to EPA as part of their SIP. The inventories have to contain information regarding the emissions of criteria pollutants and their precursors (e.g., VOCs). This applies to EAC and non-EAC Program areas in states. In 2002 EPA simplified and consolidated emission inventory reporting requirements, established new reporting requirements related to $PM_{2.5}$ and regional haze, and established new requirements for the statewide reporting of area source and mobile source emissions.[28]

3.2 Observations

3.2.1 Overall Observations Resulting from the Study

Because of the study's limitations, it is difficult to draw hard findings and conclusions. However, the study was able to make a number of observations about emission reductions, changes in air quality, and issues related to program design and process.

Overall, a number of states in the Northeast had serious concerns about the approach. The EAC program was generally popular with participating state and local officials. These officials indicated the EAC Program model provided the right combination of incentives, flexibility, and structure and was used to foster a collaborative environment that:

1) Encouraged local stakeholders to take ownership of the ozone air quality issue and to develop and adopt local measures;
2) Increased awareness of ozone air quality issues with key stakeholders and, to a degree, with the public; and

[27] EPA Region 4 worked with almost all of the participating EAC states in the Southeast – North Carolina, South Carolina, and Tennessee but not Georgia – to voluntarily agree to develop and submit maintenance plans that extended to 2017, 5 years past the year 2012 minimum date for EAC areas.

[28] "Consolidated Emissions Reporting Rule," 67 Federal Register 39602-39616, http://www.epa.gov/ttn/chief/cerr/cerr.pdf, June 10, 2002.

3) Helped establish working relationships between state environmental agencies and local government that may prove beneficial for future implementation of air quality standards.

Emission Reductions

For the vast majority of the areas included in this study, the EAC Program appeared to successfully encourage the development and adoption of quantifiable, local emission reduction control measures by the December 2005 deadline. Ninety-six percent of the total 388 measures implemented for the 20 areas included in the study were implemented by the EAC December 2005 deadline, according to EAC progress reports and SIPs. Estimated emission reductions from local measures collectively constituted an estimated nine percent or more of quantified NO_x and VOC emissions reductions in seven of 18 EAC Program areas included in this study for which complete emissions reductions data were available (the remaining reductions were achieved from national and state measures). The local measures were "directionally correct" and should assist the areas in maintaining the ozone NAAQS.

According to many state and local officials, the program also resulted in quantifiable emission co-reductions of other pollutants, including particulate matter and/or air toxics.

Air Quality

The study analyzed the air quality improvements experienced by EAC Program areas in the eastern U.S. by comparing them to improvements achieved in nearby nonattainment areas that did not participate in the EAC program. (This could not be analyzed in the Colorado, Oklahoma and Texas EAC areas, because there were not ozone nonattainment areas located near enough to provide a comparison.) The analysis found that the changes in air quality in eastern EAC Program areas were consistent with those observed in non-EAC areas. Additionally, consistent with the expectation that most progress towards ozone attainment in the East would come generally from national measures such as vehicle standards and power plant controls, it appears that, based on air quality data, local EAC measures adopted and implemented in EAC Program areas in the East did not produce an early, demonstrable incremental improvement in air quality. Relative to non-EAC Program areas, the information compiled appears to indicate that, for EAC areas in the East, progress toward meeting the air quality standards on time was not adversely affected by two factors: (1) the absence of some or all of the nonattainment area requirements that traditional nonattainment areas face, or (2) population and vehicle miles traveled growth that most of the areas experienced during EAC Program implementation. Relative to non-EAC Program areas, these two factors also did not appear to adversely affect the ability of EAC areas in the East to attain the NAAQS by December 2007 (or earlier for many EAC areas).

The fact that local measures did not produce an early, demonstrable incremental improvement in air quality can be explained in part by the fact that quantified NO_x and VOC emissions reduction estimates from *local* EAC measures represented a small part of emissions overall: (1) in EAC Program areas; (2) in states in which they are located, and (3) as compared to reductions achieved in each state through the NO_x SIP call. The best way to measure the impact on air quality of the EAC local measures – and whether they contributed to the areas attaining early – would be to conduct incremental air quality modeling of the emissions reductions from those measures. Short of that, the reductions are so small relative to the emission reductions from federal and state measures that their impact is indiscernible.

All but one of the EAC areas did attain the ozone NAAQS by December 31, 2007; in fact, 15 of the 20 EAC areas attained the 8-hour ozone NAAQS by December 31, 2004 – prior to the required 2005 implementation date for the EAC control measures.

This study looked at ozone air quality through 2007. And while almost all the EAC areas met the ozone NAAQS before 2007, it remains to be seen what will happen to ozone air quality levels in these areas as they grow in the next 5 to 10 years. Ozone air quality in many of the areas will continue to be influenced by, among other things, state and national programs to reduce NO_x and VOCs. Some state and local officials believe that local measures should benefit air quality in the future. EAC Program areas were required to develop plans to demonstrate how they would address emissions growth and maintain meeting the ozone NAAQS for five years (to 2012). They did so, and almost all the states in the southeastern U.S (EPA Region 4) with EAC Program areas submitted maintenance plans for 10 years.

The study also looked at whether the air quality modeling provided insight into what degree the "local" EAC measures contributed to additional improvements in air quality, beyond the improvements provided by the state and national measures. The only reliable way to quantify the air quality improvements from the EAC local measures is to model the local measures independently of the state and national measures. But the modeling performed for the EAC SIPs did not provide such an analysis. For this study the information available only allows for a review of whether the actual air quality improvement achieved is consistent with the level of improvement predicted by the model. After making this comparison, this study observes that the estimates in the modeled demonstration are consistent with the air quality achieved. Therefore, the modeling provided reasonable information.

It was beyond the scope of this study to analyze the improvements in short-term or long-term air quality that would have otherwise occurred in the affected EAC areas if they had followed the traditional requirements under the CAA associated with a nonattainment designation. For example, several of the nonattainment-deferred areas experienced new stationary source activity that may have been subject to permitting requirements under the CAA nonattainment NSR program had the same activities been undertaken while these areas had a designation of nonattainment. The proposed emissions increases for some of those sources were controlled under the CAA's PSD Program. As noted above, this study did not quantify emission changes in EAC versus non-EAC areas and is, therefore, unable to provide information on the impact on emissions of the absence in EAC areas of some or all of the nonattainment area requirements that traditional nonattainment areas face, including those of the Nonattainment NSR Program.

State and local agencies consulted did believe the EAC approach to be well suited for nonattainment-deferred areas that were new to the ozone air quality issue and had ozone air quality levels relatively close to the standard. Those areas did not face the same degree of ozone air quality challenge faced by some of the nation's largest areas and so, in that regard, their air quality problems were more manageable. EAC Program participants in these areas took ownership of their air quality problem in a way that was not likely, in the opinion of the state and local agencies consulted, to have occurred to the same degree under the traditional approach, absent a concerted EAC-type effort or unless the community was already active on environmental issues.

Program Design and Process

Some EAC Program areas did not experience the "collaborative environment" the EAC Program model fostered in other EAC Program areas. Based on the study discussions, several possible reasons emerged to help explain this:

- Insufficient technical support for EAC Program areas from EPA and the states;
- Insufficient state or local agency leadership to help start and/or shepherd the EAC Program process;
- Lack of public interest due to insufficient information about local air quality issues; and
- Ozone air quality problem believed to be solvable due to state and national measures alone so there was not much action perceived to be needed locally.

The state and local agencies implementing the EAC Program reported that, in order to succeed, the EAC program needed (1) the threat of reinstatement of the nonattainment designation as the consequence of failure to meet EAC Program requirements and (2) for the EAC Program to be part of the larger SIP program. The majority of state and local agencies consulted believed that states and local areas needed motivation to participate in the program for it to succeed.

The EAC Program required as much EPA staff resources or less than the staff resources EPA estimated would have been needed to implement the regular program for the same areas. The question of whether the EAC Program saved estimated human resources varied by EPA region. The study lacked data to assess the resource impact of the EAC program on the participating state and local agencies.

3.2.2 Specific Observations

Quantitative Observations

Environmental Aspects

The following seven quantitative observations relate to environmental aspects of the EAC Program study. They are based on a quantitative information gathered for 20 EAC Program areas – 14 nonattainment-deferred and 6 designated unclassifiable/attainment – and, thus, pertain to those areas.

Observation 1: In the East air quality changes in EAC Program areas were consistent with air quality changes in non-EAC 8-hour ozone nonattainment areas in the same region. Based on a study of meteorologically-controlled air quality data from 2001-2003 to 2005-2007, air quality changes in EAC Program areas in the East are consistent with changes in non-EAC Program areas in the East. Any pre-program concern that ozone air quality in EAC Program areas would suffer as compared to non-EAC Program areas does not appear in retrospect to have been justified, at least with respect to air quality measured through 2007. (The study did not quantify emission changes in EAC versus non-EAC areas and is, therefore, unable to comment on the impact on emissions of the absence in EAC areas of some or all of the nonattainment area requirements that traditional nonattainment areas face.) The study lacked adequate sites with meteorologically-controlled ozone air quality data to enable us to make comparisons for areas in the Central Southwest. Therefore, the study cannot comment on how those air quality gains in that region compare to other non-EAC ozone areas there. The study did not compare two individual cities because it is very difficult to determine if they are comparable. Comparing the range of reductions between two groups is more reasonable, as the study did for areas in the East.

Observation 2: States relied largely on state and national measures for their attainment demonstrations. Despite having quantified local measures, and, thus, satisfying one of the criteria necessary for a measure to be included in the attainment demonstration, states chose for the most part not to include those measures as part of the attainment demonstration. The study did not explore why states chose to include some measures in the attainment demonstration but not others.

Observation 3: The overwhelming majority of the EAC Program areas included in the study attained the 8-hour ozone NAAQS despite growth in population and VMT. Nineteen of the 20 EAC Program areas included in the study that attained the 8-hour ozone NAAQS by December 2007 did so despite most of them experiencing estimated growth in either VMT or population or both during implementation of the EAC Program (in several cases these growth rates met or exceeded national and regional growth rates). In fact, 15 of the 20 EAC areas attained the 8-hour ozone NAAQS by December 31, 2004, prior to the required 2005 implementation date for the EAC control measures. (It is also important to note that the remaining 9 attainment areas for which the study did not compile quantitative information also maintained their attainment status with respect to the 8-hour NAAQS through December 2007.)

Observation 4: The EAC Program successfully encouraged local areas in the adoption and development of meaningful, local control measures in the majority of the EAC Program areas included in the study, representing a significant percentage of quantified NO_x and VOC emissions in several of the areas included in the study. Despite the uncertainty inherent in emission reduction estimates, the estimated individual and collective emissions reductions from these local measures constituted significant percentages of quantified NO_x and VOC emissions in those areas. These measures are what the study terms "directionally correct". While they should help the areas maintain their ozone air quality levels, these measures did not produce a discernible, incremental change in ozone air quality levels that helped the areas meet the EAC requirement of attaining early by December 2007 (a requirement every area except Denver met). Twelve of nineteen nonattainment-deferred and attainment EAC Program areas included in the study that had complete emission reductions data had less than nine percent of their quantified emission reductions from local measures. This is likely due to one or more factors:

- Local measures were not adopted, which was the case for two areas;
- Attainment was demonstrated without including local measures;
- Certain measures did not lend themselves to quantification; and
- State determined that the potential emissions reductions were not great enough to justify the effort EPA requires to document those projected emissions reductions.

Observation 5: Ninety-six percent of the total 388 measures implemented for the 20 areas included in the study were implemented by the EAC December 2005 deadline, according to the EAC progress reports and SIPs. Conversely, four percent (i.e., 14 measures) of the 388 measures were not implemented by the EAC December 2005 deadline. Of the 14 measures not implemented by December 2005, one had quantified NO_x and/or VOC emissions reductions associated with them and seven were implemented after 2005 -- in 2006 or 2007. Only one of the measures was modeled in an area's EAC SIP attainment demonstration.

Observation 6: For the majority of EAC Program areas, quantified NO_x and VOC emissions reduction estimates from local measures represented a small fraction of 2002 emissions overall in the respective EAC Program area, in the state in which the EAC area is located, and as compared to reductions achieved in that state through the NO_x SIP call. Comparing emissions reductions from local EAC measures to these other emissions values helps to explain, at least partly, why the improvements in air quality in EAC Program areas in the East are consistent with changes in air quality in non-EAC Program areas. The comparison helps to put the relative value of those estimated reductions into perspective against all emissions contributing to ozone formation. There arguably were

EAC measures adopted and implemented in EAC Program areas that might not have been considered had the areas been designated traditional nonattainment. But, in relative terms, the measures did not reduce total emissions very much and, thus, did not produce measurable incremental improvements in air quality.

Observation 7: Air quality modeling contained in the SIPs for the 20 EAC areas included in the study predicted improvements in air quality that were generally consistent with the eventual observations. The study addressed whether the modeling provided insight into what degree the "local" EAC measures contributed to additional improvements in air quality, beyond the improvements provided by the state and national measures. The only reliable way to quantify the air quality improvements from the EAC local measures is to model the local measures independently of the state and national measures. But the modeling performed for the EAC SIPs did not provide such an analysis. For this study the only assessment that could be performed was to determine whether the actual air quality improvement achieved is consistent with the level of improvement predicted by the model. After making this comparison, the study observes that the estimates in the modeled demonstration are consistent with the air quality achieved.

Program Design Aspects

The observation is related to the quantitative, programmatic aspects of the EAC Program study. It is based on a quantitative study of EPA resources expended relative to the whole EAC Program consisting of 29 areas – 14 nonattainment-deferred and 15 designated unclassifiable/attainment – and, thus, pertain to those areas.

Observation 8: The EAC Program required as much EPA human resources or less than a hypothetical traditional approach depending on the EPA region implementing the program. For EPA, the answer to the question of whether the EAC Program saved estimated human resources varied by EPA region. The study lacked data to quantitatively assess the resource impact of the EAC program on the state and local agencies.

Qualitative Observations

Environmental Aspects

The following two observations are related to the *qualitative* review of the environmental aspects of the EAC Program study. Observation 9 is based on information from EPA regional office and state agency permitting databases. Observation 10 is derived from information gathered though consultations with state and local agency officials.

Observation 9: Less than half of the nonattainment-deferred areas experienced new stationary source activity that may have been subject to permitting under the CAA nonattainment NSR program had the same activities been undertaken while these areas had a designation of nonattainment. Six of the 14 nonattainment-deferred areas experienced new stationary source activity that may have been subject to permitting under the CAA nonattainment NSR program had the same activities been undertaken while these areas had a designation of nonattainment, (this could be an underestimate given the lack of compete information on permitting activity). The proposed emissions increases from the new and modified sources in four of the six areas were controlled under the CAA's PSD program. (The study did not quantify emission changes in EAC versus non-EAC areas and is, therefore, unable to comment on the impact on emissions of the absence in EAC areas of some or all of

the nonattainment area requirements that traditional nonattainment areas face, including nonattainment NSR.)

Observation 10: The state and local agencies implementing the EAC Program believe that the EAC activities generated direct environmental benefits other than ozone reduction. A majority of the individuals consulted reported that EAC activities directly generated environmental benefits other than ozone reduction. The largest benefit came from reductions of $PM_{2.5}$ through such programs as alternative fuels, open burning bans, freight partnership, diesel and school bus retrofits, and idling reduction. EAC activities also generated reductions in GHG, air toxics, NO_x, and VOCs. However, several individuals consulted stated that no additional environmental benefits were generated directly from the EAC activities. This is partly because EAC control measures were selected from a list of existing state rules. In these cases, no local measures were developed for the EAC.

Program Design Aspects

The following four qualitative observations are based on a qualitative review of the program design aspects of the EAC Program study. The observations draw on information gathered through consultations with state and local agency officials.

Observation 11: The state and local agencies implementing the EAC Program believe that the EAC Program, in order to succeed, needed (1) the threat of reinstatement of the nonattainment designation as the consequence of failure to meet EAC Program requirements and (2) for the EAC Program to be part of the larger SIP program. The majority of the individuals consulted believed that states and local areas needed motivation to participate in the program for it to succeed. For many states and local areas, EAC participants were motivated to enter the program as nonattainment-deferred areas specifically to avoid the NSR and Conformity Program requirements for their 8-hour ozone areas. Those areas were also concerned about the impact of a nonattainment designation on economic development.

Observation 12: The state and local agencies implementing the EAC Program believe the EAC Program gave local areas the flexibility to develop their own approach to meeting the 8-hour ozone standard that might not otherwise have been present under the traditional approach. The majority of the individuals consulted stated that the EAC Program gave local areas the flexibility to develop their own approach. They believed that the opportunity for flexibility in local decision-making was critical to obtaining support for the program.

Observation 13: The state and local agencies implementing the EAC Program believe the EAC Program effectively engaged and involved local stakeholders in the program and created positive working relationships. The majority of the individuals consulted supported this statement. The diverse range of local stakeholders engaged in the EAC Program areas included local governments, elected officials, the media, councils of governments, industry, local businesses, utilities, chambers of commerce, environmentalists, and other organizations. According to the individuals consulted, the EAC Program model produced numerous intangible benefits, such as a greater public awareness of air quality issues and local stakeholder participation in air quality improvement than would have occurred under the traditional approach. The EAC Program is also credited with: (1) improving the working relationships between states and local stakeholders, and (2) helping create an infrastructure for stakeholder involvement in future air quality issues. The improved relationships and flexibility are

believed to have created an environment for local areas to consider measures that would not have been discussed outside of the EAC Program.

Observation 14: The state and local agencies implementing the EAC Program believe that it is expected to result in continued reductions in ozone and air quality improvement activities and policies that were not foreseen, initially, as the EAC Program was implemented. The majority of the individuals consulted believed that: (1) EAC efforts would lead to continued reductions in ozone and air quality improvement activities and policies that were not originally foreseen; and (2) programs adopted by the EAC would continue providing additional reductions beyond those already achieved or create a local "infrastructure" for further or continued action in the future. It is believed that some of the policies, projects and activities would not have occurred without the EAC Program. Several of the individuals consulted noted that the EAC control measures would remain in place for the foreseeable future. In addition, local organizations that did not address air quality issues prior to the EAC Program are now considering air quality issues in their areas.

3.2.3 Study Results Where Information is Insufficient or Too Ambiguous to Make an Observation

Observations did not emerge from information in three areas where the study lacked sufficient information or the information was too ambiguous:

- Program design aspects
  - EAC program efficiency;
- Environmental aspects
  - EAC program requirements versus Subpart 1 requirements; and
  - Conformity Program.

Program Design Aspects

EAC Program Efficiency

Based on the consultations with state and local officials, the EAC model is believed to be a more efficient way to deliver clean air quicker than the traditional nonattainment designation approach. However, the impact of the EAC Program on state and local resources is unclear, including whether the EAC approach saved money and resources for state and local agencies over the traditional approach. The majority of the individuals consulted believe the EAC model is a more efficient way to deliver clean air quicker than the traditional approach. Several of the individuals consulted believe that the EAC is a more efficient method for areas that: (1) are relatively close to the standard, and/or (2) have significant local stakeholder involvement.

Several of the individuals consulted believe that local areas spent more resources in the EAC Program than they would have in the traditional program. This is because local stakeholders are not as involved in the traditional method. However, these individuals consulted believed that the EAC benefits overshadowed the costs by:

- Saving resources in the long run;
- Developing control measures that accommodate economic growth;
- Developing good will between stakeholders;
- Providing local control over program activities; and,
- Avoiding nonattainment status.

Several other individuals consulted found it difficult to determine the impact of the EAC on state and local resources. They were divided on whether the EAC approach saved money and resources over the traditional approach. A few individuals consulted found that the EAC Program did not save money or resources over the traditional approach.

Environmental Aspects

EAC Program Requirements versus Subpart 1 Requirements

In comparing the differences between the EAC program and Subpart 1 area CAA requirements, the study did not arrive at a observation as to which approach would have produced the greater emission reductions and air quality improvement. As the qualitative information indicates, some requirements were more stringent for EAC Program areas and some more stringent for Subpart 1 areas. Relative to non-EAC Program areas, air quality in EAC areas in the East was not adversely affected by two factors: (1) the absence of some or all of the nonattainment area requirements that traditional nonattainment areas face or (2) by the fact that most of the areas experienced population and VMT growth during EAC Program implementation. Relative to non-EAC Program areas, these two factors also did not adversely affect the ability of EAC areas in the East to attain the NAAQS by December 2007 (or earlier for many EAC areas). However, it remains to be seen what will happen to ozone air quality levels in these areas as they grow in the next five to 10 years. Ozone air quality in many of the areas will continue to be influenced by, among other things, state and National programs to reduce NO_x and VOCs. Moreover, EAC Program areas were required to demonstrate maintenance of the standard for five years (to 2012), although almost all the states in the Southeast (EPA Region 4) with EAC Program areas submitted maintenance plans for 10 years. These plans are in place to address emissions growth to ensure attainment of the ozone standard.

With respect to the relative burden of the CAA requirements, the individuals consulted clearly viewed not having to implement the Nonattainment NSR and Conformity Programs as a burden reduction. However, several state and local agencies consulted felt that reducing EAC Program's reporting requirements could have eased the resource burden of the EAC Program further. Other individuals consulted felt the benefits of the EAC Program outweighed the burden.

Conformity Program

The study lacked sufficient information on which to base a Conformity Program-specific observation as to the emissions and/or air quality impacts of not requiring the Conformity Program in EAC areas. Such an analysis was beyond the scope of this study. The study did find information that the Conformity Program applied in about one-half of the 14 EAC nonattainment-deferred areas for at least one criteria pollutant other than the 8-hour ozone standard. Six of the 14 nonattainment-deferred EAC Program areas were subject to the CAA Conformity Program requirement during the EAC Program (from June 14 2004 to April 15, 2008) for pollutants other than the 8-hour ozone NAAQS: the 1-hour ozone NAAQS, the PM_{10} NAAQS, the $PM_{2.5}$ NAAQS and the carbon monoxide NAAQS.