NCDENR
North Carolina Department of Environment and Natural Resources
Division of Air Quality

Michael F. Easley, Governor

William G. Ross, Jr., Secretary
B. Keith Overcash, P.E., Director

April 14, 2004

Kay T. Prince
Chief, Air Planning Branch
USEPA Region 4
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, GA 30303-3104

Dear Ms. Prince,

I am pleased to submit the 1-hour ozone maintenance plan updates for the Raleigh/Durham and Greensboro/Winston-Salem/High Point maintenance areas. Enclosed is the complete package containing the maintenance plan, the supporting documentation as to how the emission estimates were developed, and the complete hearing record including comments and responses. The State's public hearings took place on January 21 and 22, 2004, in Raleigh and Winston-Salem, respectively.

The submittal includes three major items. The first is an analysis of the ambient air quality data demonstrating continued maintenance with the 1-hour ozone National Ambient Air Quality Standard. The second is an emissions inventory comparison showing that the 1-hour ozone standard can be maintained an additional 10 years. The third is the contingency measures to be implemented in the event of an air quality violation or other indications of an impending violation.

I respectfully request that you commence the federal approval process for the Raleigh/Durham and Greensboro/Winston-Salem/High Point maintenance areas.

Please let me know if you have any questions.

Sincerely,

Laura A Boothe

Laura Boothe
Attainment Planning Branch Chief

Enclosure

cc: Keith Overcash
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1-Hour Ozone

Maintenance Plan Update

For

Raleigh/Durham
&
Greensboro/Winston-Salem/High Point
1-Hour Ozone
Maintenance Areas

April 14, 2004

Prepared by:

North Carolina Department of Environment and Natural Resources
Division of Air Quality
Planning Section

PREFACE

This document contains North Carolina's update to the Raleigh-Durham area and the Greensboro/Winston-Salem/High Point area maintenance plans for the National Ambient Air Quality Standard (NAAQS) for 1-hour tropospheric ozone.

EXECUTIVE SUMMARY

INTRODUCTION

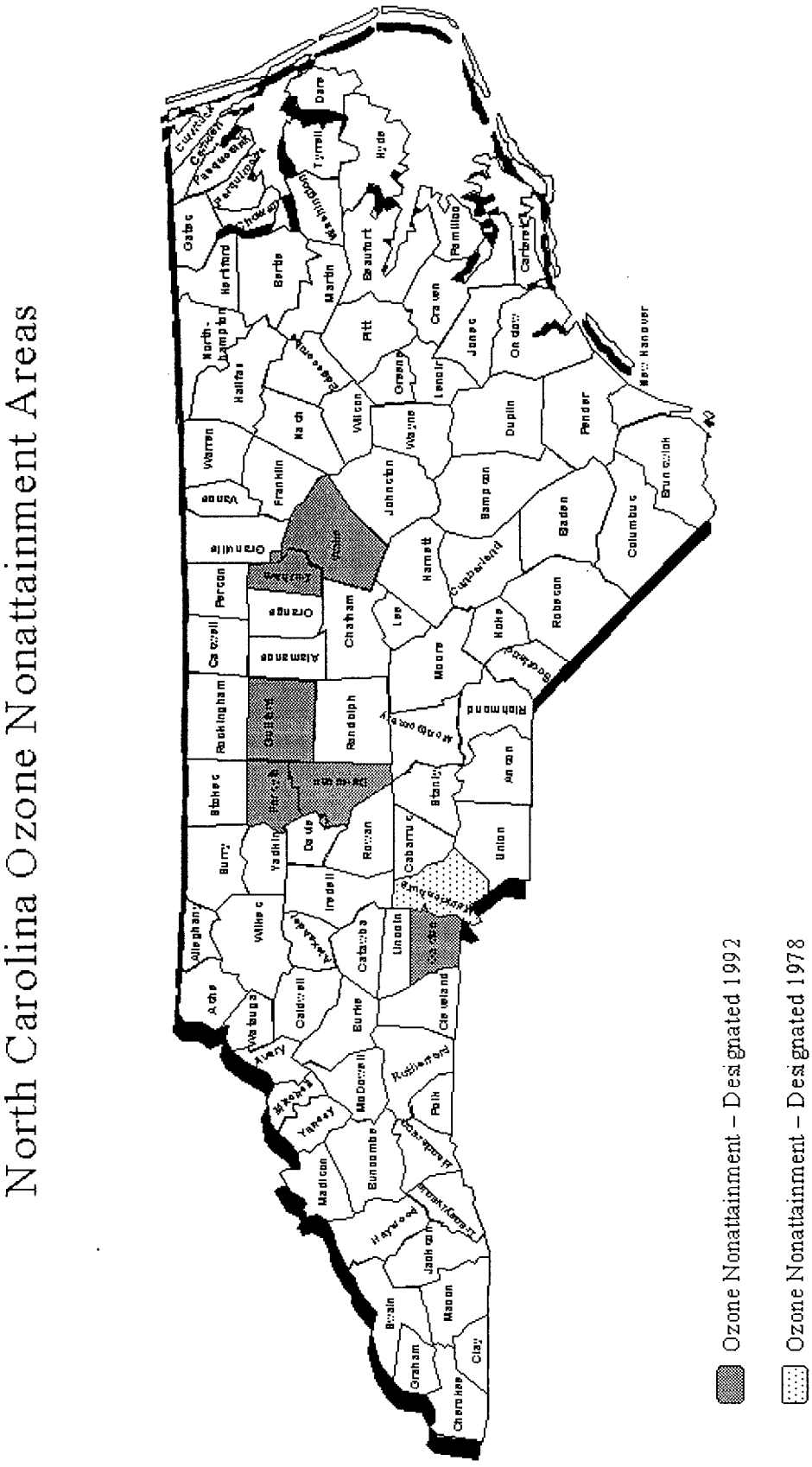
Ozone is formed by a complex set of chemical reactions involving volatile organic compounds (VOCs), nitrogen oxides (NOx) and to a lesser extent carbon monoxide (CO). These gases are generated by combustion processes, certain industrial processes and even by natural sources such as trees. Evaporative gasoline losses and tailpipe emissions from mobile sources (vehicles) are also significant sources. Even the emissions from such sources as boat engines, lawn mowers and construction equipment contribute to the formation of ozone. Ozone formation is promoted by strong sunlight, warm temperatures and light winds and is hence a problem only during the hot summer months.

The national ambient air quality standard (NAAQS) for 1-hour ozone is based on an annual number of exceedance days averaged over a three-year period. A violation of the NAAQS occurs when the annual average exceedances is greater than one. In other words, four days with exceedances in a three-year period will constitute a violation of the NAAQS and result in the area being designated as nonattainment for 1-hour ozone. The severity of the exceedances above the standard determines the degree or level of nonattainment according to five classifications: marginal, moderate, serious, severe and extreme.

DESIGNATION OF NONATTAINMENT

During the three year period from 1987 through 1989, both the Raleigh/Durham and the Greensboro/Winston-Salem/High Point areas violated the 1-hour ozone NAAQS (Figure 1). The Environmental Protection Agency (USEPA) subsequently designated them as nonattainment for 1-hour ozone with a moderate classification. This triggered certain mandatory requirements which were to be accomplished by November 15, 1992 and November 15, 1993. The most significant control measure that was phased-in throughout these two areas during this time period was the vehicle inspection and maintenance (I/M) program. The I/M program assures that automotive exhaust emissions remain within acceptable standards.

Figure 1. North Carolina 1-Hour Ozone Nonattainment Areas



REDESIGNATION TO ATTAINMENT

The Raleigh/Durham area (Durham and Wake Counties and part of Granville County) and the Greensboro/Winston-Salem/High Point area (Davidson, Forsyth, and Guildford Counties and part of Davie County) were designated nonattainment for 1-hour ozone in 1992 and classified as moderate (Figure 1). In November 1992, the State of North Carolina submitted a request to redesignate these two areas to maintenance status, based upon three years of clean air quality data (1990 through 1992). The State submitted supplemental information to EPA in June 1993 for the Greensboro/Winston-Salem/High Point area, which was redesignated to maintenance status on November 8, 1993. The State submitted supplemental information in June 1993 and January 1994 for the Raleigh/Durham area, which was redesignated to maintenance status on June 17, 1994.

AIR QUALITY

Since the Greensboro/Winston-Salem/High Point has been redesignated to maintenance status for 1-hour ozone, the area has continued to meet the 1-hour ozone NAAQS.

The Raleigh/Durham area did have a brief period where two monitors violated the 1-hour ozone NAAQS. The Millbrook monitor was in violation during the 1998-2000 period and the St. Augustine monitor during the 1997-1999 period. These violations were the result of an abnormally hot summer during 1999, in which both monitors had three exceedances of the standard. These exceedances along with an additional exceedance in 1997 for St Augustine and in 1998 for Millbrook resulted in the violation of the NAAQS. Once the 1997 and 1998 exceedances dropped out of the NAAQS calculation, these two monitors met and have continued to meet the 1-hour ozone standard. Even with the hot, dry summer of 2002, the Millbrook monitor only had one exceedance, the first since the 1999 ozone season and the St. Augustine monitor has not had any 1-hour exceedances since the 1999 ozone season.

There have been a number of emission reductions that contribute to the maintenance of the 1-hour ozone standard in the Raleigh/Durham and Greensboro/Winston-Salem/High Point areas. One of the major reductions comes from the improvements in vehicle tailpipe emissions associated with an increasing number of newer vehicles on the road. Another major reduction has come from the utility sector. As a result of North Carolina's NOx SIP Call rule, some of the utilities began installing NOx controls as early as 2002. Although these units may not have been located within the maintenance area boundaries, these reductions contributed to lower ozone formation in other areas of the state that may have been transported into the maintenance areas. In addition, the NOx emissions from these sources are significantly lower now, so they will have less impact on the two maintenance areas.

Additional emission reductions are expected between now and 2007 as the utility and large industrial boiler sectors meet the NOx SIP call system wide emission limit cap. NC anticipates a reduction of approximately 68% from utility and large industrial boilers by 2007. Emission reductions are also expected in the mobile sector as the North Carolina's NOx inspection and maintenance (I/M) program phases in between July 2002 through January 2006. North Carolina has increased its requirement for inspection and maintenance to reduce not only CO and VOC but also NOx. The program is also being expanded from only 9 counties to 48 counties (Figure 2).

Further reductions are expected from Federal programs such as low sulfur gasoline, low sulfur diesel, Tier II vehicle standards, and heavy-duty diesel standard. The combination of all of these emission reductions lead the State to believe that there is convincing evidence that the Raleigh/Durham and Greensboro/Winston-Salem/High Point areas will continue to maintain the 1-hour ozone standard through 2015.

REQUIREMENTS FOR MAINTENANCE PLAN

The maintenance demonstration that was submitted in 1993 was made by comparing the baseline emissions inventory (1990) and the projection year emissions inventory (2004) and demonstrating that the projected inventories did not exceed the baseline inventory. The 2004 projected emissions inventory was below the 1990 emissions inventory for all three pollutants (VOC, NOx and CO) in both geographic areas.

The U.S. Environmental Protection Agency (USEPA) requires that the maintenance plan be updated, projecting out an additional ten years beyond the original maintenance period, to ensure that the areas will continue to maintain the NAAQS for the1-hour ozone standard. In discussions with the USEPA, Region 4, it was determined that since VOC and NOx are considered the precursors to ozone that only the emissions for these two pollutants needed to be estimated for the maintenance plan update. This plan is developed considering the latest emission factors, methodologies and projection techniques. The most current information on expected population and industrial growth, and all planned or reasonably anticipated transportation projects, plans, and programs, regardless of source of funding, is accounted for in the updated maintenance plan. Currently there are no violations of the 1-hour ozone standard in the Raleigh/Durham or Greensboro/Winston-Salem/High Point areas. The man made emissions for these two areas are listed in Table 1. These emissions summaries do not include the biogenic emissions.

Figure 2. North Carolina's NOx Inspection & Maintenance (I/M) Phase-In Map

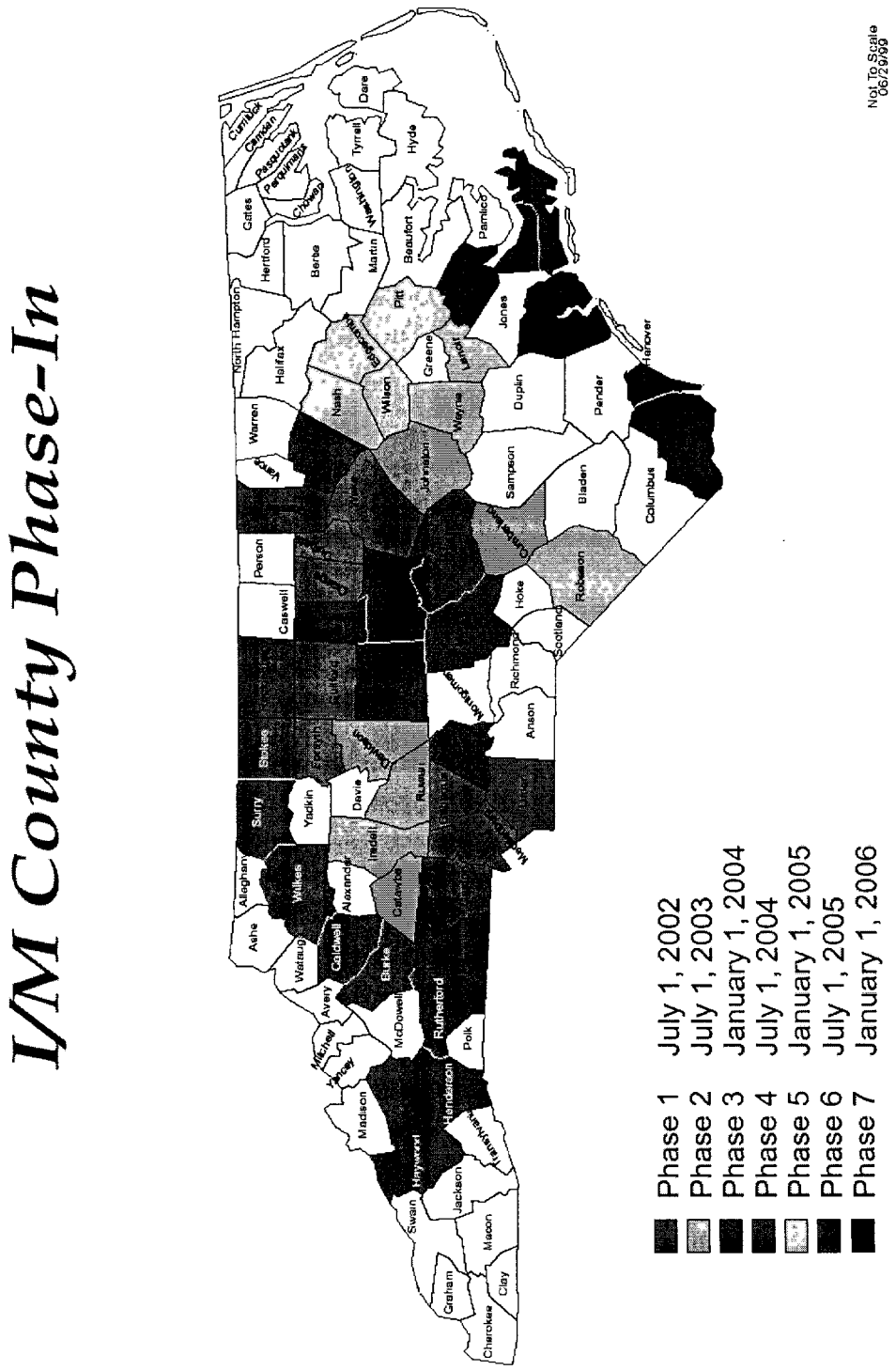


Table 1. Maintenance Update

Year	Raleigh/Durham Maintenance Area		Greensboro/Winston-Salem/High Point Maintenance Area	
	VOC TPD	NOx TPD	VOC TPD	NOx TPD
2000	105.81	118.09	166.50	146.64
2004	93.52	104.18	148.82	124.42
2007	87.63	88.74	141.85	99.62
2010	85.04	73.06	138.27	85.62
2012	84.53	65.43	137.25	78.27
2015	85.79	57.03	137.91	70.09
Difference from 2000 to 2015	- 20.02	- 61.06	- 28.59	- 76.55

For the maintenance plan update, the base year of 2000 was chosen. This was so that a more current year could be used for the comparison, and 2000 was the year of the latest census data. Additionally, a number of models used to estimate the emissions had changed since 1990 and the information used to calculate the emissions in these models may not be relevant to 1990. Only one monitor in both areas experienced an exceedance of the 1-hour ozone standard in 2000, and there were no violations of the 1-hour ozone standard, so 2000 can clearly be seen as an attainment year. The projection years selected were: 2004, 2007, 2010, 2012 and 2015. To demonstrate maintenance with the emission comparison approach, all projection years should be below the base year for both pollutants. As evidenced in Table 1, both pollutants exhibit a declining trend from 2000 to 2015. Based on this emission inventory comparison, North Carolina concludes that both the Raleigh/Durham and the Greensboro/Winston-Salem/High Point areas will continue to maintain the 1-hour ozone standard through 2015.

CONTINGENCY MEASURES

The North Carolina contingency plan involves tracking and triggering mechanisms to determine when contingency measures are needed and a process of implementing appropriate control measures. The trigger of the contingency plan will be a violation of the ambient air quality standard for 1-hour ozone. The trigger date will be the date that the State certifies to the USEPA that the air quality data is quality assured.

Once the trigger has been activated, the NCDAQ shall commence analyses, including, if necessary, updated gridded photochemical modeling to determine those emission control measures that will be required for attaining and maintaining the ambient air quality standard for 1-hour ozone. Furthermore, North Carolina has pre-adopted certain emission control regulations that are prescribed for moderate ozone nonattainment areas in the Clean Air Act as amended (CAA). These pre-adopted measures are additional measures beyond those required by the

North Carolina maintenance plan for the Raleigh/Durham and Greensboro/Winston-Salem/High Point areas. If the modeling supports the use of these pre-adopted measures to show attainment of the NAAQS, then NCDAQ will commence the process for activation within one year of the modeling analysis completion.

Additionally, the 8-hour ozone nonattainment designations are expected to be final by April 2004. All of the 1-hour ozone maintenance area is expected to be included in the Raleigh/Durham 8-hour ozone nonattainment area and the State Implementation Plan (SIP) will be due April 2007 showing how North Carolina will attain the 8-hour ozone standard in the Raleigh/Durham area. This SIP will have control measures necessary to meet the 8-hour ozone standard and contingency measures. The 8-hour ozone attainment SIP for the Raleigh/Durham area will be added assurance that the 1-hour ozone standard will continue to be attained.

The expected 8-hour ozone nonattainment boundary for the Greensboro/Winston-Salem/High Point area also contains all of the 1-hour maintenance area except from Davie County, where the monitor was moved. However, this area has signed an Early Action Compact (EAC) with the USEPA. Through the EAC agreement, the local area and the State agree to develop control strategies to reduce ozone pollution by March 2004, submit an attainment SIP by December 2004, implement control strategies by 2005, and ultimately will allow the area to attain the 8-hour ozone standard by December 2007. USEPA then agrees to defer the designation status, provided all milestones are met, to December 2007. If in December 2007 the area is attaining the 8-hour ozone standard, then the nonattainment designation will be revoked and the area will be categorized as attainment. Like the Raleigh/Durham area, the attainment SIP will contain control measures to meet the 8-hour standard and contingency measures and will serve as added assurance that the 1-hour ozone standard will continue to be maintained.

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1.0 INTRODUCTION

1.1 WHAT IS TROPOSPHERIC OZONE

The rapid pace of development over the last decades has heightened concern over urban air quality in and near the cities that line the I-85 corridor of the North Carolina Piedmont. Ozone, a strong chemical oxidant, is the pollutant of main concern. It adversely impacts human health through effects on respiratory function and can also damage forests and crops. Ozone is not emitted directly by industrial sources or motor vehicles but instead, is formed in the lower atmosphere, the troposphere, by a complex series of chemical reactions involving nitrogen oxides (NOx), the result of combustion processes, and reactive organic gases. Organic gases, also termed volatile organic compounds or VOCs, include many industrial solvents, toluene, xylene and hexane as well as the various hydrocarbons that are evaporated from the gasoline used by motor vehicles or emitted through the tailpipe following combustion.

Ozone formation is promoted by strong sunlight, warm temperatures and light winds. High concentrations tend to be a problem in the eastern United States only during the hot summer months when these conditions frequently occur. Therefore, the U. S. Environmental Protection Agency (USEPA) mandates seasonal monitoring of ambient ozone concentrations in North Carolina only from April 1 through October 31 (40 CFR 58 App. D, 2.5).

The national ambient air quality standard (NAAQS) for 1-hour ozone (40 CFR 50.9) is 0.12 parts per million (ppm). When a monitor measures ozone above 0.124 ppm (per the rounding convention), and an exceedance of the NAAQS occurs. A violation of the NAAQS occurs when the three year annual average exceedances is greater than one. In other words, four days with exceedances, at the same monitor, in a three year period will constitute a violation of the NAAQS.

1.2 CLEAN AIR ACT OF 1990

Since the 1977 amendments to the Clean Air Act, areas of the country that had not attained the ambient standard for a particular pollutant were formally designated as nonattainment for that pollutant. This formal designation concept was retained in the 1990 Amendments, but additionally, areas designated as nonattainment were to be classified as to the degree of nonattainment. Five categories were created (section 181 of the 1990 CAAA). In increasing severity, these were marginal, moderate, serious, severe and extreme. In moderate areas like the areas in North Carolina, the design value included the range from 0.138 ppm to 0.160 ppm.

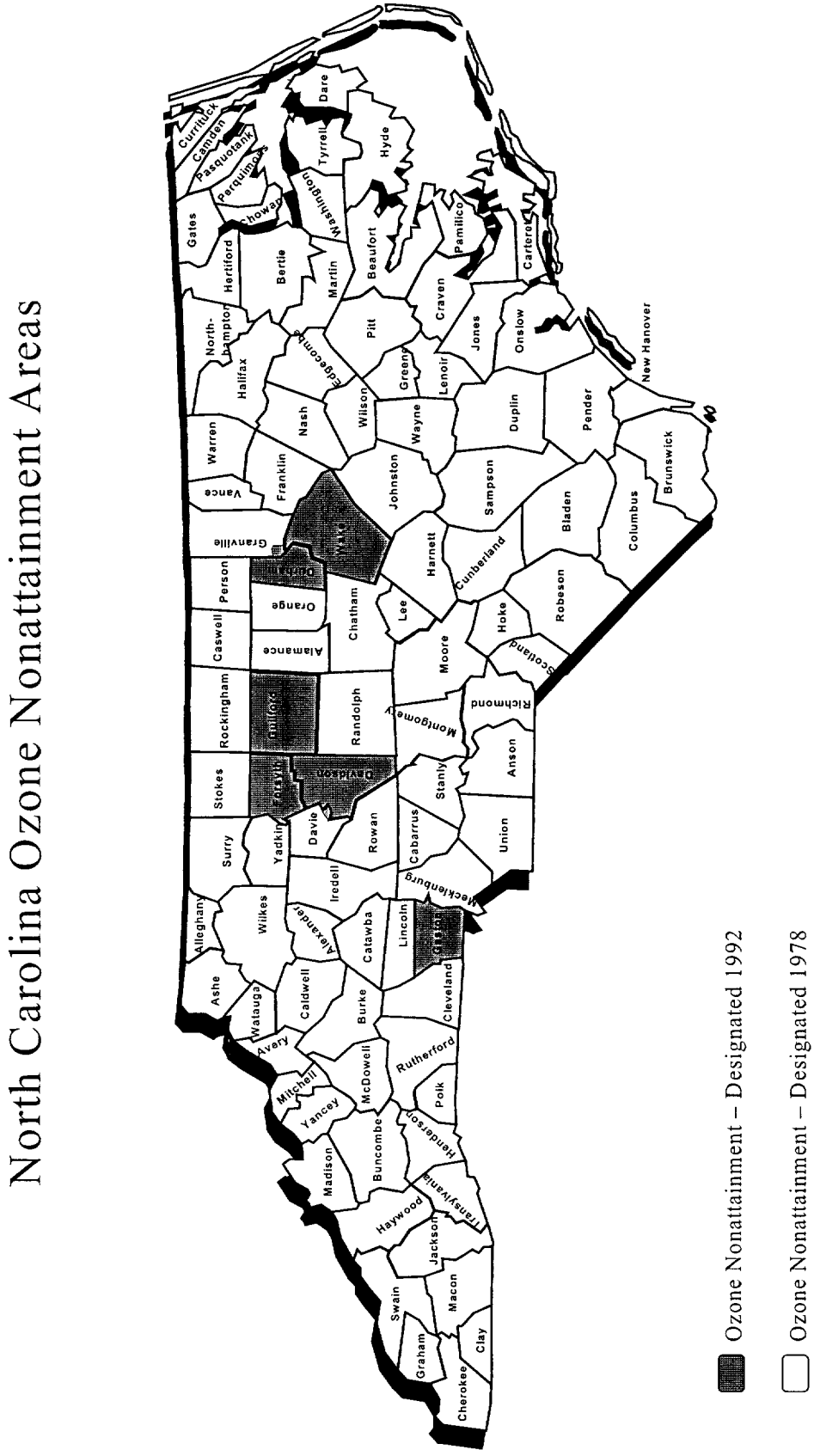
1.3 NATURE OF PROBLEM IN NORTH CAROLINA

The Raleigh/Durham and Greensboro/Winston-Salem/High Point areas (Figure 1.3-1) were recommended as nonattainment for ozone by the Governor in a March 15, 1991 letter to the USEPA Region IV Administrator as required by section 107(d)(1)(A) of the 1990 Clean Air Act Amendments (CAAA). Both cities were designated as nonattainment and classified as "moderate" under the provisions outlined in Sections 107 and 181 of the CAA (See Appendix A). Design values were 0.141 and 0.151 ppm for Raleigh/Durham and Greensboro/Winston-Salem/High Point, respectively, based mainly on air quality data from the unusually severe summer of 1988. Areas classified as moderate were, in the CAAA, given 6 years from November 15, 1990, to reach attainment.

In November 1992, the State of North Carolina submitted a request to redesignate these two areas to maintenance status, based upon three years of clean air quality data (1990 through 1992). The State submitted supplemental information to EPA in June 1993 for the Greensboro/Winston-Salem/High Point area, which was redesignated to maintenance status on November 8, 1993. The State submitted supplemental information in June 1993 and January 1994 for the Raleigh/Durham area, which was redesignated to maintenance status on June 17, 1994.

Currently both areas are meeting the 1-hour ozone NAAQS. The current design values for the period 2000-2002 are 0.118 and 0.121 ppm for the Raleigh/Durham and Greensboro/Winston-Salem/High Point areas, respectively.

Figure 1.3-1. North Carolina 1-Hour Ozone Nonattainment Areas



2.0 AIR QUALITY

2.1 HISTORIC AIR QUALITY

Since the Greensboro/Winston-Salem/High Point has been redesignated to maintenance status for 1-hour ozone, the area has continued to meet the 1-hour ozone NAAQS. Table 2.1-1 shows the historic air quality data for the Greensboro/Winston-Salem/High Point maintenance area since redesignation through 2000.

Raleigh/Durham area did have a brief period where two monitors violated the 1-hour ozone NAAQS. The Millbrook monitor was in violation during the 1998-2000 period and the St. Augustine monitor during the 1997-1999 period. These violations were the result of an abnormally hot summer during 1999, in which both monitors had three exceedances of the standard. These exceedances along with an additional exceedance in 1997 for St. Augustine and in 1998 for Millbrook resulted in the violation of the NAAQS. Once the 1997 and 1998 exceedances dropped out of the NAAQS calculation, these two monitors once again met 1-hour ozone standard. Table 2.1-2 shows the historic air quality data for the Raleigh/Durham maintenance area since redesignation through 2000.

It should be noted that in both maintenance areas the montoring network has increased from 1990 to include monitors not only in the maintenance area but also in some of the surrounding counties. Figures 2.1-1 and 2.1-2 display the monitoring networks for the Greensboro/Winston-Salem/High Point and Raleigh/Durham areas, respectively. All monitors in each area have maintained the 1-hour NAAQS with the exception of the two monitors in Raleigh noted above.

Table 2.1-1 Greensboro/Winston-Salem/High Point Area's Historic Air Quality Data Since Redesignation

Site ID# Name County	Year	Daily 1-Hr Maximum (ppm)				Values >0.125ppm (measured)
		1st	2nd	3rd	4th	
059-0002 Cooleemee Davie	1996	0.108	0.103	0.100	0.100	0
	1997	0.112	0.105	0.104	0.104	0
	1998	0.142	0.123	0.115	0.113	1
	1999	0.164	0.126	0.120	0.119	2
	2000	0.114	0.112	0.111	0.108	0
067-0022 Hattie Ave Forsyth	1994	0.104	0.098	0.098	0.093	0
	1995	0.130	0.117	0.108	0.106	1
	1996	0.112	0.102	0.099	0.095	0
	1997	0.117	0.115	0.105	0.101	0
	1998	0.136	0.119	0.112	0.111	1
	1999	0.129	0.113	0.112	0.112	1
	2000	0.109	0.104	0.099	0.099	0
067-0027 Pollirosa Forsyth	1994	0.094	0.094	0.084	0.082	0
	1995	0.118	0.093	0.090	0.089	0
	1996	0.109	0.096	0.096	0.095	0
	1997	0.105	0.094	0.093	0.092	0
	1998	0.133	0.111	0.107	0.105	1
	1999	0.120	0.113	0.107	0.105	0
	2000	0.101	0.096	0.095	0.094	0
067-0028 Shiloh Ch Forsyth	1996	0.126	0.118	0.107	0.099	1
	1997	0.110	0.103	0.099	0.099	1
	1998	0.134	0.112	0.110	0.110	1
	1999	0.127	0.123	0.100	0.113	0
	2000	0.112	0.107	0.106	0.096	0
067-1008 Union Cross Forsyth	1994	0.106	0.105	0.095	0.093	0
	1995	0.114	0.109	0.103	0.102	0
	1996	0.121	0.119	0.109	0.104	0
	1997	0.119	0.115	0.109	0.103	0
	1998	0.137	0.123	0.120	0.112	1
	1999	0.118	0.113	0.112	0.110	0
	2000	0.110	0.105	0.103	0.097	0
081-0011 McLeansville Guilford	1994	0.114	0.110	0.106	0.105	0
	1995	0.117	0.111	0.109	0.099	0
	1996	0.125	0.109	0.103	0.100	1
	1997	0.108	0.104	0.100	0.098	0
	1998	0.122	0.115	0.112	0.112	0
	1999	0.112	0.111	0.108	0.108	0
	2000	0.121	0.116	0.109	0.107	0
033-0001 Cherry Grove Caswell	1994	0.123	0.113	0.109	0.092	0
	1995	0.115	0.108	0.102	0.098	0
	1996	0.109	0.108	0.103	0.099	0
	1997	0.123	0.117	0.111	0.107	0
	1998	0.124	0.119	0.118	0.109	0
	1999	0.110	0.109	0.107	0.106	0
	2000	0.122	0.121	0.112	0.105	0

Table 2.1-1 (continued) Greensboro/Winston-Salem/High Point Area's Historic Air Quality Data Since Redesignation

157-0099 Bethany Rockingham	1994	0.111	0.108	0.103	0.103	0
	1995	0.093	0.088	0.088	0.083	0
	1996	0.124	0.123	0.118	0.106	0
	1997	0.113	0.109	0.106	0.105	0
	1998	0.125	0.112	0.111	0.099	1
	1999	0.112	0.105	0.094	0.093	0
	2000	0.105	0.100	0.098	0.092	0

Note: Shaded areas represent exceedances of the 1-hour ozone standard.

Table 2.1-2 Raleigh/Durham Area's Historic Air Quality Data Since Redesignation

Site ID# Name County	Year	Daily 1-Hr Maximum (ppm)				Values >0.125ppm* (measured)
		1st	2nd	3rd	4th	
063-0013 Duke Street Durham	1994	0.104	0.102	0.097	0.095	0
	1995	0.103	0.101	0.100	0.096	0
	1996	0.105	0.103	0.100	0.098	0
	1997	0.106	0.097	0.095	0.093	0
	1998	0.121	0.112	0.111	0.110	0
	1999	0.118	0.113	0.112	0.108	0
	2000	0.116	0.112	0.105	0.101	0
077-0001 Butner Granville	1994	0.102	0.101	0.100	0.096	0
	1995	0.111	0.109	0.108	0.105	0
	1996	0.124	0.124	0.116	0.115	0
	1997	0.116	0.116	0.116	0.115	0
	1998	0.133	0.130	0.122	0.116	2
	1999	0.098	0.093	0.093	0.093	0
	2000	0.113	0.106	0.105	0.102	0
183-0014 Millbrook Wake	1994	0.122	0.107	0.104	0.102	0
	1995	0.102	0.096	0.093	0.091	0
	1996	0.108	0.093	0.093	0.093	0
	1997	0.122	0.112	0.109	0.108	0
	1998	0.132	0.124	0.116	0.116	1
	1999	0.155	0.134	0.127	0.117	3
	2000	0.122	0.115	0.114	0.104	0
183-0015 St. Augustine Wake	1994	0.106	0.104	0.102	0.099	0
	1995	0.111	0.108	0.102	0.100	0
	1996	0.093	0.084	0.079	0.078	0
	1997	0.126	0.110	0.108	0.106	1
	1998	0.122	0.118	0.115	0.113	0
	1999	0.134	0.132	0.127	0.123	3
	2000	0.115	0.113	0.107	0.100	0

Table 2.1-2(continued) Raleigh/Durham Area's Historic Air Quality Data Since Redesignation

Site ID# Name County	Year	Daily 1-Hr Maximum (ppm)				Values >0.125ppm* (measured)
		1st	2nd	3rd	4th	
183-0016 Fuquay-Varina Wake	1994	0.117	0.111	0.106	0.101	0
	1995	0.102	0.101	0.096	0.095	0
	1996	0.109	0.107	0.099	0.098	0
	1997	0.090	0.083	0.083	0.082	0
	1998	0.118	0.118	0.115	0.115	0
	1999	0.110	0.103	0.102	0.100	0
	2000	0.124	0.101	0.101	0.096	0
183-0017 WRAL Tower Wake	1994	0.099	0.097	0.095	0.094	0
	1995	0.114	0.114	0.107	0.102	0
	1996	0.119	0.105	0.103	0.101	0
	1997	0.118	0.107	0.105	0.104	0
	1998	0.118	0.115	0.114	0.110	0
	1999	0.127	0.126	0.124	0.123	2
	2000	0.135	0.117	0.100	0.098	1
037-0004 Pittsboro Chatham	1994	0.092	0.092	0.087	0.087	0
	1995	0.103	0.102	0.101	0.100	0
	1996	0.106	0.100	0.099	0.099	0
	1997	0.120	0.106	0.102	0.101	0
	1998	0.106	0.106	0.105	0.104	0
	1999	0.110	0.110	0.107	0.098	0
	2000	0.100	0.099	0.091	0.090	0
069-0001 Franklinton Franklin	1994	0.115	0.105	0.105	0.101	0
	1995	0.091	0.091	0.090	0.087	0
	1996	0.107	0.107	0.104	0.102	0
	1997	0.118	0.116	0.112	0.110	0
	1998	0.112	0.110	0.108	0.107	0
	1999	0.113	0.112	0.104	0.102	0
	2000	0.113	0.110	0.101	0.099	0
101-0002 W Johnston Johnston	1994	0.113	0.104	0.095	0.095	0
	1995	0.107	0.102	0.101	0.100	0
	1996	0.107	0.102	0.101	0.100	0
	1997	0.112	0.110	0.106	0.103	0
	1998	0.118	0.111	0.105	0.104	0
	1999	0.124	0.121	0.115	0.115	0
	2000	0.117	0.116	0.097	0.096	0
145-0003 Bushy Fork Person	1997	0.112	0.100	0.100	0.099	0
	1998	0.127	0.117	0.109	0.105	1
	1999	0.137	0.117	0.109	0.109	1
	2000	0.100	0.095	0.095	0.091	0

Note: Shaded areas represent exceedances of the 1-hour ozone standard.

*The standard is 0.12 ppm, but measurements are to 0.001 ppm. Values of 0.124 are rounded down to 0.12 and thus do not exceed the standard while those at 0.125 are rounded up to 0.13 and do.

Figure 2.1-1 Triad Monitoring Network

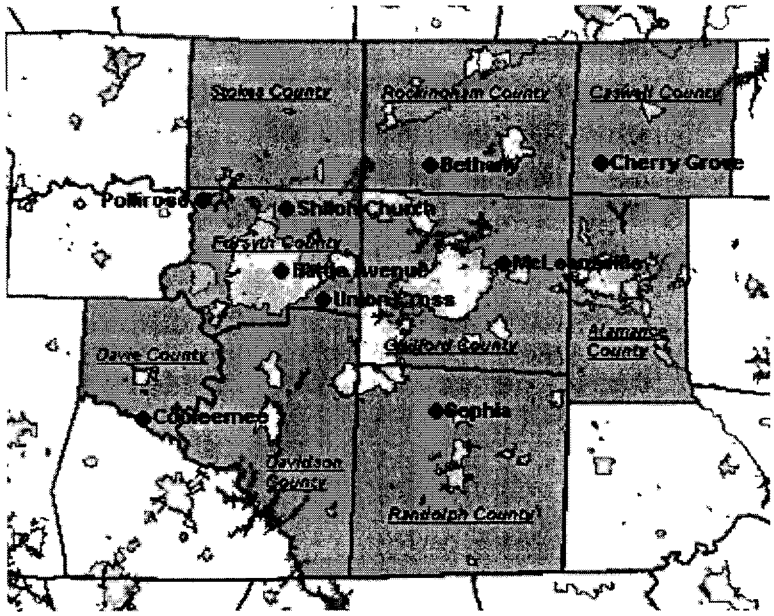
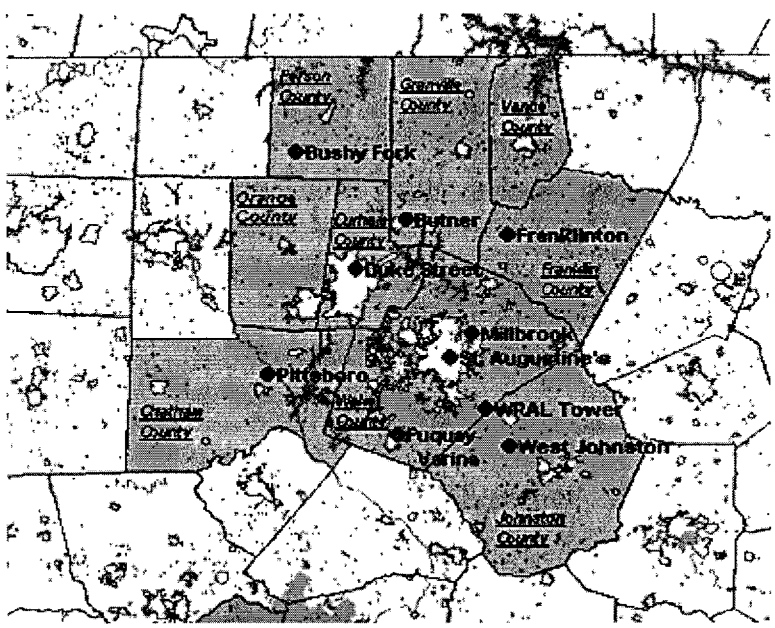


Figure 2.1-2 Triangle Monitoring Network



2.2 RECENT AIR QUALITY VALUES

As stated in the previous section, the Greensboro/Winston-Salem/High Point maintenance area has continued to meet the 1-hour ozone NAAQS since being redesignated. Of the two monitors that had violated the 1-hour ozone standard in the Raleigh/Durham maintenance area since redesignation, Millbrook and St. Augustine, once the data for 1998 was no longer considered in the calculation for violation, they have met and continue to meet the 1-hour ozone standard. Even with the hot, dry summer of 2002, the Millbrook monitor only had one exceedance, the first since the 1999 ozone season and the St. Augustine monitor has not had any 1-hour exceedances since the 1999 ozone season. Table 2.2-1 and Table 2.2-2 list the most recent air quality data (2001-2003) for the Greensboro/Winston-Salem/High Point and Raleigh/Durham areas, respectively.

There have been a number of emission reductions that contribute to the maintenance of the 1-hour ozone standard in the Raleigh/Durham and Greensboro/Winston-Salem/High Point areas. One of the major reductions comes from the improvements in vehicle tailpipe emissions associated with an increasing number of newer vehicles on the road. Another major reduction has come from the utility and large industrial boiler sectors. As a result of North Carolina's NOx SIP Call rule, some of the utilities started putting on NOx controls as early as 2002. Although these units may not have been located within the maintenance area boundaries, these reductions contributed to lower ozone formation in other areas of the state that may have been transported into the maintenance areas.

Additional emission reductions are expected between now and 2007 as the utility and large industrial boiler sectors meet the NOx SIP call system wide emission limit cap. Emission reductions are also expected in the mobile sector as the North Carolina's NOx inspection and maintenance (I/M) program phases in between July 2002 through January 2006. North Carolina has increased its requirement for inspection and maintenance to reduce not only CO and VOC but also NOx. The program is also being expanded from only 9 counties to 48 counties (Figure 2.2-1).

Further reductions are expected from Federal programs such as low sulfur gasoline, low sulfur diesel, Tier II vehicle standards, and heavy-duty diesel standard. The combination of all of these emission reductions lead the State to believe that there is convincing evidence that the Raleigh/Durham and Greensboro/Winston-Salem/High Point areas will continue to maintain the 1-hour ozone standard.

Table 2.2-1 Current Air Quality Data (2001-2003)
For the Greensboro/Winston-Salem/High Point Area

Site ID# and County	Year	Daily 1-Hr Maximum (ppm)				Values >0.125ppm* (measured)
		1st	2nd	3rd	4th	
59-0002	2001	0.128	0.122	0.119	0.102	1
Cooleemee	2002	0.118	0.116	0.116	0.110	0
Davie	2003	0.120	0.116	0.106	0.101	0
67-0022	2001	0.109	0.106	0.105	0.104	0
Hattie Ave	2002	0.120	0.119	0.118	0.116	0
Forsyth	2003	0.114	0.106	0.102	0.099	0
67-0027	2001	0.107	0.103	0.096	0.095	0
Pollirosa	2002	0.118	0.115	0.113	0.103	0
Forsyth	2003	0.094	0.094	0.090	0.086	0
67-0028	2001	0.115	0.113	0.108	0.108	0
Shiloh Ch	2002	0.118	0.117	0.117	0.113	0
Forsyth	2003	0.092	0.090	0.088	0.087	0
67-1008	2001	0.109	0.108	0.104	0.101	0
Union Cross	2002	0.127	0.113	0.112	0.108	1
Forsyth	2003	0.103	0.102	0.096	0.088	0
81-0011	2001	0.120	0.111	0.107	0.104	0
McLeansville	2002	0.134	0.129	0.121	0.116	2
Guilford	2003	0.121	0.109	0.101	0.090	0
033-0001	2001	0.114	0.109	0.105	0.103	0
Cherry Grove	2002	0.123	0.119	0.112	0.105	0
Caswell	2003	0.121	0.095	0.094	0.087	0
151-0004	2001	0.109	0.102	0.101	0.100	0
Sophia	2002	0.106	0.104	0.103	0.103	0
Randolph	2003	0.106	0.104	0.087	0.082	0
157-0099	2001	0.107	0.105	0.105	0.103	0
Bethany	2002	0.128	0.125	0.116	0.109	2
Rockingham	2003	0.092	0.092	0.089	0.088	0

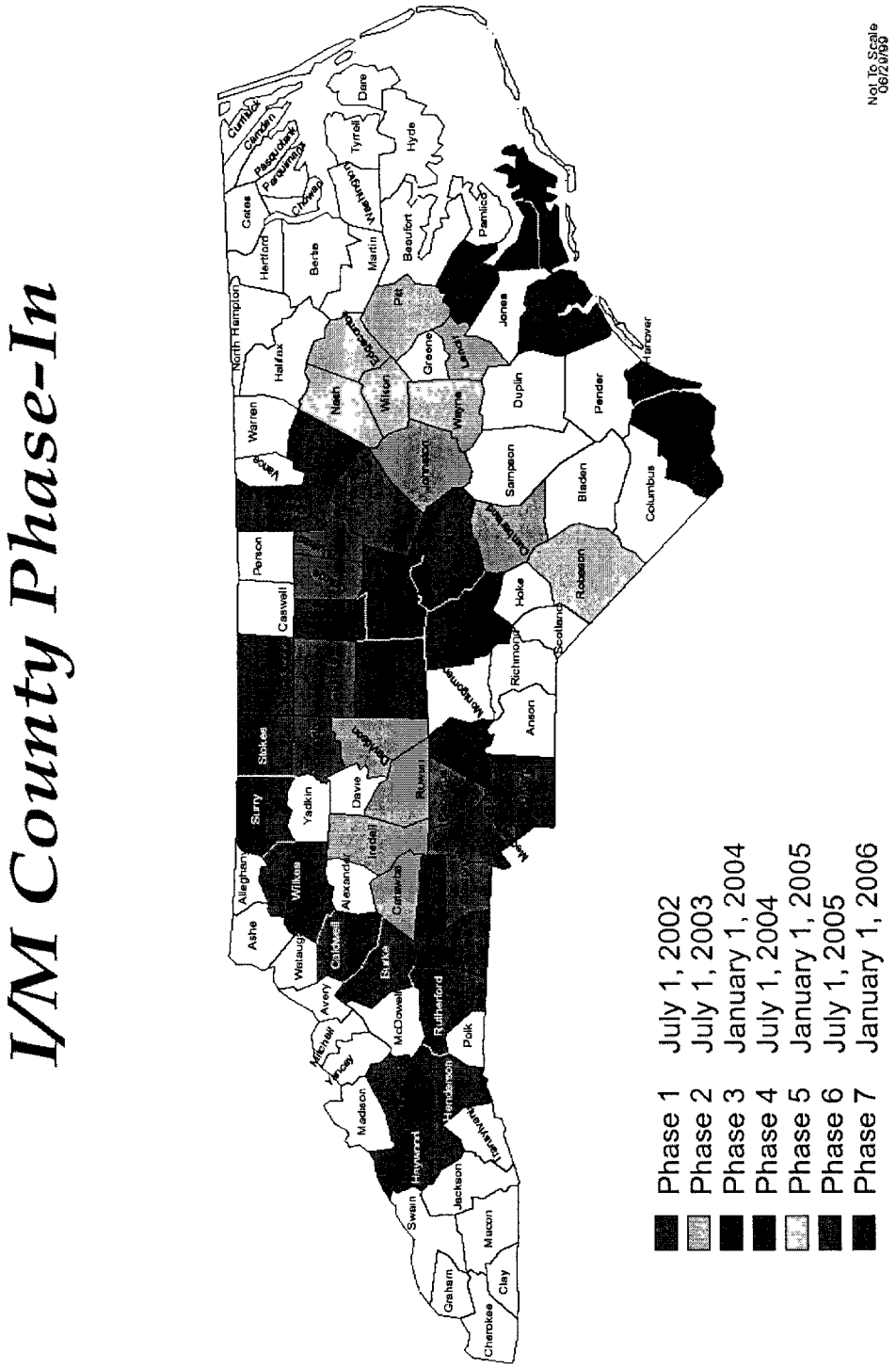
Table 2.2-2 Current Air Quality Data (2001-2003) for the Raleigh/Durham Area

Site ID# and County	Year	Daily 1-Hr Maximum (ppm)				Values >0.125ppm* (measured)
		1st	2nd	3rd	4th	
063-0013	2001	0.116	0.105	0.105	0.103	0
Duke Street	2002	0.121	0.117	0.117	0.114	0
Durham	2003	0.109	0.100	0.092	0.091	0
077-0001	2001	0.127	0.108	0.105	0.098	1
Butner	2002	0.118	0.117	0.108	0.106	0
Granville	2003	0.118	0.115	0.108	0.106	0
183-0014	2001	0.113	0.113	0.113	0.102	0
Millbrook	2002	0.135	0.115	0.111	0.110	1
Wake	2003	0.122	0.104	0.102	0.083	0
183-0015	2001	0.108	0.104	0.104	0.099	0
St. Augustine	2002	0.124	0.123	0.120	0.118	0
Wake	2003	0.105	0.098	0.091	0.086	0
183-0016	2001	0.094	0.091	0.090	0.089	0
Fuquay-Varina	2002	0.110	0.108	0.108	0.107	0
Wake	2003	0.108	0.104	0.100	0.100	0
183-0017	2001	0.101	0.093	0.091	0.090	0
WRAL Tower	2002	0.121	0.119	0.117	0.110	0
Wake	2003	0.102	0.100	0.097	0.087	0
037-0004	2001	0.091	0.091	0.089	0.089	0
Pittsboro	2002	0.111	0.110	0.109	0.107	0
Chatham	2003	0.096	0.095	0.088	0.087	0
069-0001	2001	0.128	0.108	0.094	0.094	1
Franklinton	2002	0.122	0.116	0.114	0.111	0
Franklin	2003	0.106	0.102	0.100	0.089	0
101-0002	2001	0.098	0.090	0.089	0.088	0
W Johnston	2002	0.127	0.117	0.113	0.112	1
Johnston	2003	0.101	0.095	0.093	0.086	0
145-0003	2001	0.117	0.111	0.101	0.095	0
Bushy Fork	2002	0.120	0.118	0.117	0.113	0
Person	2003	0.111	0.111	0.107	0.097	0

Note: Shaded areas represent exceedances of the 1-hour ozone standard.

*The standard is 0.12 ppm, but measurements are to 0.001 ppm. Values of 0.124 are rounded down to 0.12 and thus do not exceed the standard while those at 0.125 are rounded up to 0.13 and do.

Figure 2.2-1. North Carolina's NOx Inspection & Maintenance (I/M) Phase-In Map



3.0 MAINTENANCE PLAN

3.1 CONCEPT OF NORTH CAROLINA'S MAINTENANCE PLAN

The State's plan for maintaining compliance with the ambient air quality standard for 1-hour ozone in Greensboro/Winston-Salem/High Point and Raleigh/Durham consists of three major parts: a foundation control program, a maintenance demonstration, and a contingency plan. The foundation control program consists of the current Federal and State control measures already in effect, as well as the future controls of North Carolina's NOx I/M program, the NOx SIP call and federal low sulfur gasoline and low sulfur diesel fuels programs.

For the maintenance plan update, the base year of 2000 was chosen. This was so that a more current year could be used for the comparison and 2000 was the year of the latest census data. Additionally, a number of models used to estimate the emissions had changed since 1990 and the information used to calculate the emissions in these models may not be relevant to 1990. The interim years chosen were: 2004 since this was in the original maintenance plan, 2007 and 2010 since USEPA recommends three year increments for interim years, 2015 since many of the transportation planners project out to this year and it would be easier to do comparisons under the transportation conformity requirements. The final interim year is 2012, and it was chosen so that it is mid-way between 2010 and 2015 and a key year for Early Action Compacts. The maintenance plan updates consist of a comparison between the 2000 baseline emissions inventory and a 2015 projected emissions inventory, which considers economic and population growth. The projected emissions inventory shows emissions below the 2000 emissions inventory.

The reduction in emissions is due to tighter federal emission standards for new motor vehicles (both Tier II and heavy-duty engine standards) and tighter off-road engine standards (both spark engine and compression engine standards). Also, the current Reid Vapor Pressure (RVP) standards for gasoline and other new fuels programs, due to be phased in by 2006 (low sulfur gasoline and low sulfur diesel), contribute to the reduction in emissions. Additionally, the State's inspection/maintenance (I/M) program has been expanded to include not only CO and VOC, but also NOx and was expanded to include Alamance, Davidson, Forsyth, Guilford, Randolph, Rockingham, and Stokes Counties in the Greenboro/Winston-Salem/High Point area; and Chatham, Durham, Franklin, Granville, Johnston, Orange, and Wake Counties in the Raleigh/Durham area. The Air Toxics program, which includes Stage I controls for gasoline distribution, also contributes to a reduction in emissions of volatile organic compounds. These controls will remain in place as part of the foundation control program.

The North Carolina contingency plan involve tracking and triggering mechanisms to determine when contingency measures are needed and a process of implementing appropriate control measures. The trigger of the contingency plan will be a violation of the ambient air quality standard for 1-hour ozone. The trigger date will be the date that the State certifies to the USEPA that the air quality data is quality assured.

Additionally, the 8-hour ozone nonattainment designations are expected to be final by April 2004. All of the 1-hour ozone maintenance area is expected to be included in the Raleigh/Durham 8-hour ozone nonattainment area and the State Implementation Plan (SIP) will be due April 2007 showing how North Carolina will attain the 8-hour ozone standard in the Raleigh/Durham area. This SIP will have control measures necessary to meet the 8-hour ozone standard and contingency measures. The 8-hour ozone attainment SIP for the Raleigh/Durham area will be added assurance that the 1-hour ozone standard will continue to be met.

The expected 8-hour ozone nonattainment boundary for the Greensboro/Winston-Salem/High Point area also contains all of the 1-hour maintenance area. However, this area has signed an Early Action Compact (EAC) with the USEPA. Through the EAC agreement, the local area and the State agree to develop control strategies to reduce ozone pollution by March 2004, submit an attainment SIP by December 2004, implement control strategies by 2005, and ultimately will allow the area to attain the 8-hour ozone standard by December 2007. USEPA then agrees to defer the designation status, provided all milestones are met, to December 2007. If in December 2007 the area is attaining the 8-hour ozone standard, then the nonattainment designation will be revoked and the area will be categorized as attainment. Like the Raleigh/Durham area, the attainment SIP will contain control measures to meet the 8-hour standard and contingency measures and will serve as added assurance that the 1-hour ozone standard will continue to be attained.

3.2 FOUNDATION CONTROL PROGRAM

The main element of the maintenance plan updates is the foundation control program. The foundation control program contains the controls necessary to maintain the ambient air quality standards. The purpose of the foundation control program is to prevent the ambient air quality standards from being violated and thereby eliminate the need for more costly controls being imposed on industry and the general public. Each component of the State's foundation control program is essential in demonstrating maintenance of the air quality standards. All have been used in demonstrating maintenance. The elimination of any one component could result in failure to demonstrate maintenance.

The foundation control program consists of federal measures and State measures. The federal measures include the gasoline volatility control program and the federal highway motor vehicle and off-road equipment control program. State measures include the I/M program in Forsyth, Guilford, Wake, Durham, and Orange Counties, the air toxics program, Stage I vapor controls, a transportation and air quality planning conformity analysis program, and piping for Stage II controls. Although Stage II piping does not reduce emissions itself, the piping is already in place if the State decides to implement State II controls. All of these programs have already been implemented or are in the process of being implemented.

Gasoline Volatility Program

The Reid vapor pressure program limits the Reid vapor pressure of gasoline to 9.0 psi in May and to 7.8 psi between June and September, inclusively, for 1992 and subsequent years (40 CFR 80.27). Lower Reid vapor pressures lead to lower volatile organic compound emissions from gasoline handling and to lower vapor losses (volatile organic compounds) from motor vehicles. The Reid vapor pressure program is a very effective program that has little cost associated with it.

Federal Motor Vehicle Control Program

The federal vehicle control program specifies emissions standards for motor vehicles. Newer motor vehicles are required to meet lower emissions standards for volatile organic compounds, carbon monoxide and nitrogen oxides. As newer vehicles replace older vehicles, the emissions per vehicle mile traveled decreases. The light duty engine standards, or Tier II, become effective with manufacturer year (MY) 2004 vehicles. These standards require that sports utility vehicles (SUVs), minivans and pick-up trucks meet the same emissions standards as light duty passenger cars. The heavy duty engine standards become effective with the MY 2007 vehicles.

Federal Fuels Programs

To compliment the new engine standards, USEPA also requires two new clean fuels programs; low sulfur gasoline to be phased in beginning in 2004, and low sulfur diesel fuel to be phased in beginning in 2006. The programs are in addition to the gasoline volatility program discussed above.

NOx SIP Call

In response to EPA's NOx SIP call, North Carolina adopted rules to control the emissions of nitrogen oxides (NOx) from large stationary combustion sources. These rules cover (1) fossil fuel-fired stationary boilers, combustion turbines, and combined cycle systems serving a generator with a nameplate capacity greater than 25 megawatts electrical and selling any amount of electricity, (2) fossil fuel-fired stationary boilers, combustion turbines, and combined cycle

systems having a maximum design heat input greater than 250 million Btu per hour, and (3) reciprocating stationary internal combustion engines rated at equal or greater than 2400 brake horsepower (3000 brake horsepower for diesel engines and 4400 brake horsepower for dual fuel engines).

As part of the NOx SIP call, EPA rules established a NOx budget for sources in North Carolina and other states. North Carolina has a Phase II budget of 165,022 tons per ozone season.

Besides amending existing NOx rules and adopting new NOx rules specifically to address the EPA NOx SIP call, the North Carolina rules also require new sources to control emissions of NOx. The objective of this requirement is (1) to aid in meeting the NOx budget for North Carolina for minor sources and (2) to aid in attaining and maintaining the ambient air quality standard for ozone in North Carolina.

Inspection/Maintenance Program

The State has adopted a NOx I/M program, that will be phased in by January 2006, in 48 counties (Figure 2.2-1). This program will reduce NOx emissions as well as VOC and CO emissions. The effective dates for the counties in and around the Raleigh/Durham maintenance area are listed below.

County	Date	County	Date
Chatham	January 1, 2004	Johnston	July 1, 2003
Durham	July 1, 2002	Orange	July 1, 2002
Franklin	January 1, 2004	Wake	July 1, 2002
Granville	July 1, 2004		

For the counties in and around the Greensboro, Winston-Salem/High Point maintenance area, the effective dates for the NOx I/M program are listed below.

County	Date	County	Date
Alamance	January 1, 2004	Randolph	January 1, 2004
Davidson	July 1, 2003	Rockingham	July 1, 2004
Forsyth	July 1, 2002	Stokes	July 1, 2005
Guildford	July 1, 2002		

Air Toxics Control Program

Although the purpose of the State's air toxic program is to control toxic air pollutants rather than volatile organic compounds, it will also reduce emissions of volatile organic compounds because

many toxic air pollutants are also volatile organic compounds. The air toxic program was adopted effective May 1, 1990. All new facilities are required to comply with the air toxic rules before beginning operation. Existing facilities that are modified such that there are additional emissions of toxic air pollutants are required to comply with the air toxic rules. All other facilities are required to comply with the air toxic rules when their Standard Industrial Classification (SIC) code is called.

As part of the air toxic program, Stage I controls for gasoline dispensing facilities have been adopted effective May 1, 1990, with final compliance by January 1, 1994. Amendments to the gasoline bulk plant and terminal rules have been adopted that require more restrictive controls for volatile organic compounds.

Transportation Conformity

The State Division of Air Quality (DAQ) will work closely with the State Department of Transportation (DOT) and local transportation agencies to assure that Transportation Improvement Programs (TIPs) in the maintenance areas are consistent with and conform to the State's air quality program including the SIP and meet the Federal requirements on conformity. This conformity review shall be performed for all Federally funded and all other major projects contained in TIPs, regardless of source of funding. Technical analysis of transportation plans, programs, and projects for conformity will be done cooperatively by the Statewide Planning Branch of the State DOT and the DAQ. In the event that the DAQ disagrees with the State DOT on a conformity determination or issue, the DAQ and the State DOT will present the issue to the Governor for resolution. Additionally, the State will prepare NOx emissions analyses in the ozone conformity determinations.

The public and interested parties will be given an early and reasonable opportunity to comment on transportation plans, programs, projects and proposed conformity determinations in accordance with procedures adopted by metropolitan planning organizations pursuant to the requirements of the Transportation Equity Act of the 21st Century (and any updated transportation legislation) and the Clean Air Act as amended.

Prevention of Significant Deterioration

All new major sources of volatile organic compounds and nitrogen dioxide will be evaluated under the prevention of significant deterioration program and will be required to use best available control technology.

Air Awareness Program

The State and the Forsyth County Environmental Affairs Department work to produce an 8-hour ozone forecast for the Triangle and Triad, respectively. The Triad forecast area is shown in

Figure 2.1-1, while the Triangle forecast area is shown in Figure 2.1-2. The purpose of the Air Awareness Program is as follows: to forecast when ozone levels are going to exceed the 8-hour ozone standards so that the general public can better protect their health, and so individuals, businesses and industry can take action to reduce pollution on days that are conducive to high ozone formation.

3.3 EMISSIONS INVENTORIES AND MAINTENANCE DEMONSTRATION

3.3.1 Theory Of Approach

There are two basic approaches used to demonstrate continued maintenance. The first is the comparison of a projected emissions inventory with a baseline emissions inventory. The second approach involves complex analysis using gridded dispersion modeling. The approached used by North Carolina is the comparison of emissions inventories for the years 2000 and 2015.

The demonstration is made by comparing a 2000 baseline emissions inventory to a 2015 projected emissions inventory. The baseline emissions inventory represents an emission level that did not cause the ambient air quality standard to be violated. If the projected emissions remain at or below the baseline emissions, continued maintenance is demonstrated and it then follows, if the projected emissions remain at or below the baseline emissions, then the ambient air quality standard should not be violated in the future.

The emissions inventories are comprised of three major types of sources: point, area, and mobile. The projected emissions inventories has been computed using projected rates of growth in population, traffic, economic activity, and other parameters.

3.3.2 Emission Inventories

Types of Emission Sources

There are four different man-made emission inventory source classifications, stationary point and area sources, and off-road and on-road mobile sources.

Point sources are those stationary sources that emit more than 10 tons per year volatile organic compounds (VOC), 100 tons per year of nitrogen oxides (NOx), or 100 tons per year carbon monoxide (CO) from a single facility. The source emissions are tabulated from data collected by direct on-site measurements of emissions or mass balance calculations utilizing emission factors from USEPA's AP.02. There may be several emission sources for one facility. Emission data is collected for each point source at a facility and the data is entered into a in house database system. For the projected year's inventory, point sources are adjusted by growth factors based on SIC (Standard Industrial Classification) 2-digit codes that are derived using the Bureau of Labor

and Statistics (BLS) factors in USEPA's Economic (E-GAS) program or based on specific industry growth expectations.

Stationary area sources are those sources whose emissions are relatively small but due to the large number of these sources, the collective emissions could be significant (i.e., dry cleaners, service stations, etc.). For area sources, emissions are estimated by multiplying an emission factor by some known indicator of collective activity such as production, number of employees, or population. These types of emissions are estimated on the county level. For the projected year's inventory, area source emissions are changed by population growth, projected production growth, or when applicable, by E-GAS BLS growth factors.

For on-road, often referred to as highway, mobile sources, USEPA's MOBILE6.2 mobile model is run to generate the twelve functional road class (i.e. urban interstate, rural interstate, rural local, etc.) emission factors. The emissions are calculated by multiplying the road class vehicle miles traveled (VMT) by the road class emission factor and summed to the county level. For the projected years' inventories, the highway mobile sources emissions are calculated by re-running the MOBILE6.2 mobile model for the future year to generate emission factors that take into consideration expected Federal tailpipe standards, fleet turn-over and new fuels. The new emission factors are multiplied by the projected VMT.

Off-road mobile sources are equipment that can move but do not use the roadways, i.e., lawn mowers, construction equipment, railroad locomotives, aircraft, etc. The emissions from this category are calculated using USEPA's NONROAD2002 nonroad mobile model, with the exception of the railroad locomotives and aircraft engine. The railroad locomotive and aircraft engine emissions are estimated by taking an activity and multiply by an emission factor. These emissions are also estimated at the county level. For the projected years' inventories, the emissions are estimated using USEPA's NONROAD2002 nonroad mobile model, EGAS BLS growth factors or projected landing and take off data for aircraft.

Sources Of Information

The information on emission factors comes from a variety of sources. Guidance for both the base and projected year's inventories is given in documents established by the USEPA. These documents include, AP-42, Compilation of Air Pollutant Emission Factors, Fifth Edition, Procedures for the Preparation of Emissions Inventories of Carbon Monoxide and Precursors of Ozone, Procedures for Emission Inventory Preparation Volume IV: Mobile Sources, and Emissions Inventory Improvement Program (EIIP) technical reports. These documents establish average emission factors to be applied to industry and off road equipment, such as railroad locomotives and aircraft engines. They also establish a list source categories to be addressed in the emissions inventory.

The activity levels used to estimate the emissions are also obtained from a variety of sources. For area sources, these included U. S. Census Bureau, North Carolina Office of Statewide Planning, County Business Patterns, and Federal Highway Administration Highway Statistics just to name a few. For highway mobile sources, activity levels were received from the North Carolina Department of Transportation (NCDOT). The activity data used for estimating the off-road categories not estimated in the NONROAD2002 model are obtained from the airports and federal reports.

The data used to project the inventories into the future are obtained from similar sources and also the USEPA E-GAS model.

Point Source Inventory

Point sources are larger sources of emissions that are reported as individual facilities. These sources were identified from lists of sources covered by permits, for the most part. In general, size criteria for the 2000 point source inventory is a 100 tons/year or greater of NOx and CO and 10 tons/year or greater of VOCs. A few other sources, known to exist but not required to have a permit, (e.g., bakeries and landfills), and may be smaller than the size criteria were identified and inventoried. In accordance with EPA-450/4-91-010, nonreactive VOCs were not included in the inventory. The list of compounds excluded from the inventory can be found in Appendix A.

Point source emissions were inventoried in Wake and Durham Counties and the Dutchville Township in Granville County for the Raleigh/Durham maintenance area and in Guilford, Forsyth and Davidson Counties and a small part of Davie County bordering the Yadkin River for the Greensboro/Winston-Salem/High Point maintenance area. The small part of Davie County in the maintenance area does not contain any inventoried point sources.

The point source inventory is largely prepared by State regional office personnel and Local Program personnel. These persons have direct familiarity with the sources inventoried. The method of emission estimation depends on the particular source and the particular process in question. Methods used include:

AP-42 Methods,
Mass balance methods,
Source specific emission factors, and
Direct tests

In some cases VOC sources in 2000 had emission control devices installed. In these cases, unless emissions were directly determined (as by mass balance where recovered VOC could be measured), a rule effectiveness of 80% was assumed in accordance with USEPA requirements.

The practical effect of this is that a source with a 90% efficient control device is presumed to operate 80% of the time with 90% control and 20% of the time with no control.

The database that the point source emissions are entered into performs a number of checks for incompatible or missing data elements. Therefore any obvious errors are corrected at the time of data entry. Additionally, DAQ Planning Section staff reviews the data from the regional offices and local programs for any suspect data.

The point source inventory was projected to the future years using the BLS growth factors from the E-GAS projection model. These growth factors were based on Standard Industrial Classification (SIC) codes. For BLS growth factors that looked suspect, alternative methods of projection were reviewed, such as employment rates. Once the projected year emissions were estimated, the probable impact of anticipated regulations is assessed. Only the more significant source categories were evaluated for future control. In cases where a facility had control devices in 2000, the presence of existing controls and control efficiency was considered in assessing reductions due to new regulations. The emissions were then adjusted to account for any control measures that were expected to be implemented prior to the year the emissions were projected to.

A detailed description of the point source emissions inventory development for the base year 2000 and the future years 2004, 2007, 1010, 2012 and 2015 can be found in Appendix C. A summary of the emissions for each maintenance area is in Section 3.3.3.

Area Source Inventory

Area sources represent a collection of many small points of air pollution emissions within a specified geographical area, all-emitting less than the minimum level prescribed for point sources. Because these sources are too small and/or too numerous to be surveyed and characterized individually, all area source activities are collectively estimated. The county is usually the geographic area for which emissions from area sources are compiled, primarily because counties are the smallest areas for which data used for estimating emissions is readily available.

The area source inventory was developed for the North Carolina counties in the Raleigh/Durham and the Greensboro/Winston-Salem/High Point 1-hour ozone maintenance areas. Specifically, these counties are Davidson, Durham, Forsyth, Guilford, Wake, and parts of Davie (small area bordering the Yadkin River) and Granville (Dutchville Township). All emissions were calculated on a tons per day basis.

Area source categories were identified from a list in the USEPA guidance document EPA-450/4-91-016, Procedures for the Preparation of Emission Inventories of Carbon Monoxide and Precursors of Ozone, and from the EIIP technical reports.

The emissions from area sources were estimated by multiplying an emission factor by some known indicator of collective activity for each source category within the inventory area. An indicator is any parameter associated with the activity level of a source that can be correlated with the air pollutant emissions from that source, such as production, number of employees, or population. In general, one of four emission factor estimation approaches was used to calculate area source emissions. These approaches are:

Per capita emission factors;
Employment-related emission factors;
Commodity consumption-related emission factors; and
Level-of-activity based emission factors.

There are several methods for estimating the activity level for a specific area source category. These are:

Treating area sources as point sources;
Surveying local activity levels;
Apportioning national or statewide activity totals to local inventory areas;
Using per capita emission factors; or
Using emissions-per-employee factors.

All of these methods were used to estimate area source emissions. The 2000 census population data (Table 3.3.2-1) was used in conjunction with the per capita emission factors. In the cases of Davie and Granville counties, the populations were adjusted to include only the nonattainment area population. The population of that portion of Davie County had not changed significantly over the last 10 years. The 1990 and 2000 census population was 248 and 250 people, respectively. Therefore the growth assumption for this county was assumed to be two people per 10 years. For employment data, the 2000 County Business Patterns was used. In cases where population was not used to calculate the emissions for the partial counties, the emissions were apportioned to the maintenance area based on percent population. The percent population for the partial counties are 0.7% and 28.5% for Davie and Granville Counties, respectively.

TABLE 3.3.2-1 2000 Census Population Data

COUNTY	2000	2004	2007	2010	2012	2015
Davidson	147,246	155,178	161,259	167,233	170,692	176,493
Davie (Partial)	250	250	251	252	252	253
Durham	223,314	238,126	248,165	258,245	265,054	275,576
Forsyth	306,067	322,960	335,589	348,126	355,920	368,164
Granville(Partial)	13,801	14,960	15,786	16,604	17,105	17,922
Guilford	421,048	449,174	474,317	499,132	513,679	536,973
Wake	627,846	724,752	791,023	857,054	900,599	969,438

In most cases, emission factors from the Procedures for the Preparation of Emission Inventories of Carbon Monoxide and Precursors of Ozone, from the EIIP technical reports, or USEPA's AP-42, Compilation of Air Pollutant Emission Factors, Fifth Edition were used. There were a few instances where an emission factor had to be developed.

Once the 2000 base year ozone season area source emissions were estimated, emissions from point sources were subtracted when appropriate to avoid double counting. The projected future years emissions were then estimated using either BLS growth factors from the E-GAS projection model or projected population growth factors from data obtained from the NC Office of Statewide Planning. Where appropriate, the future year emissions were adjusted to account for any control measures that were expected to be implemented prior to the year the emissions were projected to.

In accordance with USEPA's guidance, the area source inventories were quality assured. The first issue in quality assurance was that of developing a complete list of area sources. Additionally, emission sources whose contribution was either at the high or low end of the range of estimates were scrutinized more closely for reasonableness. The accuracy was addressed by performing independent checks of the emission calculations.

A detailed description of the area source emissions inventory development for the base year 2000 and the future years 2004, 2007, 1010, 2012 and 2015 can be found in Appendix C. A summary of the emissions for each maintenance area is in Section 3.3.3.

Highway Mobile Source Inventory

Mobile Sources comprise about 50% of man made emissions, with the larger contributor being from highway mobile sources. These emissions are the result of evaporative and tailpipe emissions from automobiles, trucks and motorcycles.

The highway mobile source inventory was developed for the North Carolina counties in the Raleigh/Durham and the Greensboro/Winston-Salem/High Point 1-hour ozone maintenance areas. For Granville County, a partial county, the emissions were estimated using vehicle miles traveled associated with the maintenance area only. This data was provided by NCDOT. For Davie County, another partial county, the emissions were apportioned to the maintenance area based on percent population. The percent of Davie County's population within the maintenance area is 0.7%. All emissions were calculated on a tons per day basis.

The estimation of emissions from highway mobile sources, like area sources, involves multiplying an activity level by an emission factor. To determine the emission factors, the USEPA's MOBILE6.2 model was used. Based on the information inputted into the model, emission factors were generated for the twelve functional road classes. The activity level is the road class vehicle miles traveled (VMT), which was obtained by the North Carolina Department of Transportation (NCDOT). The emissions were then calculated by multiplying the road class emission factors by the road class VMT.

The highway mobile source projected inventories were created by re-running the MOBILE6.2 model for the future years. By changing the inputs into the model to reflect the year the emissions are being estimated for and any control measures expected to be implemented, the emission factors generated reflected the effects of cleaner vehicles due to tighter federal tailpipe standard and expected control measures such as I/M and cleaner fuels programs. The VMT was projected to the future years in accordance with USEPA's guidance. The projected VMT was then multiplied by the new future year emission factors.

Due to the importance of the highway mobile source category, more emphasis was placed on the quality assurance of this portion of the inventory. The MOBILE6.2 model inputs, defaults, and output were reviewed in detail. Also, the procedures regarding the VMT data manipulation and emission calculations were scrutinized.

A detailed description of the highway mobile source emissions inventory development for the base year 2000 and the future years 2004, 2007, 1010, 2012 and 2015 can be found in Appendix C. A summary of the emissions for each maintenance area is in Section 3.3.3.

Off-Road Mobile Source Inventory

Off-road mobile sources, sometimes referred to as non-highway mobile sources, are those sources that can move but do not use the highway system. Examples include lawn mowers, agricultural equipment, construction equipment, aircraft engines and railroad locomotives. The list of sources to inventory came from USEPA's NONROAD2002 model and the USEPA guidance document, Procedures for Emission Inventory Preparation Volume IV: Mobile Sources.

The off-road mobile source inventory was developed for the North Carolina counties in the Raleigh/Durham and the Greensboro/Winston-Salem/High Point 1-hour ozone maintenance areas. For the partial counties, the emissions were apportioned to the maintenance area based on percent population. The percent population for the partial counties are 0.7% and 28.5% for Davie and Granville Counties, respectively. All emissions were calculated on a tons per day basis.

All off-road mobile sources, except for aircraft engines and railroad locomotives, were estimated using the USEPA NONROAD2002 model. This model predicts the emissions for off-road equipment based upon the year inputted into the model. For railroad locomotive emissions, emission factors were supplied by the Procedures for Emission Inventory Preparation Volume IV: Mobile Sources document, which were then multiplied by a variety of different activity levels. For aircraft engine emissions, the Federal Aviation Administration (FAA) model EDMS was used. Actual 2000 aircraft operations were obtained from the major airports and inputted into the EDMS model. The model predicts the aircraft engine emissions based on average landing and take off practices for the aircraft types.

The projected years emissions from those categories in the NONROAD2002 model were created by changing the year for which emissions were needed. The railroad locomotive emissions were projected using the BLS growth factors from the E-GAS projection model and the aircraft engine emissions were projected using estimated growth in landing and take off operations at the various airports supplied by the NCDOT, Division of Aviation.

The non-highway mobile source inventory was quality assured by reviewing the input files for the NONROAD2002 and EDMS models. For railroad locomotive emissions the calculations were checked to ensure they were correct. Additionally, the emissions were reviewed by source category for reasonableness.

A detailed description of the non-highway mobile source emissions inventory development for the base year 2000 and the future years 2004, 2007, 1010, 2012 and 2015 can be found in Appendix C. A summary of the emissions for each maintenance area is in Section 3.3.3.

3.3.3 Summary of Emissions

Table 3.3.3-1 Point Source Emissions for the Greensboro/Winston-Salem/High Point Maintenance Area

County	2000	2004	2007	2010	2012	2015
VOC Emissions (tons/day)						
Davidson	17.51	17.26	17.31	17.35	17.41	17.40
Davie*	0.00	0.00	0.00	0.00	0.00	0.00
Forsyth	13.58	13.34	13.42	13.98	14.34	14.84
Guilford	23.81	24.63	25.94	27.58	28.73	30.26
Total	54.90	55.23	56.67	58.91	60.48	62.50
NOx Emissions (tons/day)						
Davidson	14.60	10.23	7.40	7.89	8.21	8.64
Davie*	0.00	0.00	0.00	0.00	0.00	0.00
Forsyth	9.33	12.40	7.86	8.17	8.37	8.64
Guilford	2.42	2.57	2.69	2.84	2.94	3.07
Total	26.35	25.20	17.95	18.90	19.52	20.35

* Partial County

Table 3.3.3-2 Point Source Emissions for the Raleigh/Durham Maintenance Area

County	2000	2004	2007	2010	2012	2015
VOC Emissions (tons/day)						
Durham	1.80	1.77	1.77	1.90	1.91	1.98
Granville*	0.79	0.77	0.77	0.80	0.85	0.89
Wake	9.04	9.16	9.48	9.90	10.15	10.54
Total	11.63	11.70	12.02	12.60	12.91	13.41
NOx Emissions (tons/day)						
Durham	3.84	4.10	4.29	4.54	4.70	4.93
Granville*	0.28	0.30	0.31	0.33	0.34	0.35
Wake	2.68	2.83	2.98	3.16	3.27	3.42
Total	6.80	7.23	7.58	8.03	8.31	8.70

* Partial County

Table 3.3.3-3 Area Source Emissions for the Greensboro/Winston-Salem/High Point Maintenance Area

County	2000	2004	2007	2010	2012	2015
VOC Emissions (tons/day)						
Davidson	8.77	7.41	7.61	7.82	7.93	8.12
Davie*	0.11	0.11	0.12	0.12	0.13	0.13
Forsyth	12.48	10.88	11.34	11.82	12.13	12.58
Guilford	20.01	17.19	17.93	18.71	19.19	19.90
Total	41.37	35.59	37.00	38.47	39.38	40.73
NOx Emissions (tons/day)						
Davidson	0.45	0.48	0.50	0.51	0.52	0.54
Davie*	0.002	0.002	0.002	0.002	0.002	0.002
Forsyth	0.48	0.51	0.53	0.55	0.56	0.58
Guilford	0.85	0.91	0.96	1.01	1.04	1.08
Total	1.78	1.90	1.99	2.07	2.12	2.20

* Partial County

Table 3.3.3-4 Area Source Emissions for the Raleigh/Durham Maintenance Area

County	2000	2004	2007	2010	2012	2015
VOC Emissions (tons/day)						
Durham	8.01	6.98	7.26	7.59	7.82	8.15
Granville*	1.17	1.11	1.14	1.17	1.19	1.22
Wake	27.52	25.72	27.46	29.37	30.63	32.59
Total	36.70	33.81	35.86	38.13	39.64	41.96
NOx Emissions (tons/day)						
Durham	0.37	0.39	0.41	0.43	0.44	0.45
Granville*	0.07	0.07	0.08	0.08	0.08	0.09
Wake	1.42	1.64	1.79	1.93	2.03	2.19
Total	1.86	2.10	2.28	2.44	2.55	2.73

* Partial County

Table 3.3.3-5 Highway Mobile Source Emissions for the Greensboro/Winston-Salem/High Point Maintenance Area

County	2000	2004	2007	2010	2012	2015
VOC Emissions (tons/day)						
Davidson	8.37	6.49	5.44	4.46	3.91	3.43
Davie*	0.02	0.01	0.01	0.01	0.01	0.01
Forsyth	17.00	13.77	11.38	9.37	8.14	7.08
Guilford	25.00	20.21	16.56	13.51	11.70	10.14
Total	50.39	40.48	33.39	27.35	23.76	20.66
NOx Emissions (tons/day)						
Davidson	16.23	12.78	9.90	7.35	5.94	4.29
Davie*	0.05	0.04	0.03	0.02	0.02	0.01
Forsyth	31.50	24.18	18.42	13.67	11.06	7.99
Guilford	44.70	34.03	25.74	18.97	15.36	11.07
Total	92.48	71.03	54.09	40.01	32.38	23.36

* Partial County

Table 3.3.3-6 Highway Mobile Source Emissions for the Raleigh/Durham Maintenance Area

County	2000	2004	2007	2010	2012	2015
VOC Emissions (tons/day)						
Durham	10.76	8.74	7.09	5.69	4.95	4.31
Granville*	0.73	0.61	0.47	0.39	0.34	0.30
Wake	24.95	20.36	17.13	14.59	13.03	11.76
Total	36.44	29.71	24.69	20.67	18.32	16.37
NOx Emissions (tons/day)						
Durham	22.38	17.99	13.65	9.96	7.90	5.55
Granville*	2.65	1.80	1.30	0.99	0.77	0.53
Wake	55.28	46.86	36.95	26.23	21.23	15.30
Total	80.31	66.65	51.90	37.18	29.90	21.38

* Partial County

Table 3.3.3-7 Off Road Mobile Source Emissions for the Greensboro/Winston-Salem/High Point Maintenance Area

County	2000	2004	2007	2010	2012	2015
VOC Emissions (tons/day)						
Davidson	2.19	1.99	1.76	1.62	1.61	1.64
Davie*	0.01	0.01	0.01	0.01	0.01	0.01
Forsyth	5.65	4.96	4.18	3.83	3.85	3.97
Guilford	11.99	10.56	8.85	8.08	8.15	8.40
Total	19.84	17.52	14.80	13.54	13.62	14.02
NOx Emissions (tons/day)						
Davidson	4.27	4.10	3.92	3.76	3.68	3.61
Davie*	0.02	0.01	0.01	0.01	0.01	0.01
Forsyth	7.03	6.97	6.81	6.58	6.49	6.52
Guilford	14.71	15.22	14.84	14.29	14.07	14.03
Total	26.03	26.30	25.58	24.64	24.25	24.17

* Partial County

Table 3.3.3-8 Off Road Mobile Source Emissions for the Raleigh/Durham Maintenance Area

County	2000	2004	2007	2010	2012	2015
VOC Emissions (tons/day)						
Durham	5.07	4.61	4.05	3.81	3.82	3.92
Granville*	0.30	0.28	0.24	0.23	0.23	0.24
Wake	15.66	13.40	10.76	9.61	9.61	9.89
Total	21.03	18.29	15.05	13.65	13.66	14.05
NOx Emissions (tons/day)						
Durham	9.64	9.39	9.04	8.58	8.37	8.27
Granville*	0.44	0.42	0.40	0.38	0.37	0.37
Wake	19.05	18.39	17.54	16.44	15.93	15.58
Total	29.13	28.20	26.98	25.40	24.67	24.22

* Partial County

Table 3.3.3-9 Total Anthroprogenic Emissions for the Greensboro/Winston-Salem/High Point Maintenance Area

County	2000	2004	2007	2010	2012	2015
VOC Emissions (tons/day)						
Davidson	37.07	33.30	32.19	31.26	30.85	30.55
Davie*	1.01	1.15	1.26	1.34	1.39	1.44
Forsyth	49.31	43.38	40.59	39.15	38.59	38.58
Guilford	82.65	74.07	70.43	68.79	68.64	69.54
Total	170.04	151.90	144.47	140.54	139.47	140.11
NOx Emissions (tons/day)						
Davidson	35.40	27.56	21.76	19.60	18.45	17.18
Davie*	0.72	0.71	0.69	0.66	0.65	0.64
Forsyth	48.27	44.31	33.94	29.30	26.86	24.12
Guilford	63.31	53.78	45.32	38.18	34.47	30.34
Total	147.70	126.36	101.71	87.74	80.43	72.28

* Partial County

Table 3.3.3-10 Total Anthroprogenic Emissions for the Raleigh/Durham Maintenance Area

County	2000	2004	2007	2010	2012	2015
VOC Emissions (tons/day)						
Durham	26.34	22.65	20.62	19.37	18.88	18.73
Granville*	3.90	3.60	3.33	3.25	3.26	3.32
Wake	78.96	69.87	65.57	63.83	63.73	64.98
Total	109.20	96.12	89.52	86.45	85.87	87.03
NOx Emissions (tons/day)						
Durham	36.77	32.59	28.11	24.19	22.09	19.88
Granville*	4.41	3.60	3.08	2.74	2.51	2.28
Wake	79.27	70.77	60.39	49.09	43.81	37.91
Total	120.45	106.96	91.58	76.02	68.41	60.07

* Partial County

3.3.4 Maintenance Demonstration

The Raleigh/Durham area (Durham and Wake Counties and part of Granville County) and the Greensboro/Winston-Salem/High Point area (Davidson, Forsyth, and Guildford Counties and part of Davie County) were designated nonattainment for 1-hour ozone in 1992 and classified as moderate (Figure 1). In November 1992, the State of North Carolina submitted a request to redesignate these two areas to maintenance status, based upon three years of clean air quality data (1990 through 1992). The Greensboro/Winston-Salem/High Point area had supplemental

information in June 1993 and was redesignated to maintenance status on November 8, 1993. The Raleigh/Durham area submitted supplemental information in June 1993 and January 1994 and was redesignated to maintenance status on June 17, 1994.

The continued maintenance of the 1-hour ozone NAAQS in the Raleigh/Durham and the Greensboro/Winston-Salem/High Point maintenance areas is expected through the demonstration of showing that the 2015 projected emissions for VOCs and NOx are projected to be less than the 2000 baseline emissions. The emissions are summarized in Table 3.3.4-1. In the Raleigh/Durham maintenance area there is an expected reduction in VOCs and NOx emissions of 20 tons and 61 tons, respectively between 2000 and 2015. In the Greensboro/Winston-Salem/High Point maintenance area there is an expected reduction in VOCs and NOx emissions of 28 tons and 76 tons, respectively between 2000 and 2015.

The projected emissions inventory has been calculated using moderately conservative assumptions. Not all emission reductions may have been counted. Only the more significant source categories have been evaluated; therefore, not all the reductions brought about by the air toxic rules may have been counted

The following table summarizes the VOC and NOx emissions for each inventoried year by maintenance area. The differences between the base and projected years, for each pollutant, illustrates that maintenance of the 1-hour ozone NAAQS will be maintained.

TABLE 3.3.4-1 MAINTENANCE DEMONSTRATION

Year	Raleigh/Durham Maintenance Area		Greensboro/Winston-Salem/High Point Maintenance Area	
	VOC TPD	NOx TPD	VOC TPD	NOx TPD
2000	105.81	118.09	166.50	146.64
2004	93.52	104.18	148.82	124.42
2007	87.63	88.74	141.85	99.62
2010	85.04	73.06	138.27	85.62
2012	84.53	65.43	137.25	78.27
2015	85.79	57.03	137.91	70.09
Difference from 2000 to 2015	- 20.02	- 61.06	- 28.59	- 76.55

The year 2000 was selected as the new base year for this maintenance plan update. Only one monitor in both areas experienced an exceedance of the 1-hour ozone standard, so 2000 can clearly be seen as an attainment year. The projection years selected are: 2004, 2007, 2010, 2012 and 2015. To demonstrate maintenance with the emission comparison approach, all projection

years should be below the base year for both pollutants. As evidenced in Table 1, both pollutants exhibit a declining trend from 2000 to 2015. Based on this emission inventory comparison, North Carolina concludes that both the Raleigh/Durham and the Greensboro/Winston-Salem/High Point areas will continue to maintain the 1-hour ozone standard through 2015.

The difference between the attainment level of emissions from all sources and the projected level of emissions from all sources in the maintenance area is considered the "safety margin". The safety margin for each projected year is listed below in Table 3.3.4-2.

TABLE 3.3.4-2 SAFETY MARGINS FOR MAINTENANCE AREAS

Year	Raleigh/Durham Maintenance Area		Greensboro/Winston-Salem/High Point Maintenance Area	
	VOC TPD	NOx TPD	VOC TPD	NOx TPD
2000	N/A	N/A	N/A	N/A
2004	-12.29	-13.91	-17.68	-22.21
2007	-18.18	-29.35	-24.65	-47.01
2010	-20.76	-45.04	-28.23	-61.01
2012	-21.28	-52.66	-29.26	-68.36
2015	-20.02	-61.06	-28.59	-76.55

3.4 CONTINGENCY PLAN

The North Carolina contingency plan involves tracking and triggering mechanisms to determine when contingency measures are needed and a process of implementing appropriate control measures. The trigger of the contingency plan will be a violation of the ambient air quality standard for 1-hour ozone. The trigger date will be the date that the State certifies to the USEPA that the air quality data is quality assured.

Once the trigger has been activated, the NCDAQ shall commence analyses, including, if necessary, updated gridded photochemical modeling to determine those emission control measures that will be required for attaining and maintaining the ambient air quality standard for 1-hour ozone. Furthermore, North Carolina has pre-adopted certain emission control regulations that are prescribed for moderate ozone nonattainment areas in the Clean Air Act as amended (CAA). These pre-adopted measures are additional measures beyond those required by the North Carolina maintenance plan for the Raleigh/Durham and Greensboro/Winston-Salem/High Point areas. If the modeling supports the use of these pre-adopted measures to show attainment of the NAAQS, then NCDAQ will commence the process for activation within one year of the modeling analysis completion.

Additionally, the 8-hour ozone nonattainment designations are expected to be final by April 2004. All of the Raleigh/Durham 1-hour ozone maintenance area is expected to be included in

the Raleigh/Durham 8-hour ozone nonattainment area and the State Implementation Plan (SIP) will be due April 2007 showing how North Carolina will attain the 8-hour ozone standard in the Raleigh/Durham area. This SIP will have control measures necessary to meet the 8-hour ozone standard and contingency measures. The 8-hour ozone attainment SIP for the Raleigh/Durham area will be added assurance that the 1-hour ozone standard will continue to be met.

The expected 8-hour ozone nonattainment boundary for the Greensboro/Winston-Salem/High Point area also contains all of the 1-hour maintenance area. However, this area has signed an Early Action Compact (EAC) with the USEPA. Through EAC the agreement, the area agrees to develop control strategies to reduce ozone pollution by March 2004, submit an attainment SIP by December 2004, implement control strategies by 2005 and ultimately will allow the area to attain the 8-hour ozone standard by December 2007. USEPA then agrees to defer the designation status, provided all milestones are met, to December 2007. If in December 2007 the area is attaining the 8-hour ozone standard, then the nonattainment designation will be revoked and the area will be categorized as attainment. Like the Raleigh/Durham area, the attainment SIP will contain control measures to meet the 8-hour standard and contingency measures and will serve as added assurance that the 1-hour ozone standard will continue to be attained.

4.0 MOTOR VEHICLE EMISSIONS BUDGET FOR CONFORMITY

4.1 TRANSPORTATION CONFORMITY

Transportation conformity is used to ensure that Federal transportation actions occurring in the maintenance areas do not hinder the area from maintaining the 1-hour ozone standard. This means that the level of emissions estimated by the NC Department of Transportation (NCDOT) or the Metropolitan Planning Organizations (MPOs) for the Transportation Implementation Plan (TIP) must not exceed the on-road motor vehicle emissions budget (MVEB) defined in the maintenance SIP for motor vehicles.

4.2 SAFETY MARGIN

As stated in Section 3.3.4, a safety margin is the difference between the attainment level of emissions from all sources and the projected level of emissions from all sources. The safety margins for the Raleigh/Durham and the Greensboro/Winston-Salem/High Point maintenance areas are listed in Table 3.3.4-2 above. The State may choose to allocate some of the safety margin to the MVEB, for transportation conformity purposes, so long as the total level of emissions from all sources remains below the attainment level of emissions.

North Carolina has decided to allocate a portion of the safety margin to the MVEB to allow for unanticipated growth in VMT, changes to vehicle mix assumption, etc., that will influence the emission estimates. The amount allocated to the MVEB varied by maintenance area, year, and pollutant. The percentages used to come up with the safety margins were based on latest socio-economic data used in the travel demand model, which predicts VMT, and the sensitivity of the emissions to vehicle mix and vehicle age distribution. Table 4.2-1 summarizes the percent increase to MVEB for purposes of transportation conformity.

Table 4.2-1 PERCENT INCREASE TO MOBILE VEHICLE EMISSIONS BUDGET

County	2004	2007	2010	2012	2015
Greensboro/Winston-Salem High Point					
VOC	0%	6%	6%	12%	15%
NOx	0%	6%	6%	7%	10%
Raleigh Durham					
VOC	9%	17%	19%	20%	22%
NOx	9%	12%	14%	15%	17%

4.3 MOTOR VEHICLE EMISSION BUDGETS

NCDOT requested that the MVEB, for transportation conformity purposes, be split out by county since the conformity timetable may vary county by county within a maintenance area. NCDAQ has agreed to set the MVEB, for transportation conformity purposes, as county budgets within a maintenance area. This will allow the flexibility of an area to either meet only the county budget or to combine the county budgets for a maintenance area and meet the regional budget. The tables below list out the MVEB, for transportation conformity purposes, by county.

4.3.1 Greensboro/Winston-Salem/High Point Maintenance Area

Tables 4.3.1-1 through 4.3.1-4 explicitly provide county-by-county sub-area MVEB for counties (or portion thereof) that comprise the 1-hour ozone maintenance area for the Greensboro/Winston-Salem/High Point area for the years 2004, 2007, 2010, 2012, and 2015 for both volatile organic compounds and nitrogen oxides. Upon EPA's affirmative adequacy finding for these sub-area MVEB, these MVEB will become the applicable MVEB for each county. The MVEB for Davie County is only for the portion of Davie County that is within the maintenance area.

Table 4.3.1-1 Davidson County MVEB

	2000	2004	2007	2010	2012	2015
VOC Emissions (tons/day)						
Base Emissions	8.37	6.49	5.44	4.46	3.91	3.43
Safety Margin Allocated to MVEB	0.00	0.00	0.33	0.27	0.47	0.51
VOC Conformity MVEB	**8.37**	**6.49**	**5.77**	**4.73**	**4.38**	**3.94**
NOx Emissions (tons/day)						
Base Emissions	16.23	12.78	9.90	7.35	5.94	4.29
Safety Margin Allocated to MVEB	0.00	0.00	0.59	0.44	0.42	0.43
NOx Conformity MVEB	**16.23**	**12.78**	**10.49**	**7.79**	**6.36**	**4.72**

Table 4.3.1-2 Davie County* MVEB

	2000	2004	2007	2010	2012	2015
VOC Emissions (tons/day)						
Base Emissions	0.02	0.01	0.01	0.01	0.01	0.01
Safety Margin Allocated to MVEB	0.00	0.00	0.00	0.00	0.00	0.00
VOC Conformity MVEB	**0.02**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**
NOx Emissions (tons/day)						
Base Emissions	0.05	0.04	0.03	0.02	0.02	0.01
Safety Margin Allocated to MVEB	0.00	0.00	0.00	0.00	0.00	0.00
NOx Conformity MVEB	**0.05**	**0.04**	**0.03**	**0.02**	**0.02**	**0.01**

*The Davie County MVEB is for the portion of Davie County in the maintenance area.

Table 4.3.1-3 Forsyth County MVEB

	2000	2004	2007	2010	2012	2015
VOC Emissions (tons/day)						
Base Emissions	17.00	13.77	11.38	9.37	8.14	7.08
Safety Margin Allocated to MVEB	0.00	0.00	0.68	0.56	0.98	1.06
VOC Conformity MVEB	**17.00**	**13.77**	**12.06**	**9.93**	**9.12**	**8.14**
NOx Emissions (tons/day)						
Base Emissions	31.50	24.18	18.42	13.67	11.06	7.99
Safety Margin Allocated to MVEB	0.00	0.00	1.11	0.82	0.77	0.80
NOx Conformity MVEB	**31.50**	**24.18**	**19.53**	**14.49**	**11.83**	**8.79**

Table 4.3.1-4 Guilford County MVEB

	2000	2004	2007	2010	2012	2015
VOC Emissions (tons/day)						
Base Emissions	25.00	20.21	16.56	13.51	11.70	10.14
Safety Margin Allocated to MVEB	0.00	0.00	0.99	0.81	1.40	1.52
VOC Conformity MVEB	**25.00**	**20.21**	**17.55**	**14.32**	**13.10**	**11.66**
NOx Emissions (tons/day)						
Base Emissions	44.70	34.03	25.74	18.97	15.36	11.07
Safety Margin Allocated to MVEB	0.00	0.00	1.54	1.14	1.08	1.11
NOx Conformity MVEB	**44.70**	**34.03**	**27.28**	**20.11**	**16.44**	**12.18**

4.3.2 Raleigh/Durham Maintenance Area

Tables 4.3.2-1 through 4.3.2-3 explicitly provide county-by-county sub-area MVEB for counties (or portion thereof) that comprise the 1-hour ozone maintenance area for the Raleigh/Durham area for the years 2004, 2007, 2010, 2012, and 2015 for both volatile organic compounds and nitrogen oxides. Upon EPA's affirmative adequacy finding for these sub-area MVEB, these MVEB will become the applicable MVEB for each county. The MVEB for Granville County is only for the portion of Granville County that is within the maintenance area.

Table 4.3.2-1 Durham County MVEB

	2000	2004	2007	2010	2012	2015
VOC Emissions (tons/day)						
Base Emissions	10.76	8.74	7.09	5.69	4.95	4.31
Safety Margin Allocated to MVEB	0.00	0.79	1.21	1.08	0.99	0.95
VOC Conformity MVEB	**10.76**	**9.53**	**8.30**	**6.77**	**5.94**	**5.26**
NOx Emissions (tons/day)						
Base Emissions	22.38	17.99	13.65	9.96	7.90	5.55
Safety Margin Allocated to MVEB	0.00	1.62	1.64	1.39	1.19	0.94
NOx Conformity MVEB	**22.38**	**19.61**	**15.29**	**11.35**	**9.09**	**6.49**

Table 4.3.2-2 Granville County* MVEB

	2000	2004	2007	2010	2012	2015
VOC Emissions (tons/day)						
Base Emissions	0.73	0.61	0.47	0.39	0.34	0.30
Safety Margin Allocated to MVEB	0.00	0.05	0.08	0.07	0.07	0.07
VOC Conformity MVEB	**0.73**	**0.66**	**0.55**	**0.46**	**0.41**	**0.37**
NOx Emissions (tons/day)						
Base Emissions	2.65	1.80	1.30	0.99	0.77	0.53
Safety Margin Allocated to MVEB	0.00	0.16	0.16	0.14	0.12	0.09
NOx Conformity MVEB	**2.65**	**1.96**	**1.46**	**1.13**	**0.89**	**0.62**

*The Granville County MVEB is for the portion of Granville County in the maintenance area.

Table 4.3.2-3 Wake County MVEB

	2000	2004	2007	2010	2012	2015
VOC Emissions (tons/day)						
Base Emissions	24.95	20.36	17.13	14.59	13.03	11.76
Safety Margin Allocated to MVEB	0.00	1.83	2.91	2.77	2.61	2.59
VOC Conformity MVEB	**24.95**	**22.19**	**20.04**	**17.36**	**15.64**	**14.35**
NOx Emissions (tons/day)						
Base Emissions	55.28	46.86	36.95	26.23	21.23	15.30
Safety Margin Allocated to MVEB	0.00	4.22	4.43	3.67	3.18	2.60
NOx Conformity MVEB	**55.28**	**51.08**	**41.38**	**29.90**	**24.41**	**17.90**

4.4 New Safety Margins

Taking into consideration the portion of the safety margin applied to the MVEB the resulting difference between the attainment level of emissions from all sources and the projected level of emissions from all sources in the maintenance area, i.e., the new safety margins, for each projected year is listed below in Table 4.4-1.

TABLE 4.4-1 NEW SAFETY MARGINS FOR MAINTENANCE AREAS

Year	Raleigh/Durham Maintenance Area		Greensboro/Winston-Salem/High Point Maintenance Area	
	VOC TPD	NOx TPD	VOC TPD	NOx TPD
2000	N/A	N/A	N/A	N/A
2004	-9.62	-7.91	-17.68	-22.21
2007	-13.98	-23.12	-22.65	-43.77
2010	-16.84	-39.84	-26.59	-58.61
2012	-17.61	-48.17	-26.41	-66.09
2015	-16.41	-57.43	-25.50	-74.21

5.0 STATE IMPLEMENTATION PLAN (SIP) APPROVAL

5.1 INTRODUCTION

For an area to have an approved maintenance plan, the State must submit a revision to the maintenance plan within 8 years of the original redesignation to attainment. The SIP revision must include evidence of compliance with the rules relied on to show maintenance of the standard. This section provides the evidence of compliance with such rules for the North Carolina 1-hour ozone maintenance areas.

5.2 EVIDENCE OF COMPLIANCE

These two areas of North Carolina have not been required to make SIP revisions, since they have not been designated nonattainment for ozone prior to the 1990 CAA. Therefore, North Carolina has fully approved SIPs for these areas. However, the following rules regulating emissions of volatile organic compounds in Forsyth, Guilford, Davidson, Durham, and Wake Counties and those parts of Davie and Granville Counties that are part of the ozone nonattainment areas have been approved, or have been submitted with a request to be approved, as part of the State Implementation Plan:

15A NCAC 2D .0958, Work Practices For Sources of Volatile Organic Compounds,
15A NCAC 2D .0530, Prevention of Significant Deterioration,
15A NCAC 2D .0925, Petroleum Liquid Storage in Fixed Roof Tanks,
15A NCAC 2D .0926, Bulk Gasoline Plants,
15A NCAC 2D .0927, Bulk Gasoline Terminals,
15A NCAC 2D .0928, Gasoline Service Stations Stage I,
15A NCAC 2D .0932, Gasoline Truck Tanks and Vapor Collection Systems,
15A NCAC 2D .0933 Petroleum Liquid Storage in External Floating Roof Tanks
15A NCAC 2D .1000, Motor Vehicle Emission Control Standards.
15A NCAC 2D .1409(b), Stationary Internal Combustion Engines
15A NCAC 2D .1416 - .1423, NOx SIP rules, and
15A NCAC 2D .1700, Municipal Solid Waste Landfills

Although 15A NCAC 2D .0925, .0926, .0927, .0928, .0932, and .0933, have been approved as part of the state implementation plan, their applicability to these counties has not been submitted to USEPA for approval as part of the federally-approved state implementation plan. These rules are, however, state enforceable in these counties. The extension of these rules to these counties was part of the State's air toxic program and not part of any federally mandated program.

Section 15A NCAC 2D .1000 also regulates emissions from motor vehicles in the surrounding counties of Chatham, Franklin, Johnston and Orange in the Raleigh/Durham area and Alamance, Randolph, Rockingham and Stokes in the Greensboro/Winston-Salem/High Point area.

Another important set of rules that control volatile organic compound emissions in these counties is Section 15A NCAC 2D .1100, Control of Toxic Air Pollutants. These rules, however, have not been submitted to USEPA to be approved as part of the state implementation plan.

There are two other rules that control emissions of volatile organic compounds in these areas. They are 15A NCAC 2D .0524, New Source Performance Standards, and .2D.1110, National Emission Standards for Hazardous Air Pollutants. Also, rule 2D.1111, Maximum Achievable Control Technology applies to control of emissions of volatile organic compounds. They are not part of the state implementation plan, but USEPA has delegated the State enforcement authority for standards that have been adopted by the State. (The standards adopted by the State are state-enforceable regardless of USEPA delegation.)

6.0 STATE COMPLIANCE WITH CLEAN AIR ACT REQUIREMENTS

6.1 INTRODUCTION

Section 107(d)(3)(E)(v) of the CAA requires that the provisions of Section 110 and part D of the Act be met within the area to be redesignated. This means that North Carolina must meet all requirements, if any, that had come due as of the date of the redesignation request.

6.2 COMPLIANCE WITH REQUIREMENT

USEPA in its latest guidance on meeting redesignation requirements as contained in a memorandum from John Calcagni, Director, Air Quality Management Division, Office of Air Quality Planning and Standards to the USEPA Regional Offices dated September 4, 1992, (See Appendix A), states that "For the purposes of redesignation, a State must meet all requirements of Section 110 and Part D that were applicable prior to submittal of the complete redesignation request. When evaluating a redesignation request, Regions should not consider whether the State has met requirements that come due under the Act after submittal of a complete redesignation request." (emphasis added). This means that North Carolina does not have to meet any of the requirements associated with an ozone classification of moderate that become due after submittal of this redesignation request; that is those regulatory requirements due on and after November 15, 1992.

USEPA may require that states develop conformity rules under Section 176(c)(4) for attainment areas, however, USEPA has not yet issued its conformity regulations specifying what areas are subject to this provision in the CAA. In 1995 we adopted General Conformity (Section 2D.1600) and Transportation Conformity (Section 2D.1500,recodified as 2D.2000 when we adopted significant revisions to these rules).