Redesignation Demonstration

and

Maintenance Plan

for

The Rocky Mount, North Carolina
8-Hour Ozone Nonattainment Area

Prepared by

North Carolina Department of Environment and Natural Resources

Division of Air Quality

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Preface: This document contains the technical support for North Carolina's Division of Air Quality to request the Rocky Mount 8-hour ozone nonattainment area be redesignated as attainment for the 8-hour ozone national ambient air quality standard pursuant to §§107(d)(3)(D) and (E) of the Clean Air Act, as amended.

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. These gases are generated by utilities, combustion processes, certain industrial processes and even by natural sources such as trees. Tailpipe emissions from mobile sources (vehicles) are also significant sources of these pollutants. 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 predominantly during the hot summer months.

The 8-hour ozone national ambient air quality standard (NAAQS) is 0.08 parts per million (ppm). An exceedance of the 8-hour ozone NAAQS occurs when a monitor measures ozone above 0.084 ppm on average for an eight-hour period. A violation of this NAAQS occurs when the average of the annual fourth highest daily maximum 8-hour ozone values over three consecutive years is greater than or equal to 0.085 ppm. This three-year average is termed the "design value" for the monitor.

Rocky Mount Nonattainment Designation

The area surrounding Rocky Mount, North Carolina was designated nonattainment for the 8-hour ozone NAAQS on April 30, 2004 (69 Federal Register 23858). The Rocky Mount nonattainment area includes both Edgecombe and Nash Counties. The nonattainment designation was an action taken by the U. S. Environmental Protection Agency (USEPA) under Section 107(d) of the Clean Air Act (CAA). The CAA requires that some area be designated as nonattainment if a monitor is found to be in violation of a NAAQS. The USEPA took designation action in 2004 based on the ambient data from 2001-2003. At that time, the monitor in this area had a design value of 0.089 ppm.

Current Air Quality

The ozone monitor is located in the small community of Leggett, east of Rocky Mount in Edgecombe County, and is the only ozone monitor in this nonattainment area. The latest design value for the monitor is 0.079 ppm based on the data from 2003-2005, and is therefore in attainment of the 8-hour ozone NAAQS, and eligible to be considered for redesignation to attainment.

Maintenance Plan Requirements

The State of North Carolina has implemented permanent and enforceable reductions in ozone precursor emissions in the Rocky Mount area. These actions include implementing the on-board diagnostic vehicle inspection and maintenance program that began on January 1, 2005, and an open burning ban during ozone action days. In addition, there have been several State rules that have resulted in reductions in emissions in nearby areas that have resulted in lower ozone levels at the monitor. These State actions include the NOx SIP Call, the Clean Smokestacks legislation, and heavy-duty engine stop-gap rule for model years 2005 and 2006. Finally, several actions at the Federal level by the USEPA have resulted in lower emissions throughout the eastern portion of the country. These Federal actions include the Tier 2 engine standards for light and medium duty vehicles, heavy-duty engine standards, the low sulfur gasoline and diesel requirements, off-road engine standards, and the Clean Air Interstate Rule.

This combination of State and Federal actions have resulted in cleaner air in the Rocky Mount area, and the anticipated future benefits from these programs are expected to result in continued maintenance of the 8-hour ozone NAAQS in this region. An attainment year emissions inventory for NOx and VOC's was developed for 2005, since the design value for the 2003-2005 period showed attainment of the 8-hour ozone NAAQS. Future year emissions inventories were also developed for the interim years 2008, 2011, 2014, and a final year emission inventory was developed for 2017. The future year emissions were lower than the 2005 emissions in all cases. This demonstrates that the Rocky Mount area is expected to maintain the 8-hour ozone NAAQS through 2017, since in no future year are the emissions expected to be greater than they were in 2005. The area is also in compliance with Section 110 and Part D requirements of the CAA.

Conclusion and Request for Redesignation

Based on the information above and criteria established in Section 107(d)(3)(E) of the CAA, North Carolina is requesting that the USEPA redesignate the Rocky Mount nonattainment area to attainment. The monitor data clearly shows that the region has attained the 8-hour ozone standard, and the maintenance demonstration shows that the future emission inventories are expected to be lower than the attainment year inventory through the implementation of the various control measures listed above.

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LIST OF ACRONYMS

Acronym	Definition
ºF	Degrees Fahrenheit
CAA	Clean Air Act
CERR	Consolidated Emissions Reporting Rule
CFR	Code of Federal Regulations
CO	Carbon Monoxide
E-GAS 5.0	Economic Growth Analysis System version 5.0
FR	Federal Register
HC	Hydrocarbons
I/M	Inspection and Maintenance
MVEB	Motor Vehicle Emission Budget
NAAQS	National Ambient Air Quality Standard
NCDAQ	North Carolina Division of Air Quality
NCDENR	North Carolina Department of Natural Resources
NCDOT	North Carolina Department of Transportation
NOx	Nitrogen Oxides
PM	Particulate Matter
ppm	Parts per million
QA	Quality Assure
SIP	State Implementation Plan
SUV	Sports Utility Vehicle
TIP	Transportation Improvement Program
USEPA	U.S. Environmental Protection Agency
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds

1.0 INTRODUCTION

1.1 WHAT IS TROPOSPHERIC OZONE?

Ozone, a strong chemical oxidant, adversely impacts human health through effects on respiratory function and can also damage forests and crops. Ozone is not emitted directly by the utilities, 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), resulting from the utilities, combustion processes and motor vehicles, and reactive volatile organic compounds (VOCs). VOCs include many industrial solvents, toluene, xylene and hexane as well as the various hydrocarbons (HC) 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).

In 1997, the USEPA revised the primary (health) and secondary (welfare) national ambient air quality standards (NAAQS) for ozone by establishing 8-hour standards. The 8-hour ozone standards are met when the 3-year average of the annual fourth highest daily maximum 8-hour average ozone concentration is less than or equal to 0.084 parts per million (ppm). The resulting concentration represents an 8-hour ozone design value. A violation of the 8-hour ozone NAAQS occurs when the design value exceeds 0.084 ppm.

1.2 CLEAN AIR ACT OF 1990

Since the 1977 amendments to the Clean Air Act (CAA), 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.

1.3 ROCKY MOUNT AIR QUALITY HISTORY

On April 15, 2004, the USEPA designated the Rocky Mount, North Carolina area (i.e., Edgecombe and Nash Counties) as “basic” nonattainment for the 8-hour ozone standard (Figure 1). The official designation and classification was published in the Federal Register (FR) on April 30, 2004 (69 FR 23858). The designation became effective on June 15, 2004. Prior to

the implementation of the new 8-hour ozone standard, this area had always been in attainment of the 1-hour ozone standard.

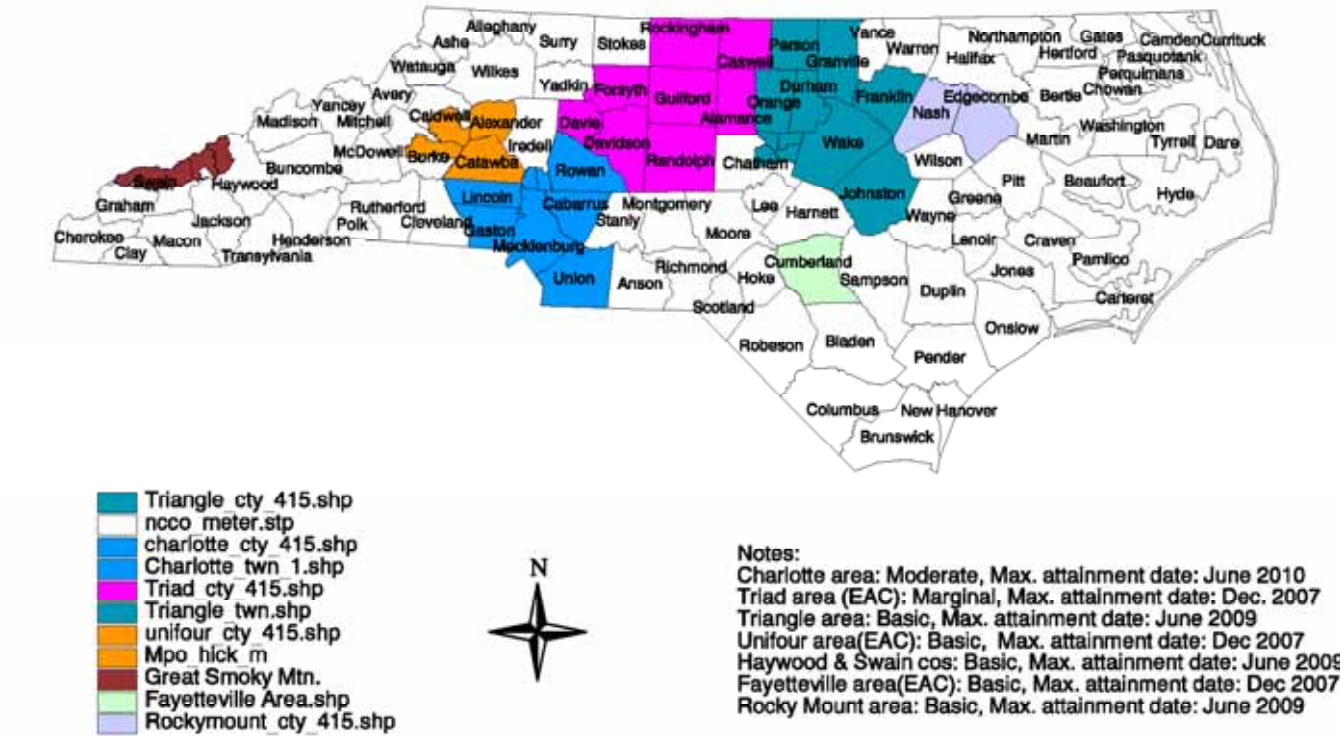

Figure 1. USEPA Designated 8-Hour Ozone Nonattainment Areas in North Carolina

There is one monitor located in the Rocky Mount nonattainment area in the town of Leggett, just east of Rocky Mount. In 2005, this monitor came into attainment of the 8-hour ozone NAAQS with a 2003-2005 design value of 0.079 ppm.

1.4 CLEAN AIR ACT REDESIGNATION CRITERIA

Section 107(d)(3)(E) of the CAA, as amended, states an area can be redesignated to attainment if the following conditions are met:

1. The USEPA has determined that the NAAQS have been attained. For ozone, the areas must show that the average of the fourth highest 8-hour ozone values from three (3) complete, consecutive calendar years of quality-assured air quality monitoring data must be below 0.085 ppm.

2. The applicable implementation plan has been fully approved by the USEPA under section 110(k).

3. The USEPA has determined that the improvement in air quality is due to permanent and enforceable reductions in emissions. To demonstrate this, the State should estimate the percent reduction (from the year used to determine the design value for designation and classification) achieved from Federal, State, and local measures.

4. The State has met all applicable requirements for the area under section 110 and Part D.

5. The USEPA has fully approved a maintenance plan, including a contingency plan, for the areas under section 175A.

In the sections to follow, the North Carolina Department of Environment and Natural Resources, Division of Air Quality (NCDAQ) will provide the technical data necessary to show that the Rocky Mount nonattainment area has attained and is expected to maintain the 8-hour ozone standard, and has met the requirements for redesignation set forth above.

2.0 AIR QUALITY

2.1 HISTORIC AIR QUALITY (1996 – 2004)

The NCDAQ has collected ambient monitoring data for the Rocky Mount area since 1986. The monitor was operated as an industrial expansion monitor, i.e., operated every third ozone season, until 1996, when NCDAQ began operating the monitor every year. The Rocky Mount area has one ambient ozone monitoring station located in the town of Leggett (see Figure 2) installed in accordance with the Code of Federal Regulations (CFR) 40 CFR 58. This monitor provides adequate coverage of the entire nonattainment area. Tables 2-1 and 2-2 below show the air quality data and corresponding design values for the Leggett monitor, respectively, from 1996 to 2004. As you can see, this monitor was in violation of the 8-hour ozone NAAQS for this period.

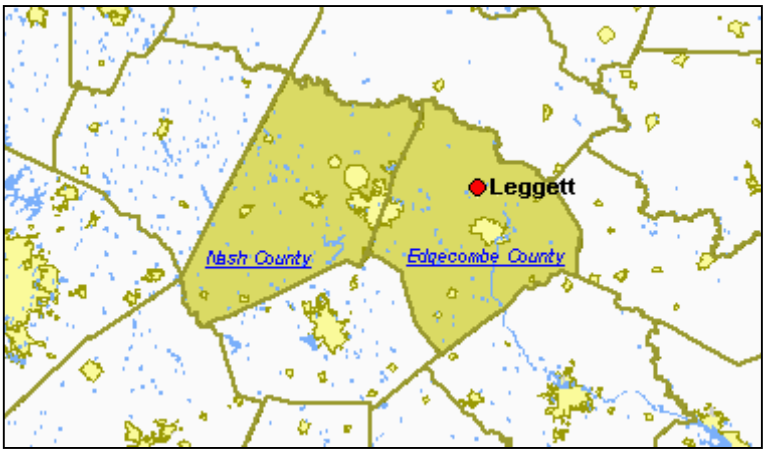

Figure 2. Ozone Monitor Location in the Rocky Mount Nonattainment Area

Table 2-1 Rocky Mount Area's Historic 4th Highest 8-hour Ozone Values (1996-2004)

Monitor	4th Highest 8-hour Ozone Values (ppm)								
	1996	1997	1998	1999	2000	2001	2002	2003	2004
Leggett AIRS ID #37-065-0099 Edgecombe County	0.080	0.089	0.090	0.092	0.085	0.085	0.095	0.088	0.072

Table 2-2 Rocky Mount Area's Historic Design Values (1996 - 2004)

Monitor	Design Value (ppm)						
	96-98	97-98	98-00	99-01	00-02	01-03	02-04
Leggett AIRS ID #37-065-0099 Edgecombe County	0.086	0.090	0.089	0.087	0.088	0.089	0.085

The NCDAQ has evaluated the wind patterns on a number of days when the Leggett monitor exceeded the 8-hour ozone NAAQS. A limited number of days were due to local recirculation. The majority of the days showed impacts at the monitor from the Raleigh/Durham area. Several other days showed impacts from the Fayetteville area and the I-95 corridor. The emissions reductions realized over all of North Carolina have helped the Leggett monitor reach attainment and are expected to help the area maintain the 8-hour ozone NAAQS.

2.2 RECENT AIR QUALITY VALUES (2003 –2005)

The most recent three years of ozone monitoring data (2003-2005) for the Rocky Mount, North Carolina area demonstrate compliance with the 8-hour ozone NAAQS. Table 2-3 is a summary of the fourth highest 8-hour average at the Leggett monitor for 2003-2005 and the design value. The 2005 8-hour ozone monitoring data has been fully quality assured (QA'ed) and officially submitted to the USEPA. A letter from NCDAQ certifying the data will be submitted to USEPA Region 4 by no later than the required date of June 30, 2006.

Table 2-3 Rocky Mount Area's Current Air Quality Data (2003 -2005)

Monitor	Year	4th Highest 8-hour ozone values (ppm)	Design Value (ppm) 2003-2005
Leggett Monitor AIRS ID #37-065-0099 Edgecombe County	2003	0.088	0.079
	2004	0.072	
	2005	0.079	

2.3 PERMANENT AND ENFORCEABLE EMISSIONS REDUCTIONS

There are several State and Federal measures that have been enacted in recent years that are resulting in permanent and enforceable emissions reductions. A list of those measures that contributed to the permanent and enforceable emission reductions are listed below and are more fully described in Section 3.2.

The federal measures that have been implemented include:

- Tier 2 vehicle standards: Began implementation in 2004 and will require all passenger vehicles in the manufactures fleet to meet an average standard of 0.07 grams of NOx per mile.

- Heavy-duty gasoline and diesel highway vehicle standards: Began to take effect in 2004 and is designed to reduce NOx and VOC emissions.

- Nonroad spark-ignition engines and recreational engines standards: Began to take effect in 2003 and will reduce NOx and HC emissions.

The state measures that have been implemented include:

- Clean Air Bill: Expanded the inspection and maintenance (I/M) program from 9 counties to 48. It was phased-in in the Rocky Mount area on January 1, 2005.

- Open burning ban: The rule prohibits open burning in areas that NCDAQ forecasts ozone and will reduce NOx and VOC emissions, as well as CO and fine particulate matter.

- Air toxics control program: The rule was effective in 1990 and reduce VOC emissions across the state.

- Heavy duty diesel engine gap filling rule: This rule requires engine manufacturers to perform the supplemental testing requirements for heavy duty diesel engines for model years 2005 and 2006 due to delays in the USEPA's rule. It was estimated to reduce the 2005 emissions by 5.3 tons per day.

- NOx State Implementation Plan (SIP) Call rule: the NOx that will result in a 68 percent reduction in NOx emissions from the State's large stationary combustion sources by 2006.

A recent review of the NOx emissions in the USEPA's acid rain database shows a reduction in over 36,000 tons of NOx from the utilities subject to the NOx SIP call between 2002 and 2005. Table 2-4 presents the annual emissions for the North Carolina sources in the USEPA acid rain database.

Table 2-4. NOx Emissions from NC Sources in USEPA Acid Rain Database

Year	Annual NOx Emissions from NC Sources (Tons)
2002	142,564.7
2003	129,461.2
2004	115,422.7
2005	106,386.8

Table 2-5 displays the NOx emission reductions, as the result of the NOx SIP call rule, from two power plants that potentially impacts the Rocky Mount nonattainment area. These two facilities are located in Person County (Northwest of Rocky Mount) and are the two largest utilities located in the area. This data is also from the USEPA acid rain database and represents the second and third quarters of the year (April through September), the period during which ozone levels are the highest. It is clearly demonstrated that the emissions from these facilities have significantly decreased during the ozone season since 2002, with over an 8,600 tons of NOx per period reduction since 2002.

Table 2-5. April – September NOx Emissions for Roxboro and Mayo (tons/period)

Year	Roxboro	Mayo
2002	10,045	4,703
2003	9,451	3,597
2004	7,245	1,630
2005	4,966	1,165

One measure to consider in determining how all of the emissions reductions have impacted air quality is whether the relationship of exceedance days and high temperature days has changed over this time period. Temperature is one of the key meteorological factors that determines the ozone production potential of a given day. In North Carolina, many exceedance days occur when the maximum daily temperature is 90 degrees Fahrenheit (ºF) or greater. Figure 3 shows this relationship from 1996 through 2005 for the Leggett monitor.

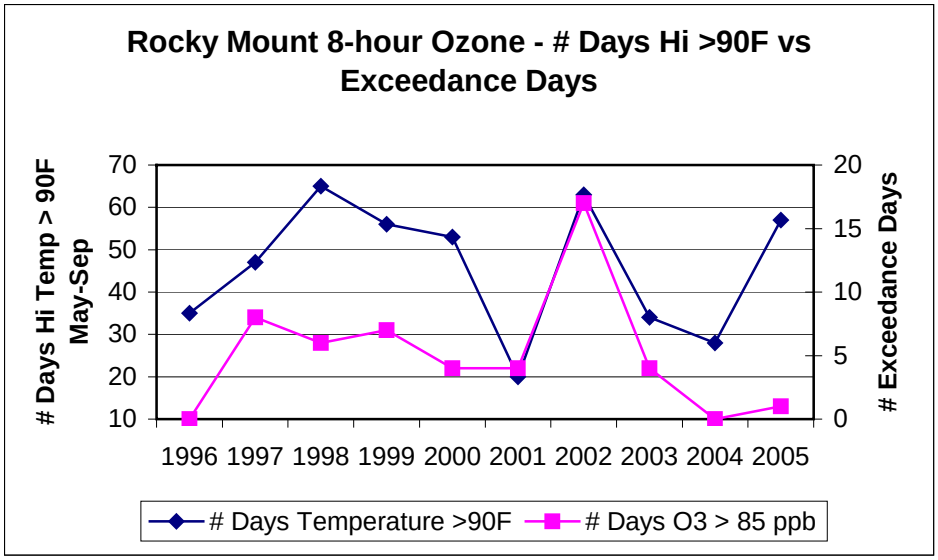

Figure 3. Relationship Between High Temperature Days and Number of Exceedances at the Leggett Monitor

It is important to see how the ozone levels have changed between 2002 and 2005 in response to lower NOx emissions in the State. In 2002, there were 63 days when the temperature was 90 ºF or greater, and the Leggett monitor observed a record high 17 exceedances of the 8-hour ozone NAAQS. In 2005, there were a similar number of hot days, 57, but only one exceedance occurred in the ozone season at the Leggett monitor. North Carolina believes that this represents compelling evidence that the improvement in air quality is due to the real, permanent and enforceable reduction in NOx emissions in the State.

Further evidence that the area will continue to maintain the 8-hour ozone standard is that the monitor would need to measure a value of 0.104 ppm in 2006 to violate the 8-hour ozone NAAQS. The highest 4th high value observed at this site was 0.095 ppm, measured in the summer of 2002. Therefore, the NCDAQ believes that a future violation of the 8-hour standard at this monitor is extremely unlikely, given the expected downward trend in NOx emissions in North Carolina and the surrounding States.

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 8-hour ozone in the Rocky Mount nonattainment area 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 benefits of the federal Clean Air Interstate Rule, cleaner engine programs, and low sulfur gasoline and low sulfur diesel fuel programs.

For the maintenance demonstration, the base year of 2005 was chosen since this is the year the Rocky Mount area came into attainment. The interim years chosen were: 2008, 2011, and 2014 since the USEPA recommends three-year increments for interim years. The final year of the maintenance demonstration is 2017, since the CAA requires maintenance for at least ten years after redesignation. The maintenance demonstration consists of a comparison between the 2005 baseline emissions inventory and the projected emissions inventories (for 2008, 2011, 2014 and 2017), which consider economic and population growth. The comparison shows that the total emissions in each of the interim years and the final year will be lower than in the attainment year, which demonstrates maintenance of the 8-hour ozone standard. The reductions in emissions are due to the foundation control programs outlined below.

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 primary trigger of the contingency plan will be a violation of the ambient air quality standard for 8-hour ozone. The secondary trigger will be a monitored air quality pattern that suggests an actual 8-hour ozone NAAQS violation may be imminent.

3.2 FOUNDATION CONTROL PROGRAM

The main element of the maintenance plan 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.

The foundation control program consists of Federal and State measures. The Federal measures include the cleaner fuel programs and the federal highway motor vehicle and off-road equipment

control program. State measures include the I/M program, the air toxics program, the NOx SIP Call rule, the Clean Smokestacks Act, heavy duty diesel engine gap filling requirements and an open burning regulation. All of these programs have already been implemented or are in the process of being implemented.

3.2.1 Federal Control Measures

Tier 2 Vehicle Standards

Federal Tier 2 vehicle standards will require all passenger vehicles in a manufacturer's fleet, including light-duty trucks and Sports Utility Vehicles (SUVs), to meet an average standard of 0.07 grams of NOx per mile. Implementation began in 2004, and most vehicles will be phased in by 2007. Tier 2 standards will also cover passenger vehicles over 8,500 pounds gross vehicle weight rating (the larger pickup trucks and SUVs), which are not covered by current Tier 1 regulations. For these vehicles, the standards will be phased in beginning in 2008, with full compliance in 2009. The new standards require vehicles to be 77% to 95% cleaner than those on the road today. Tier 2 rule also reduces the sulfur content of gasoline to 30 ppm starting in January of 2006. Most gasoline sold in North Carolina prior to January 2006 had a sulfur content of about 300 ppm. Sulfur occurs naturally in gasoline but interferes with the operation of catalytic converters on vehicles resulting in higher NOx emissions. Lower-sulfur gasoline is necessary to achieve Tier 2 vehicle emission standards.

Heavy-Duty Gasoline and Diesel Highway Vehicles Standards

New USEPA standards designed to reduce NOx and VOC emissions from heavy-duty gasoline and diesel highway vehicles began to take effect in 2004. A second phase of standards and testing procedures, beginning in 2007, will reduce particulate matter from heavy-duty highway engines, and will also reduce highway diesel fuel sulfur content to 15 ppm since the sulfur damages emission control devices. The total program is expected to achieve a 90% reduction in particulate matter (PM) emissions and a 95% reduction in NOx emissions for these new engines using low sulfur diesel, compared to existing engines using higher-content sulfur diesel.

Large Nonroad Diesel Engines Rule

The USEPA promulgated in May 2004 new rules for large nonroad diesel engines, such as those used in construction, agricultural, and industrial equipment, to be phased in between 2008 and 2014. The nonroad diesel rules also reduce the allowable sulfur in nonroad diesel fuel by over 99%. Nonroad diesel fuel currently averages about 3,400 ppm sulfur. The proposed rules limit nonroad diesel sulfur content to 500 ppm in late 2006 and 15 ppm in 2010. The combined engine and fuel rules would reduce NOx and PM emissions from large nonroad diesel engines by over 90 %, compared to current nonroad engines using higher-content sulfur diesel.

Nonroad Spark-Ignition Engines and Recreational Engines Standard

The new standard, effective in July 2003, will regulate NOx, HC and carbon monoxide (CO) for groups of previously unregulated nonroad engines. The new standard will apply to all new engines sold in the United States and imported after these standards begin and will apply to large spark-ignition engines (forklifts and airport ground service equipment), recreational vehicles (off-highway motorcycles and all-terrain-vehicles), and recreational marine diesel engines. The regulation varies based upon the type of engine or vehicle.

The large spark-ignition engines contribute to ozone formation and ambient CO and PM levels in urban areas. Tier 1 of this standard was implemented in 2004 and Tier 2 is scheduled to start in 2007. Like the large spark-ignition, recreational vehicles contribute to ozone formation and ambient CO and PM levels. They can also be a factor in regional haze and other visibility problems in both state and national parks. For the off-highway motorcycles and all-terrain-vehicles, model year 2006, the new exhaust emissions standard will be phased-in by 50% and for model years 2007 and later at 100%. Recreational marine diesel engines over 37 kilowatts are used in yachts, cruisers, and other types of pleasure craft. Recreational marine engines contribute to ozone formation and PM levels, especially in marinas. Depending on the size of the engine, the standard for will begin phase-in in 2006.

When all of the nonroad spark-ignition engines and recreational engines standards are fully implemented, an overall 72% reduction in HC, 80% reduction in NOx, and 56% reduction in CO emissions are expected by 2020. These controls will help reduce ambient concentrations of ozone, CO, and fine PM.

3.2.2 State Control Measures

North Carolina has adopted a number or regulations and legislation to address pollution issues across the State. These are summarized below.

Clean Air Bill

The 1999 Clean Air Bill expanded the vehicle emissions I/M program from 9 counties to 48, phased in between July 1, 2002 through January 1, 2006 (see Figure 4). Vehicles will be tested using the onboard diagnostic system, an improved method of testing, which will indicate NOx emissions, among other pollutants. The previously used tailpipe test did not measure NOx. Beginning January 1, 2005, vehicles registered in Edgecombe and Nash Counties were required to be inspected.

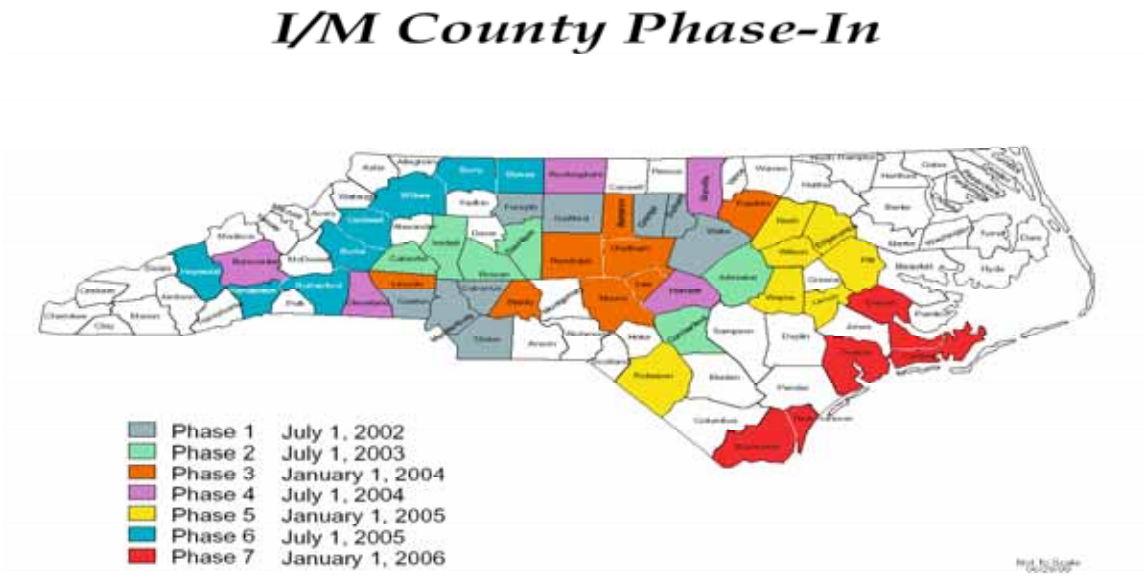

Figure 4. North Carolina's NOx Inspection & Maintenance (I/M) Phase-In Map

NOx SIP Call Rule

In response to the USEPA's NOx SIP call, North Carolina adopted rules to control the emissions of 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 British thermal units 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, the USEPA rules established a NOx budget for sources in North Carolina and other states. North Carolina has a Phase II budget (i.e., emissions allowance) of 165,022 tons of NOx per ozone season.

Besides amending existing NOx rules and adopting new NOx rules specifically to address the USEPA 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.

North Carolina's NOx SIP Call rule will reduce summertime NOx emissions from power plants and other industries by 68% by 2006. The North Carolina Environmental Management Commission adopted rules requiring the reductions in October 2000.

Clean Smokestacks Act

In June 2002, the North Carolina General Assembly enacted the Clean Smokestacks Act, requiring coal-fired power plants to reduce annual NOx emissions by 78% by 2009. These power plants must also reduce annual sulfur dioxide emissions by 49% by 2009 and by 74% by 2013. The Clean Smokestacks Act could reduce NOx emissions beyond the requirements of the NOx SIP Call Rule. One of the first state laws of its kind in the nation, this legislation provides a model for other states in controlling multiple air pollutants from old coal-fired power plants.

Open Burning Bans

The Environmental Management Commission approved revisions to the open burning regulation banning open burning during the ozone season on forecasted code orange and code red ozone action days for those counties that the NCDAQ forecasts ozone. Since 2001, the NCDAQ has forecasted ozone in the Rocky Mount area, therefore this area is subject to this rule.

Air Toxics Control Program

Although the purpose of North Carolina'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 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.

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 are required to use best available control technology.

Heavy Duty Diesel Engine Gap Filling Requirements

In October of 2001, the Environmental Management Commission adopted a rule to fill a gap in federal requirements for improved heavy duty diesel engine emissions testing in order to prevent excess NOx emissions from occurring over the lengthy life of such vehicles. Without the rule, estimated excess NOx emissions of 5.3 tons per day would occur in 2005 and 10.91 tons per day

in 2006 from heavy-duty diesels registered in North Carolina. The rule requires that all model year 2005 and 2006 heavy-duty diesel engines sold, leased, or registered in North Carolina to be of the type which have been certified by the California Air Resources Board as meeting supplemental test procedures that are more representative of actual on-road operating conditions than the federal test procedures for those model years. On January 1, 2002, the rule became effective.

3.2.3 Additional Programs Supporting Maintenance

Air Awareness Program

The North Carolina Air Awareness Program is a public outreach and education program of the NCDAQ. The goal of the program is to reduce air pollution though voluntary actions by individuals and organizations. The program seeks to educate individuals about (1) the sources of air pollution; (2) the health effects of air pollution and how these effects can be mitigated by modification of outdoor activities on ozone action days; and (3) simple "action tips", such as carpooling, vehicle maintenance, and energy conservation, that reduce individual contributions to air pollution. One of the major program components is the ozone forecast. The NCDAQ produces the 8-hour ozone forecasts and corresponding air quality index for the Rocky Mount forecast area from May 1 through September 30 of each year.

Transportation Conformity

The NCDAQ will work closely with the North Carolina Department of Transportation (NCDOT) and local transportation agencies to assure that Transportation Improvement Programs (TIPs) in the nonattainment area 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 NCDOT and the NCDAQ. In the event that the NCDAQ disagrees with the NCDOT on a conformity determination or issue, the NCDAQ and the NCDOT 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 Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (and any updated transportation legislation) and the CAA as amended.

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 approach used by the NCDAQ is the comparison of emissions inventories for the years 2005 and 2017.

The maintenance demonstration is made by comparing the 2005 baseline emissions inventory to the 2017 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. In addition to comparing the final year of the plan, all of the interim years are compared to the 2005 baseline to demonstrate that these years are also expected to show continued maintenance of the 8-hour ozone standard.

The emissions inventories are comprised of four major types of sources: point, area, highway mobile and off-road mobile. The projected emissions inventories have been estimated using projected rates of growth in population, traffic, economic activity, and other parameters.

3.3.2 Emission Inventories

There are four different man-made emission inventory source classifications: (1) stationary point, (2) area, (3) highway mobile and (4). off-road mobile sources.

Point sources are those stationary sources that emit more than 10 tons per year VOC or 100 tons per year of NOx 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 the USEPA's AP-42. There are usually several emission sources for each facility. Emission data is collected for each point source at a facility and the data is entered into an in-house database system. For the projected year's inventory, point sources are adjusted by growth factors based on Standard Industrial Classification codes. The growth factors are generated using the USEPA's Economic Growth Analysis System version 5.0 (E-GAS 5.0) program.

Area sources are those stationary 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 5.0 growth factors.

For highway mobile sources, the 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 running the MOBILE6.2 mobile model for the future year to generate emission factors that take into consideration expected Federal tailpipe standards, fleet turnover 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 the USEPA's NONROAD2005a 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 the USEPA's NONROAD2005a nonroad mobile model, E-GAS 5.0 growth factors or projected landing and take off data for aircraft.

A complete description of how these inventories were developed is discussed in detail in Appendix C.

3.3.3 Summary of Emissions

The tables below contain the estimated emissions from all of the emission source sectors, i.e., point, area, highway mobile and off-road mobile. Additionally, the sum total of these man-made emissions for the Rocky Mount area is tabulated in Table 3-5.

Table 3-1 Point Source Emissions for the Rocky Mount Area

County	2005	2008	2011	2014	2017
VOC Emissions (tons/day)					
Edgecombe	3.86	4.35	4.74	5.20	5.65
Nash	1.35	1.45	1.56	1.65	1.78
Total	5.21	5.80	6.30	6.85	7.43
NOx Emissions (tons/day)					
Edgecombe	2.95	2.68	2.70	2.73	2.76
Nash	0.60	0.60	0.63	0.69	0.72
Total	3.55	3.28	3.33	3.42	3.48

Table 3-2 Area Source Emissions for the Rocky Mount Area

County	2005	2008	2011	2014	2017
VOC Emissions (tons/day)					
Edgecombe	5.62	5.88	6.12	6.35	6.58
Nash	7.04	7.43	7.79	8.14	8.52
Total	12.66	13.31	13.91	14.49	15.10
NOx Emissions (tons/day)					
Edgecombe	0.53	0.54	0.55	0.56	0.57
Nash	1.08	1.12	1.16	1.20	1.24
Total	1.61	1.66	1.71	1.76	1.81

Table 3-3 Highway Mobile Source Emissions for the Rocky Mount Area

County	2005	2008	2011	2014	2017
VOC Emissions (tons/day)					
Edgecombe	2.50	2.08	1.83	1.50	1.27
Nash	5.98	4.96	4.37	4.05	3.09
Total	8.48	7.04	6.20	5.55	4.36
NOx Emissions (tons/day)					
Edgecombe	3.36	2.73	2.14	1.62	1.27
Nash	12.07	9.70	7.42	5.39	4.16
Total	15.43	12.43	9.56	7.01	5.43

Table 3-4 Non-Road Mobile Source Emissions for the Rocky Mount Area

County	2005	2008	2011	2014	2017
VOC Emissions (tons/day)					
Edgecombe	0.95	0.78	0.70	0.68	0.65
Nash	1.39	1.17	1.07	1.05	1.08
Total	2.34	1.95	1.77	1.73	1.73
NOx Emissions (tons/day)					
Edgecombe	2.35	2.10	1.82	1.60	1.40
Nash	2.10	1.90	1.69	1.48	1.29
Total	4.45	4.00	3.51	3.08	2.69

Table 3-5 Total Man-Made Emissions for the Rocky Mount Area

County	2005	2008	2011	2014	2017
VOC Emissions (tons/day)					
Edgecombe	12.93	13.09	13.39	13.73	14.15
Nash	15.76	15.01	14.79	14.89	14.47
Total	28.69	28.10	28.18	28.62	28.62
NOx Emissions (tons/day)					
Edgecombe	9.19	8.05	7.21	6.51	6.00
Nash	15.85	13.32	10.90	8.76	7.41
Total	25.04	21.37	18.11	15.27	13.41

3.3.4 Maintenance Demonstration

As discussed above, maintenance is demonstrated when the future years total man-made emissions are less than the 2005 baseline emissions. The following table summarized the VOC and NOx emissions for the entire Rocky Mount nonattainment area. The difference between the base year and the final year of the plan illustrates that the continued maintenance of the 8-hour ozone NAAQS is expected.

Table 3-6 Maintenance Demonstration for Rocky Mount

Year	VOC TPD	NOx TPD
2005	28.69	25.04
2008	28.10	21.37
2011	28.18	18.11
2014	28.62	15.27
2017	28.62	13.41
Difference from 2005 to 2017	-0.07	-11.63

The difference between the attainment level of emissions (2005) from all man-made sources and the projected level of emissions from all man-made sources in the nonattainment area is considered the "safety margin". The safety margin for each projected year is listed below in Table 3-7.

Table 3-7 Safety Margin for Rocky Mount

Year	VOC TPD	NOx TPD
2005	N/A	N/A
2008	-0.59	-3.67
2011	-0.51	-6.93
2014	-0.07	-9.77
2017	-0.07	-11.63

3.4 CONTINGENCY PLAN

3.4.1 Overview

The two main elements of the North Carolina contingency plan are tracking and triggering mechanisms to determine when contingency measures are needed and a process of developing and adopting appropriate control measures. The primary trigger of the contingency plan will be a violation of the 8-hour ozone NAAQS at the Leggett monitor. The secondary trigger will be a monitored air quality pattern that suggests an actual 8-hour ozone NAAQS violation may be imminent. Upon either of these triggers being activated, the NCDAQ will commence analyses to determine what additional measures, if any, will be necessary to attain or maintain the 8-hour ozone standard. If activation of either of the triggers occurs, this plan provides a regulatory adoption process for revising emission control strategies. Each adopted rule will include a

schedule that will require compliance with the rule no later than 3 years after adoption of the rule. In addition, there will be a tracking mechanism that requires a comparison of the actual emissions inventory submitted under the Consolidated Emissions Reporting Rule (CERR) to the projected inventory, and to the attainment year inventory contained in this maintenance plan. The CERR reporting years coincide with the attainment, interim and final years of the emission inventory in this maintenance demonstration.

3.4.2 Primary and Secondary Triggers

The primary trigger of the contingency plan will be a violation of the 8-hour ozone standard, or when the three-year average of the 4th highest values is equal to or greater than 0.085 ppm. The trigger date will be 60 days from the date that the State observes a 4th highest value that, when averaged with the two previous ozone seasons' fourth highest values, would result in a three-year average equal to or greater than 0.085 ppm.

The secondary trigger will apply where no actual violation of the 8-hour ozone standard has occurred, but where the State finds monitored ozone levels indicating that an actual ozone NAAQS violation may be imminent. A pattern will be deemed to exist when there are two consecutive ozone seasons in which the 4th highest values are 0.085 ppm or greater. The trigger date will be 60 days from the date that the State observes a 4th highest value of 0.085 ppm or greater, following a season in which the 4th highest value was 0.085 ppm or greater.

3.4.3 Action Resulting From Trigger Activation

Once the primary or secondary trigger is activated, the Planning Section of the NCDAQ shall commence analyses including trajectory analyses of high ozone days, and emissions inventory assessment to determine those emission control measures that will be required for attaining or maintaining the 8-hour ozone standard. Since transport from the Raleigh/Durham and Fayetteville areas often impact the Leggett monitor, an evaluation to determine the amount of local emission contribution to the high ozone days will be conducted.

By May 1 of the year following the ozone season in which the primary or secondary trigger has been activated (violation of the 8-hour ozone NAAQS), North Carolina will complete sufficient analyses to begin adoption of necessary rules for ensuring attainment and maintenance of the 8-hour ozone NAAQS. The rules would become State effective by the following January 1, unless legislative review is required.

The measures that will be considered for adoption upon a trigger of the contingency plan include: NOx Reasonably Available Control Technology on stationary sources in Nash and

Edgecombe Counties, diesel inspection and maintenance program, implementation of diesel retrofit programs, including incentives for performing retrofits, and additional controls in upwind areas, since much of the pollution measured at the Leggett monitor is transported in from nearby larger urban areas.

3.4.4 Ongoing Maintenance Strategy Program

In addition to the measures listed above, the future CERR inventories that coincide with the attainment, interim and final year inventories will be compared to determine if additional steps are necessary for continued maintenance of the 8-hour ozone standard in this area.

4.0 MOTOR VEHICLE EMISSIONS BUDGET FOR CONFORMITY

4.1 TRANSPORTATION CONFORMITY

The purpose of transportation conformity is to ensure that Federal transportation actions occurring in nonattainment areas do not hinder the area from attaining and maintaining the 8-hour ozone standard. This means that the level of emissions estimated by the NCDOT or the metropolitan planning organizations for the Transportation Implementation Plan (TIP) and Long Range Transportation Plan must not exceed the motor vehicle emission budget (MVEB) as defined in this maintenance plan.

4.2 HIGHWAY MOBILE SOURCE VOC INSIGNIFICANCE

Section 93.109(k) in the Transportation Conformity Rule Amendments for the new 8-hour ozone and fine particulate matter NAAQS addresses areas with insignificant motor vehicle emissions. The rule suggests that such a finding would be based on a number of factors, including the percentage of motor vehicle emissions in the context of the total SIP inventory, the current state of air quality as determined by monitoring data for that NAAQS, the absence of SIP motor vehicle control measures, and historical trends and future projections of the growth of motor vehicle emissions.

The NCDAQ has examined the sources of VOC emissions and their contribution to ozone formation in North Carolina. Because of the generally warm and moist climate of North Carolina, vegetation abounds in many forms, and forested lands naturally cover much of the state. The biogenic sector is the most abundant source of VOCs in North Carolina and accounts for approximately 90% of the total VOCs statewide. The overwhelming abundance of biogenic VOCs makes the majority of North Carolina a NO_x limited environment for the formation of ozone. This holds true in Edgecombe and Nash Counties.

Also noteworthy are the projected decreases in highway mobile VOC emissions through the year 2017 despite projected VMT increases. These reductions are due mainly to the retirement of older vehicles and the growing fleet of Tier 2 vehicles on the roads in future years. Some additional reductions are attributable to North Carolina's inspection and maintenance program in Edgecombe and Nash Counties.

Additionally, the NCDAQ has performed a number of modeling sensitivities to determine the impact of highway mobile source VOCs on ozone formation in the Rocky Mount area. The results of these sensitivities indicate no change in future ozone concentrations in the Rocky

Mount area when highway mobile VOCs are significantly changed. These sensitivities are discussed in more detail in Appendix C.3.

The NCDAQ believes highway mobile VOCs are insignificant contributors to ozone formation in the Rocky Mount nonattainment area. Emission estimates indicate highway mobile VOC is a small percentage of the total VOC emissions inventory. Highway mobile VOC emissions are projected to decrease into the future notwithstanding VMT increases. The area is currently well below the NAAQS and emission sensitivity modeling indicates no change in future ozone concentrations when VOC emissions are significantly changed. Further, the NCDAQ considers it unreasonable to expect that Edgecombe and Nash Counties will experience enough motor vehicle emissions growth for a future ozone violation to occur. For these reasons, the NCDAQ will not be setting MVEB for VOC for the Rocky Mount area.

4.3 SAFETY MARGIN

As stated in Section 3.3.4, a safety margin is the difference between the attainment level of emissions from all source categories (i.e., point, area, and mobile) and the projected level of emissions from all source categories. The safety margins for the Rocky Mount area are listed in Table 3-7 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 source categories remains equal to or less than the attainment level of emissions.

The NCDAQ has decided to allocate safety margin to the MVEB to account for new emissions models, VMT projections models, as well as changes to future vehicle mix assumptions, etc. that influence the emission estimations. Since 2008 is a historic year, the NCDAQ decided to allocate the entire safety margin available to the MVEBs. For 2017, the NCDAQ estimated the amount needed to account for the current emission model and VMT projections model and then added an additional 21% to account for any future changes to the emission model, projection model and other input data.

<u>Motor Vehicle Emission Budgets</u>

The NCDAQ did not receive any comments regarding the geographic extent of the MVEB from any of the Rocky Mount transportation partners during the maintenance plan interagency consultation process. However, there was discussion through the interagency consultation process on the years to set MVEB for the Rocky Mount maintenance plan. According to Section 93.118 of the transportation conformity rule, a maintenance plan must establish a MVEB for the last year of the maintenance plan (in this case, 2017). Through the interagency consultation

process, it was decided that another MVEB would be set for the year 2008 in the Rocky Mount maintenance plan.

The NCDAQ will set MVEB, for transportation conformity purposes, as county budgets within the Rocky Mount maintenance area for 2008 and 2017. Tables 4-1 and 4-2 below list out the NOx MVEB, for transportation conformity purposes, by county for the years 2008 and 2017. Upon the USEPA's approval of these county-by-county sub-area MVEB, these MVEB will become the applicable MVEB for each county.

Table 4-1 Edgecombe County MVEB in kilograms per day

	2008	2017
NOx Emissions (kg/day)		
Base Emissions	2,483	1,143
Safety Margin Allocated to MVEB	1,674	1,108
NOx Conformity MVEB	**4,157**	**2,251**

Table 4-2 Nash County MVEB in kilograms per day

	2008	2017
NOx Emissions (kg/day)		
Base Emissions	8,790	3,767
Safety Margin Allocated to MVEB	1,655	2,374
NOx Conformity MVEB	**10,444**	**6,141**

New Safety Margins

A total of 3,329 kg (3.67 tons) and 3,482 kg (3.84 tons) of 2008 and 2017 NOx safety margin, respectively, were added to the MVEB for the Rocky Mount area. 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 4-3.

Table 4-3 New Safety Margins for the Rocky Mount Area

Year	VOC TPD	NOx TPD
2005	N/A	N/A
2008	-0.59	0.0
2011	-0.51	-6.93
2014	-0.07	-9.77
2017	-0.07	-7.79

5.0 STATE IMPLEMENTATION PLAN APPROVAL

5.1 INTRODUCTION

For an area to be redesignated and have an approved maintenance plan, the SIP 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 Rocky Mount 8-hour ozone nonattainment area.

5.2 EVIDENCE OF COMPLIANCE

The Rocky Mount area has not been required to make a SIP revision, since they have not been designated nonattainment for ozone prior to the 1990 CAA. Therefore, North Carolina has fully approved SIPs for this area. However, the following rules regulating emissions of VOCs and NOx in Edgecombe and Nash Counties have been approved, or have been submitted with a request to be approved, as part of the SIP:

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 SIP, their applicability to these counties has not been submitted to the 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 counties near the Rocky Mount nonattainment 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 the USEPA to be approved as part of the SIP.

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 SIP, but the 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 the USEPA delegation.)

6.0 STATE COMPLIANCE WITH CLEAN AIR ACT REQUIREMENTS

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.

The 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."

7.0 CONCLUSION

The most recent three years of ozone monitoring data for the Rocky Mount nonattainment area demonstrate compliance with the NAAQS for 8-hour ozone. Since the 1990's, there have been many major programs enacted in North Carolina that have led to significant actual, enforceable emissions reductions, which have led to improvements in the air quality in Rocky Mount. This redesignation demonstration and maintenance plan has been prepared to meet the requirements of the 1990 Clean Air Act Amendments.

Appendix B

Hearing Report,

Comments Received and Responses

Hearing Officer's Report

Public Hearing on March 20, 2006
For
Redesignation Demonstration and Maintenance Plan for The Rocky Mount, North Carolina 8-Hour Ozone Nonattainment Area

June 15, 2006

Robert Fisher – Hearing Officer
Regional Supervisor
Washington Regional Office
Washington, North Carolina

Robert P Fisher 6/15/06

Robert Fisher Date

EXECUTIVE SUMMARY

On March 20, 2006 a Public Hearing for the "Redesignation Demonstration and Maintenance Plan for the Rocky Mount, North Carolina 8-Hour Ozone Nonattainment Area" was held. The hearing was held at the Rocky Mount City Hall Committee Room located at 331 South Franklin Street, Rocky Mount, North Carolina. The purpose of this hearing was to inform interested parties on the 8-hour ozone redesignation demonstration and maintenance plan and to solicit comments from the public. The public comment period closed April 7, 2006. Note that the comment period was extended beyond the original deadline of March 31, 2006 to account for delays in getting the document up on the North Carolina Division of Air Quality's (NCDAQ's) website.

According to the Public Hearing Registration Forms, a total of nine (9) non-NCDAQ people attended the Public Hearing and three (3) people registered to speak. Written comments were received from the United States Environmental Protection Agency (USEPA) and the North Carolina Department of Transportation (NCDOT). It is my opinion that the concerns raised by the interested parties can be adequately addressed by NCDAQ.

Based on the information contained in this report, I recommend the following:

I recommend that the "Redesignation Demonstration and Maintenance Plan for the Rocky Mount, North Carolina 8-Hour Ozone Nonattainment Area" be approved after addressing the concerns received by the USEPA and NCDOT.

Hearing Officer's Report
for
Redesignation Demonstration and Maintenance Plan
for The Rocky Mount, North Carolina
8-Hour Ozone Nonattainment Area

June 15, 2006

Robert Fisher

On March 20, 2006 a public hearing for the Redesignation Demonstration and Maintenance Plan for the Rocky Mount, North Carolina 8-Hour Ozone Nonattainment Area was held. The hearing was held at the Rocky Mount City Hall Committee Room located at 331 South Franklin Street, Rocky Mount, North Carolina. The purpose of this hearing was to inform interested parties on the 8-hour ozone redesignation demonstration and maintenance plan and to solicit comments from the public. The public comment period closed April 7, 2006. Note that the comment period was extended beyond the original deadline of March 31, 2006 to account for delays in getting the document up on the North Carolina Division of Air Quality's (NCDAQ's) website.

Background

The area surrounding Rocky Mount, North Carolina was designated nonattainment for the 8-hour ozone NAAQS on April 30, 2004 (69 Federal Register 23858). The Rocky Mount nonattainment area includes both Edgecombe and Nash Counties. The nonattainment designation was an action taken by the U. S. Environmental Protection Agency (USEPA) under Section 107(d) of the Clean Air Act (CAA). The CAA requires that some area be designated as nonattainment if a monitor is found to be in violation of a NAAQS. The USEPA took designation action in 2004 based on the ambient data from 2001-2003. At that time, the monitor in this area had a design value of 0.089 parts per million (ppm).

The ozone monitor is in the small community of Leggett, located east of Rocky Mount in Edgecombe County, and is the only ozone monitor in this nonattainment area. The latest design value for the monitor is 0.079 ppm based on the data from 2003-2005, and is therefore in attainment of the 8-hour ozone NAAQS, and eligible to be considered for redesignation to attainment.

The State of North Carolina has implemented permanent and enforceable reductions in ozone precursor emissions in the Rocky Mount area. These actions include implementing the on-board diagnostic vehicle inspection and maintenance program that began on January 1, 2005, and an open burning ban during ozone action days. In addition, there have been several State rules that have resulted in reductions in emissions in nearby areas that have resulted in lower ozone levels at the monitor. These State actions include the NOx SIP Call, the Clean Smokestacks legislation, and heavy-duty engine stop-gap rule for model years 2005 and 2006. Finally, several actions at the Federal level by the USEPA have resulted in lower emissions throughout the eastern portion of the country. These Federal actions include the Tier II engine standards for light and medium

duty vehicles, heavy-duty engine standards, the low sulfur gasoline and diesel requirements, off-road engine standards, and the Clean Air Interstate Rule.

North Carolina is requesting that the USEPA redesignate the Rocky Mount nonattainment area to attainment. The monitor data clearly shows that the region has attained the 8-hour ozone standard, and the maintenance demonstration shows that the future emission inventories are expected to be lower than the attainment year inventory through the implementation of the various control measures listed above.

Summary of Public Hearing and Comment Period

According to the Public Hearing Registration Forms, a total of nine (9) non-NCDAQ people attended the Public Hearing and three (3) people registered to speak. Written comments were received from the USEPA and the North Carolina Department of Transportation (NCDOT).

The public hearing comment period was open until 5:00 on April 7, 2006. During the public comment period, no phone calls were received. Three people spoke at the public hearing: Lorenzo Carmon, Edgecombe County Manager; John Gessaman, President of Carolinas Gateway Partnership; and Robert Murphy, Nash County Manager. Two written comments were received (attached). The USEPA responded in a letter dated April 7, 2006 and the NCDOT responded via email on March 15, 2006.

The three people that spoke at the public hearing all spoke in favor of the redesignation demonstration and maintenance plan.

The following is a summary of the pertinent comments, with regards to NCDAQ's jurisdiction, raised by all parties involved in the public hearing process along with the Hearing Officer's opinions and recommendations.

NCDOT: Behshad Norowzi submitted written comments pointing out the vehicle age distribution file used in one of the MOBILE model run. Mr. Norowzi also requested higher safety margins be applied to the motor vehicle emission budgets.

Hearing Officer's Response: NCDAQ should use the correct file in the MOBILE model run and should take under advisement NCDOT's concern about the safety margin.

USEPA: Kay T. Prince submitted written comments. These comments were requests for clarification or additional information be added to particular sections of the narrative and appendices.

Hearing Officer's Response: NCDAQ should address all of USEPA's comments in their final submittal.

Recommendation:

Based on the information contained in this report, I recommend the following:

I recommend that the "Redesignation Demonstration and Maintenance Plan for the Rocky Mount, North Carolina 8-Hour Ozone Nonattainment Area" be approved after addressing the concerns received by the USEPA and NCDOT.

Attachments to Report:

(1) Written comments from Kay T. Prince, Chief of the Air Planning Branch of the USEPA dated April 7, 2006.

(2) Written comments via email from Behshad Norowzi, with the North Carolina Department of Transportation, received March 15, 2006.

RPF\lab

cc: Central Files (with original letters and registration information)
Laura Boothe, RCO

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

Laura

APR 0 7 2006

4APT-APB

RECEIVED
APR 1 7 2006
AIR QUALITY DIVISION
DIRECTORS OFFICE

Mr. B. Keith Overcash, P.E., Director
Division of Air Quality
North Carolina Department of Environment
And Natural Resources
1641 Mail Service Center
Raleigh, NC 27699-1641

Dear Mr. Overcash:

Thank you for your letter dated March 2, 2006, transmitting a draft of the 8-hour ozone redesignation and maintenance plan for the Rocky Mount, North Carolina nonattainment area. We have completed our review of the submittal and offer the following comments on the draft redesignation and maintenance plan:

1. Page 2-3: We suggest citing and describing those power plants subject to the NOx SIP Call,e.g., Roxoboro and Mayo, as the source of reductions contributing in the attainment of the national ambient air quality standards (NAAQS) at the Leggett monitor. The amount of those emission reductions should also be included.

2. The regulations and emission reduction programs are cited in the maintenance plan, in section 3.2.1, should be included in the discussion in section 2.3 as permanent and enforceable reductions that contributed towards attainment of the Rocky Mount area. These regulations include the Clean Smokestacks rule, open burning bans, air toxics program and the MACT controls (from Appendix C.1).

3. The large nonroad diesel engines rule is a final rule. The title and discussion in section Large Nonroad Diesel Engines Proposed Rule should change the use of the word "proposed" to "final."

4. Section 2.0 of Appendix C.1 cites the 2003 National Emissions Inventory (NEI) as the source of emissions to use in developing the 2005 and other future year emissions. This should be 2002 NEI instead of 2003.

5. Page 2-2: Quality Assured/Quality Controlled data for the three most recent years must be submitted with the final submittal in order for EPA to take action on this redesignation request.

6. For clarity in the speed tables, we suggest the use of N/A instead of zero.

7. In Appendix C-3, part 1, the statewide barometric pressure was used. Please submit an explanation of why a statewide average pressure was used.

8. Please provide units for table 4.1.5-2 of appendix C-3 and for pages 4.28-4.30.

9. Appendix C-3 references the ASIP document. The final submittal needs to contain sufficient documentation of the ASIP process.

10. Please explain why all interstate travel is nonramp.

We look forward to continuing to work with you and your staff. If you have any questions, please contact Mr. Dick Schutt, Chief, Regulatory Development Section at (404) 562-9033, or have your staff contact Ms. Nacosta C. Ward at (404) 562-9140.

Sincerely,

for Kay T. Prince
Chief
Air Planning Branch

Subject: Rocky Mount SIP Review
From: Behshad Norowzi <bnorowzi@dot.state.nc.us>
Date: Wed, 15 Mar 2006 15:56:09 -0500
To: Laura Boothe <Laura.Boothe@ncmail.net>

Dear Laura,

Please see the following comments:
Vehicle age distribution: The Mobile6.2 input file RMTDM.IN is listing NCage02.prn as the REG DIST file being used while other three input files are using NCage04.prn
Please rerun RMTDM.IN with NCAGE04.prn and recalculate the relevant sections.
This will allow the latest 2004 registration data to be used for all the Mobile6.2 input files used in this effort.

Safety Margin: The suggested 6% and 16% safety margin for 2008 and 2017 are inadequate due to the following reasons:

VMT and speed: MPO and NCDOT are in process of hiring a contractor to update the Rocky Mount Model by this fall. The updated and enhanced model will be used for the next conformity model. Even a moderate change in VMT and Speed could impact the vehicle emission estimates by more than 20%.

Vehicle mix and Vehicle age distribution: New data will be ready by the time of next conformity analysis (2008). These two critical parameters to Mobile6.2 model would certainly change and together they could easily increase the vehicle emission estimates by more 20%.

Alternative approach to calculate safety margin: It will be helpful to look at the AQ facts for the Rocky Mount area from a different angle in order to estimate the size of the a reasonable safety margin. Currently the area is in attainment (based on 2002-2005 monitoring data). Therefore, the 2005 level for total man made emission is an acceptable level.

NOx: 2008 and 2017 Highway emissions are 20% and 65% lower than 2005 and total man made NOx emissions for 2008 and 2017 are 15% and 46% lower than 2005. Therefore, I request 15% and 40% safety margin for 2008 and 2017 emission budgets.

Please take into consideration that likely the AQ in Rocky Mount area would continue to improve due to various Federal and state controls. However, small safety margin could make the conformity test difficult and risky for Rocky Mount.

Thanks,
Behshad

LEGAL ADVERTISING INVOICE

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THE ROCKY MOUNT TELEGRAM

PUBLISHED BY ROCKY MOUNT PUBLISHING COMPANY
ROCKY MOUNT, NORTH CAROLINA 27804

February 15, 2006

NCDENR
1641 Mail Service Center
Raleigh, NC 27699
Attn: Laura Boothe

AFFIDAVIT OF PUBLICATION

I solemnly swear that from my personal knowledge and from reference to the files of THE ROCKY MOUNT TELEGRAM, a newspaper printed and published at Rocky Mount, in the COUNTY of Nash, STATE of North Carolina, the Advertisment referred to on this invoice was published on the date(s) indicated.

Legal Advertising Clerk

Sworn to and subscribed before me, this 18th day of Apr.

Notary Public

My Commission Expires 2-19-2008

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DESCRIPTION: Notice of Public Hearing

PUBLISHED: February 15, 2006

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT & NATURAL RESOURCES PUBLIC NOTICE

Notice is hereby given for a public hearing to be heard by the North Carolina Department of Environment and Natural Resources, Division of Air Quality, concerning the proposed 8-hour Ozone Redesignation Demonstration and Maintenance Plan.

PURPOSE: The hearing is intended to inform interested parties on the 8-hour Ozone Redesignation Demonstration and Maintenance Plan for the Rocky Mount non-attainment area.

DATE AND LOCATION: March 20, 2006 from 4:00-5:00pm at 331 South Franklin Street, Rocky Mount City Hall (Committee Room, 3rd Floor), Rocky Mount, NC 27802.

COMMENT PROCEDURES: All persons interested in these matters are invited to attend the public hearing. Any person desiring to comment is requested to submit a written statement for inclusion in the record of proceedings at the public hearing. The hearing officer may limit oral presentation lengths if many people want to speak. The hearing record will remain open until March 31, 2006, to receive additional written statements.

INFORMATION: Copies of the proposed 8-hour Ozone Redesignation Demonstration and Maintenance Plan will be made available starting February 17, 2006 and may be downloaded at http://daq.state.nc.us/planning/nc.sip.shtml. The document may also be reviewed at the offices of the North Carolina Department of Environment and Natural Resources, Division of Air Quality, located in: Raleigh, Planning Section (919-733-1115) or at the City of Rocky Mount Engineering Department, located at: Rocky Mount City Hall (252-972-1129).

Comments should be sent to and additional information concerning the hearings or the proposals may be obtained by contacting:
Ms. Laura Boothe
Division of Air Quality
1641 Mail Service Center
Raleigh, NC 27699-1641
Phone: (919) 733-1488
Fax: (919) 715-7476

2/15, 2006

AFFIDAVIT OF PUBLICATION

NORTH CAROLINA.
Wake County.) Ss.

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT & NATURAL RESOURCES

PUBLIC NOTICE

Notice is hereby given for a public hearing to be heard by the North Carolina Department of Environment and Natural Resources, Division of Air Quality, concerning the proposed 8-hour Ozone Redesignation Demonstration and Maintenance Plan.

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Raleigh, Planning Section 919-733-1115

or at the City of Rocky Mount Engineering Department, located at:

Rocky Mt. City Hall 252-972-1129

Comments should be sent to and additional information concerning the hearings or the proposals may be obtained by contacting:

Ms. Laura Boothe
Division of Air Quality
1641 Mail Service Center
Raleigh, NC 27699-1641
Phone: (919) 733-1488
Fax: (919) 715-7476
daq.publiccomments@ncmail.net (Note: In the subject line type Rocky Mount Redesignation)

Date: 2/10/06

/s/ B. Keith Overcash, P.E., Director

N&O: February 17, 2006

Before the undersigned, a Notary Public of Chatham County North Carolina, duly commissioned and authorized to administer oaths, affirmations, etc., personally appeared Debra Peebles, who, being duly sworn or affirmed, according to law, doth depose and say that she is Billing Manager-Legal Advertising of The News and Observer a corporation organized and doing business under the Laws of the State of North Carolina, and publishing a newspaper known as The News and Observer, in the City of Raleigh , Wake County and State aforesaid, the said newspaper in which such notice, paper, document, or legal advertisement was published was, at the time of each and every such publication, a newspaper meeting all of the requirements and qualifications of Section 1-597 of the General Statutes of North Carolina and was a qualified newspaper within the meaning of Section 1-597 of the General Statutes of North Carolina, and that as such she makes this affidavit; that she is familiar with the books, files and business of said corporation and by reference to the files of said publication the attached advertisement for DEHNR was inserted in the aforesaid newspaper on dates as follows: 02/17/06

Account Number: 71576702

The above is correctly copied from the books and files of the aforesaid Corporation and publication.

Janet Scroggs Notary Public Chatham County, NC

Debra Peebles, Billing Manager-Legal Advertising
Wake County, North Carolina

Sworn or affirmed to, and subscribed before me, this 20 day of FEBRUARY , 2006 AD ,by Debra Peebles.

In Testimony Whereof, I have hereunto set my hand and affixed my official seal, the day and year aforesaid.

Janet Scroggs, Notary Public

My commission expires 14th of March 2009.

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

June 19, 2006

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

Dear ~~Ms. Prince~~: Kay

Thank you for your April 7, 2006 comments on the pre-hearing draft redesignation and maintenance plan for the Rocky Mount, North Carolina, 8-hour ozone nonattainment area. Your comments were all either requesting minor corrections to text or asking for additional information on particular sections. These have all been addressed in the final submittal in the sections where the comments cited.

I greatly appreciate you and your staff taking the time to review the pre-hearing draft documentation. If you should have any additional questions or concerns about the final submittal, or feel that we have not adequately addressed your written comments dated April 7, 2006, please contact me at (919) 733-1488. As always, we look forward to continuing to work with you and staff.

Sincerely,

Laura A. Boothe

Laura A. Boothe
Attainment Planning Branch Chief

cc: Keith Overcash
Brock Nicholson
Sheila Holman
Robert Fisher

Planning Section
1641 Mail Service Center, Raleigh, North Carolina 27699-1641
2728 Capital Blvd., Raleigh, North Carolina 27604
Phone: 919-715-7670 / FAX 919-715-7476 / Internet: www.ncair.org

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Michael F. Easley, Governor

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

June 19, 2006

Behshad Norowzi
North Carolina Department of Transportation
Statewide Planning Branch
1554 Mail Service Center
Raleigh, NC 27699-1554

Dear ~~Mr. Norowzi~~ Behshad:

Thank you for your March 15, 2006 comments on the pre-hearing draft redesignation and maintenance plan for the Rocky Mount, North Carolina, 8-hour ozone nonattainment area. We greatly appreciate your agency taking the time to review and provide comments on this document.

Your first comment pointed out that the wrong vehicle age distribution was used for one of the input files. This has been corrected and the emission estimates have been updated to reflect this change.

Your second comment was a request to increase the safety margin for both years that a motor vehicle emission budget was set. My staff and I discussed your request and have decided that we did not feel comfortable applying as large of a percentage as requested in your email. However, we believe your request has merit and have increased both years by an additional five (5) percent. Therefore, we have added 11% safety margin to 2008 and 21% safety margin to 2017.

If you should have any questions, please contact me at (919) 733-1488. As always, we look forward to continuing to work with you and your agency.

Sincerely,

Laura A. Boothe

Laura A. Boothe
Attainment Planning Branch Chief

cc: Keith Overcash
Brock Nicholson
Sheila Holman
Robert Fisher

Planning Section
1641 Mail Service Center, Raleigh, North Carolina 27699-1641
2728 Capital Blvd., Raleigh, North Carolina 27604
Phone: 919-715-7670 / FAX 919-715-7476 / Internet: www.ncair.org

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Public Notice Report

For the Supplement to the Redesignation Demonstration and Maintenance Plan for the Rocky Mount, North Carolina 8-Hour Ozone Nonattainment Area

On December 3, 2010, a draft version of the North Carolina supplement to the redesignation demonstration and maintenance plan for the Rocky Mount, North Carolina 8-hour ozone nonattainment area was submitted to the U. S. Environmental Protection Agency (USEPA). A request for public hearing, in accordance with 40 CFR 51.102, and the public comment period were noticed in the local newspapers on Wednesday, December 8, 2010. The public comment period was open from December 8, 2010, through January 10, 2011. No request for public hearing was received and no public comments were received.

In March 2010, the USEPA announced in the Federal Register (FR) that the new mobile model, Motor Vehicle Emission Simulator (MOVES), will be required for transportation conformity purposes starting March 2012 (40 FR 9411). The NCDAQ committed to the transportation partners to review and revise the motor vehicle emission budgets if necessary to account for changes to the emission models, to the vehicle miles traveled projection models and other emission model input data. This supplement revises the motor vehicle emission budgets through the allocation of a portion of the safety margin. These revised motor vehicle emission budgets will be used for transportation conformity purposes once approved by the USEPA.

The North Carolina Division of Air Quality will be moving forward with the final submittal to the USEPA of the North Carolina supplement to the redesignation demonstration and maintenance plan for the Rocky Mount, North Carolina 8-hour ozone nonattainment area.

AFFIDAVIT OF PUBLICATION

NORTH CAROLINA.
Wake County.) Ss.

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT & NATURAL RESOURCES

PUBLIC NOTICE

PURPOSE:
The North Carolina Department of Environment and Natural Resources, Division of Air Quality (NCDAQ), hereby gives notice regarding its Pre-Hearing Draft Supplement to the Redesignation Demonstration and Maintenance Plan for Rocky Mount, North Carolina 8-Hour Ozone Nonattainment Area dated December 3, 2010. Persons wishing to submit written comments or request a public hearing regarding the 'Rocky Mount Supplemental Package' are invited to do so.

COMMENT PROCEDURES:
Any person wishing to comment may submit a written statement for inclusion in the record of proceedings regarding the Supplemental Package. Written comments should be postmarked no later than January 10, 2011 and addressed to Laura Boothe, Division of Air Quality, 1641 Mail Service Center, Raleigh, North Carolina 27699-1641.

REQUESTS FOR A PUBLIC HEARING:
Requests for a public hearing must be in writing and include a statement supporting the need for such a hearing, an indication of your interest in the subject, and a brief summary of the information intended to be offered at such hearing. A public hearing will be scheduled if requested. A separate notice will be published for the hearing including the date, time and location. Written requests for a public hearing should be postmarked no later than January 10, 2011 and addressed to Laura Boothe, Division of Air Quality, 1641 Mail Service Center, Raleigh, North Carolina 27699-1641.

INFORMATION:
Copies of the Supplemental Package may be downloaded at http://www.ncair.org/planning/nc_sip.shtml or by contacting:

Laura Boothe
Division of Air Quality
1641 Mail Service Center
Raleigh, NC 27699-1641
Phone: (919) 733-1488
Fax: (919) 715-7476
daq.publiccomments@ncmail.net

(Note: In the subject line type 'Rocky Mount Supplemental Package')

The Supplemental Package may be reviewed at the office of the North Carolina Department of Environment and Natural Resources, Division of Air Quality, located in:

Raleigh Central Office,
Planning Section 919-733-1115
Raleigh Regional Office 919-791-4200

The Supplemental Package may also be reviewed at the office of the City of Rocky Mount Engineering Department 252-972-1129

Date: 11/30/10
/s/ Sheila C. Holman, Director

N&O: December 8, 2010

Janet Scroggs Notary Public Chatham County, NC

Before the undersigned, a Notary Public of Chatham County North Carolina, duly commissioned and authorized to administer oaths, affirmations, etc., personally appeared Debra Peebles, who, being duly sworn or affirmed, according to law, doth depose and say that she is Accounts Receivable Specialist of The News and Observer a corporation organized and doing business under the Laws of the State of North Carolina, and publishing a newspaper known as The News and Observer, in the City of Raleigh , Wake County and State aforesaid, the said newspaper in which such notice, paper, document, or legal advertisement was published was, at the time of each and every such publication, a newspaper meeting all of the requirements and qualifications of Section 1-597 of the General Statutes of North Carolina and was a qualified newspaper within the meaning of Section 1-597 of the General Statutes of North Carolina, and that as such she makes this affidavit; that she is familiar with the books, files and business of said corporation and by reference to the files of said publication the attached advertisement for NCDENR/ AIR QUALITY DIVISION was inserted in the aforesaid newspaper on dates as follows: 12/08/10

Account Number: 73314870

Th n the books and files of the aforesaid Corporation and publication.

Debra Peebles, Accounts Receivable Specialist
Wake County, North Carolina

Sworn or affirmed to, and subscribed before me, this 09 day of DECEMBER , 2010 AD ,by Debra Peebles.

In Testimony Whereof, I have hereunto set my hand and affixed my official seal, the day and year aforesaid.

Janet Scroggs, Notary Public

My commission expires 14th of March 2014.

Rocky Mount TELEGRAM

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BUDGET OFFICE

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NORTH CAROLINA
NASH COUNTY:

RACHEL WATSON affirms that she is clerk of the Rocky Mount Telegram, a newspaper published daily at Rocky Mount, Nash County, North Carolina, and that the advertisement, a true copy of which is hereto attached, entitled REDESIGNATION DEMO was published in said the Rocky Mount Telegram on the following dates:

Wednesday, December 8, 2010 Page: D1

and that the said newspaper in which such notice, paper, document or legal advertisement was published, was at the time of each and every publication, a newspaper meeting all of the requirements and qualifications of Chapter 1, Section 597 of the General Statutes of North Carolina and was a qualified newspaper within the meaning of Chapter 1, Section 597 of the General Statutes of North Carolina.

Rachel Watson

Affirmed and subscribed before me this 08 day

of December 2010

Michelle W. Parker

(Notary Public Signature)

Michelle W. Parker

(Notary Public Printed Name)

My commission expires 11-18-12

MICHELLE W. PARKER
NOTARY PUBLIC
NASH COUNTY
NORTH CAROLINA

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT & NATURAL RESOURCES

PUBLIC NOTICE

PURPOSE: The North Carolina Department of Environment and Natural Resources, Division of Air Quality (NCDAQ), hereby gives notice regarding its Pre-Hearing Draft Supplement to the Redesignation Demonstration and Maintenance Plan for Rocky Mount, North Carolina 8-Hour Ozone Nonattainment Area dated December 3, 2010. Persons wishing to submit written comments or request a public hearing regarding the "Rocky Mount Supplemental Package" are invited to do so.

COMMENT PROCEDURES: Any person wishing to comment may submit a written statement for inclusion in the record of proceedings regarding the Supplemental Package. Written comments should be postmarked no later than January 10, 2011 and addressed to Laura Boothe, Division of Air Quality, 1641 Mail Service Center, Raleigh, North Carolina 27699-1641.

REQUESTS FOR A PUBLIC HEARING: Request for a public hearing must be in writing and include a statement supporting the need for such a hearing, an indication of your interest in the subject, and a brief summary of the information intended to be offered at such hearing. A public hearing will be scheduled if requested. A separate notice will be published for the hearing including the date, time and location. Written requests for a public hearing should be postmarked no later than January 10, 2011 and addressed to Laura Boothe, Division of Air Quality, 1641 Mail Service Center, Raleigh, North Carolina 27699-1641.

INFORMATION: Copies of the Supplemental Package may be downloaded at http://www.ncair.org/planning/nc_sip.shtml or by contacting:

Laura Boothe
Division of Air Quality
1641 Mail Service Center
Raleigh, NC 27699-1641
Phone: (919) 733-1488

Fax: (919) 715-7476
daq.publiccomments@ncmail.net
(Note: In the subject line type "Rocky Mount Supplemental Package")

The Supplemental Package may be reviewed at the office of the North Carolina Department of Environment and Natural Resources, Division of Air Quality, located in:

Raleigh Central Office, Planning Sectior 919-733-1115
Raleigh Regional Office 919-791-4200

The Supplemental Package may also be reviewed at the office of the City of Rocky Mount Engineering Department 252-972-1129

Sheila C. Holman, Director

12/08/2010

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

January 7, 2011

Ms. Sheila C. Holman, Director
Division of Air Quality
North Carolina Department of
Environment And Natural Resources
1641 Mail Service Center
Raleigh, North Carolina 27699-1641

Dear Ms. Holman:

Thank you for your letter dated December 3, 2010, transmitting a prehearing package regarding the Supplement to the Redesignation Demonstration and Maintenance Plan for the Rocky Mount, North Carolina 8-hour Ozone Nonattainment Area. These rules will be the subject of a public hearing, if requested, with written comments due by the close of business on January 10, 2011. We have completed our review of the submittal and offer no comments at this time.

We look forward to continuing to work with you and your staff. If you have any questions, please contact Ms. Lynorae Benjamin, Chief, Regulatory Development Section at (404) 562-9040, or have your staff contact Ms. Nacosta C. Ward at (404) 562-9140.

Sincerely,

Lynorae Benjamin for

Richard A. Schutt
Chief
Air Planning Branch

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Appendix C.3

Mobile Source Inventory Documentation

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1.0 INTRODUCTION AND SCOPE

Mobile sources comprise about 50% of the nitrogen oxides (NOx) emissions in Edgecombe and Nash Counties. Mobile sources can be subdivided into two subcategories, highway mobile sources and non-highway mobile sources. Off-road mobile sources are further divided into non-road mobile, railroad locomotives and aircraft engines. The larger contributor to the mobile source emissions is from highway mobile sources.

2.0 OVERALL METHODOLOGY

2.1 SOURCE CATEGORY IDENTIFICATION

Highway mobile sources were identified from the U. S. Environmental Protection Agency (USEPA) highway mobile model MOBILE6.2.

Off-road mobile sources were identified from the USEPA guidance document EPA-450/4-91-016, Procedures for the Preparation of Emissions Inventories for Carbon Monoxide and Precursors of Ozone (Procedures document); EPA-454/R-05-001 Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations; EPA-450/4-81-026d (Revised) Procedures for Emission Inventory Preparation, Volume IV; Mobile Sources (Mobile Source Procedures); and from the USEPA's off-road mobile model NONROAD2005a released February 10, 2006.

2.2 EMISSION ESTIMATION APPROACH

Mobile source emissions are estimated by the methodologies suggested in the USEPA document Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations. The estimation of emissions from mobile sources, like area sources, involves multiplying an activity level by an emission factor.

For highway mobile sources, the USEPA mobile model MOBILE6.2 is used to generate emission factors which are multiplied by the vehicle miles traveled (VMT) to determine the estimated emissions.

The majority of the off-road mobile emissions were estimated by using the USEPA off-road mobile model NONROAD2005a. Direct emissions are generated with this model. For aircraft engine emissions, the Federal Aviation Administration (FAA) Emissions and Dispersion Modeling System (EDMS) model was used. Aircraft operations were inputted into the model and the model predicts the engine emissions based on average landing and take-off practices for the aircraft type. For railroad locomotive emissions, emission factors were obtained from the Mobile Source Procedures document and the activity level was obtained from the various railroad companies.

3.0 QUALITY ASSURANCE MEASURES

The quality assurance (QA) procedures for the off-road mobile source categories were conducted in the same manner as the area source categories. That is, for each category, the completed emission estimate (including a discussion of the methodology) was given to an individual who was not involved with the compilation of emissions for that category. This individual reviewed the information and commented to the emissions inventory developer on any needed modifications.

The QA for the highway mobile source category can be broken into three components: 1) input files, 2) MOBILE6.2 outputs/summaries, and 3) VMT interpolation. Each of these components are detailed in the paragraphs below.

After the speed and VMT information is acquired from the North Carolina Department of Transportation (NCDOT), the speed information is checked for reasonableness against previous sets of speeds for the area. Once comfortable with the speeds, the North Carolina Division of Air Quality (NCDAQ) enters the speed information into MOBILE6.2 input files. In addition to the speed information, the following inputs are included in the input files: pollutants, fuel Reid Vapor Pressure (RVP), 24 hour temperature and relative humidity profiles, barometric pressure, inspection and maintenance program, anti-tampering program, calendar year, evaluation month, and the vehicle mix per road type. All input files are printed and checked by hand against a "key" with the original source of the information. This QA step is always performed by a person other than the one who generated the files. If any discrepancies are found, they are marked on the hard copy and supplied by to the person who generated the input files for correction. Another input is referenced in the actual MOBILE6.2 input file. It is the vehicle age distribution. This file is checked against the original spreadsheet from which it is generated. Again, if any discrepancies are found, they are noted and returned to the person responsible for generating those files.

Once the input files have passed through the QA procedure, MOBILE6.2 is run to generate emission factors. The emission factors are output into two forms from the MOBILE6.2 model. One set of outputs is formatted nicely for importing into a spreadsheet. Once in the spreadsheet, data can easily be formatted into summary tables. An additional step in the spreadsheet is to multiply the emission factors by the daily VMT to get daily emissions. The next step is then performed by comparing the summary tables containing emission factors to the other MOBILE6.2 output file (referred to as the "text output").

A final step is to check the VMT used in the preceding step in the summary spreadsheets against the original source of the VMT. If VMT was not provided for the specific years requested, then the NCDAQ performs a linear interpolation to calculate the exact year needed. This linear interpolation is checked by a person other than the one who generated the file to ensure no errors were introduced.

4.0 DISCUSSION OF MOBILE SOURCE CATEGORIES

Mobile sources produce volatile organic compounds (VOCs) and NOx. Emissions of these pollutants are estimated in the mobile source inventory required for the maintenance plan. There are two major source categories comprising of a number of individual mobile source types. Sections 4.1 and 4.2 addresses highway mobile sources and off-road mobile sources, respectively. The objective of each section is to describe the source category and the emissions estimation procedures. Each section also includes tables summarizing the estimated emissions for a typical summer day by county. In Section 5 are copies of the data used in the calculation of the estimated emissions, such as the MOBILE6.2 mobile model input and output files and the NONROAD2005a model input files.

4.1 HIGHWAY MOBILE SOURCE EMISSIONS

4.1.1 Introduction and Scope

Highway mobile sources are considered those vehicles that travel on the roadways. Mobile Sources comprise over 50 percent of the emissions of NOx emissions in North Carolina. In Edgecombe and Nash Counties highway mobile sources contribute 38% and 76% of the 2005 NOx, respectively. Emissions from motor vehicles occur throughout the day while the vehicle is in motion, at idle, parked, and during refueling. All of these emissions processes need to be estimated in order to properly reflect the total emissions from this source category. In its simplest terms, emissions from highway mobile sources are calculated by multiplying an activity level, in this case daily VMT as provided by the NCDOT, by an emission factor.

The USEPA developed the MOBILE model to estimate emission factors based on information on the way vehicles are driven in a particular area. The newest version of the MOBILE model (MOBILE6.2) was used. This model was released by the USEPA in 2002 and differs significantly from previous versions of the model. Key inputs for MOBILE6.2 include information on the age of vehicles on the roads, the average speed of those vehicles, what types of roads those vehicles are traveling on, any control technologies in place in an area to reduce emissions for motor vehicles (e.g., emissions inspection programs), and ambient temperature.

A very important component of the highway mobile emission estimation process is interagency consultation. The primary transporation partners involved in the Rocky Mount redesignation interagency consultation process included: NCDOT, USEPA, Federal Highway Administration (FHWA), and the City of Rocky Mount. Specifically the NCDOT was consulted for input data such as speeds and VMT. Also, an interagency consulation conference call was held to discuss some of the specific details on setting motor vehicle emissions budguts (MVEBs).

4.1.2 MOBILE6.2 Input Assumptions

The MOBILE6.2 input files and output files are compiled in Section 5 – Data.

Speed Assumptions

Emissions from motor vehicles vary with the manner in which the vehicle is operated. Vehicles traveling at 65 miles per hour (mph) emit a very different mix of pollutants than the car that is idling at a stoplight. In order to estimate emissions from vehicles for a typical day, the NCDOT provided speeds for Edgecombe and Nash Counties.

In Edgecombe and Nash Counties, the latest speeds were obtained from the NCDOT via e-mail on January 11, 2006. The speeds provided are based on a daily average. The Rocky Mount Urban Area Metropolitan Planning Organization (MPO) does not cover the entire Rocky Mount nonattainment area, only the urban portion. Therefore, the speeds for the urban area covered by the MPO, in both Edgecombe and Nash Counties, were generated from the travel demand model. The speeds for the remaining rural area are generated by a spreadsheet used to calculate speeds by the NCDOT. The MOBILE6.2 model was utilized to generate emission factors for the entire nonattainment area that included separate modeling runs for the speeds from the travel demand model and the calculated speeds for the rural area. The speeds were provided for the years 2005, 2008, 2011, 2014 and 2017.

Tables 4.1.2-1 and 4.1.2-2 provide a summary of the speeds. The column headings in these tables represent the road types used in the modeling and are listed below.

RI	Rural Interstate	UI	Urban Interstate
RPA	Rural Other Principle Arterial	UF	Urban Freeway & Expressway
RMA	Rural Minor Arterial	UPA	Urban Other Principal Arterial
RMjC	Rural Major Collector	UMiA	Urban Minor Arterial
RMiC	Rural Minor Collector	UC	Urban Collector
RL	Rural Local	UL	Urban Local

Table 4.1.2-1 Travel Demand Model Speeds for the Rocky Mount Area

County	UI	UF	UPA	UMiA	UC	UL	RI	RPA	RMA	RMjC	RMiC	RL
For 2005												
Edgecombe	N/A	65	35	41	40	37	N/A	65	51	53	52	47
Nash	65	65	46	44	39	34	65	60	53	52	50	41
For 2008												
Edgecombe	N/A	65	35	42	40	38	N/A	65	51	53	52	47
Nash	65	65	45	44	39	34	65	61	53	52	50	42
For 2011												
Edgecombe	N/A	65	35	42	40	38	N/A	65	51	53	52	47
Nash	65	65	45	44	39	34	65	61	53	52	50	42
For 2014												
Edgecombe	N/A	65	35	42	40	38	N/A	65	51	53	52	47
Nash	65	65	45	44	39	34	65	61	53	52	50	42
For 2017												
Edgecombe	N/A	65	35	42	40	38	N/A	65	52	53	52	47
Nash	65	65	45	44	40	35	65	61	53	52	50	42

Table 4.1.2-2 Rural Area Speeds for the Rocky Mount Area

County	UI	UF	UPA	UMiA	UC	UL	RI	RPA	RMA	RMjC	RMiC	RL
For 2005												
Edgecombe	N/A	56	29	32	31	30	N/A	45	44	43	42	42
Nash	N/A	56	29	32	31	30	66	47	44	43	42	42
For 2008												
Edgecombe	N/A	55	29	32	31	30	N/A	45	44	43	42	42
Nash	N/A	56	29	32	31	30	66	47	44	43	42	42
For 2011												
Edgecombe	N/A	55	29	32	31	30	N/A	45	44	43	42	42
Nash	N/A	56	29	32	31	30	66	47	44	43	42	42
For 2014												
Edgecombe	N/A	55	29	32	31	29	N/A	45	44	43	42	42
Nash	N/A	56	29	32	31	30	65	47	44	43	42	42
For 2017												
Edgecombe	N/A	55	29	32	31	29	N/A	45	44	43	42	42
Nash	N/A	56	29	32	31	30	65	47	44	43	42	42

The MOBILE6.2 command "AVERAGE SPEED" was used to enter the daily speeds provided by NCDOT. This command requires two data elements: average speed and a roadway scenario. As with all average speed inputs to MOBILE6.2, average speeds may range from 2.5 to 65 miles per hour. The roadway scenario data element indicates the type of driving that the user intends for the average speed input to model. NCDAQ and NCDOT follow the USEPA *Technical Guidance on the Use of MOBILE6.2 for Emission Inventory Preparation* (Office of Transportation, and Air Quality EPA420-R-04-013, August 2004) to match FHWA roadways to MOBILE6.2 driving cycles with the exception of urban local roads. However, for urban local roads, NCDAQ follows the USEPA advice on provided on page 30 of the same guidance document:

> *Note that the MOBILE6.2 driving cycle used for local roadways may differ from the range of activity on the roadways defined as local by USDOT Publication No. FHWA-ED-90-006 revised March 1989 (Highway Functional Classification) for both rural and urban local VMT. The local roadway driving cycle used in MOBILE6.2 likely constitutes only a small subset of urban local VMT as defined by FHWA. When in doubt, EPA recommends that any roadway VMT that does not clearly match the MOBILE6.2 driving cycle for local roadways be included with MOBILE6.2 arterial/collector VMT rather than included with MOBILE6.2 local roadway VMT.*

Roadway scenarios per facility type are defined as follows:

Rural interstate	Non-Ramp
Rural principle arterial	Non-Ramp
Rural minor arterial	Arterial
Rural major collector	Arterial
Rural minor collector	Arterial
Rural local	Arterial
Urban interstate	Non-Ramp
Urban freeway	Non-Ramp
Urban principle arterial	Arterial
Urban minor arterial	Arterial
Urban collector	Arterial
Urban local	Arterial

Interstates are modeled as "Non-Ramp" instead of "Freeway" because both speed and VMT for ramps are included in the functional classification for the major facility it is connected to in the model. This is consistent with the USEPA guidance mentioned above.

Vehicle Age Distribution

The vehicle age distribution comes from annual registration data for North Carolina from the NCDOT. For this analysis the data was generated for 2004. The NCDOT provided the latest available count data based on the number of vehicle types per year from 1974 through 2004. Vehicles greater than 25 years old were combined and included as the 25th model year. The vehicle count information is provided for nine vehicle types; light duty gas vehicles (LDGV), light duty diesel vehicles (LDDV), light duty gas trucks 1 (LDGT1), light duty gas trucks 2 (LDGT2), light duty diesel trucks 1 (LDDT1), light duty diesel trucks 2 (LDDT2), heavy duty gas vehicles (HDGV), heavy duty diesel vehicles (HDDV) and motorcycles (MC). LDDT1 and LDDT2 are combined and labeled as light duty diesel trucks (LDDT). This vehicle distribution corresponds to the old MOBILE5 format and does not correlate to the USEPA MOBILE6.2 model vehicle types. In order to convert the data provided by the NCDOT into the MOBILE6.2 model format, the NCDAQ used an utility developed by the USEPA that disaggregates the 8 MOBILE5 model vehicle types into the 16 MOBILE6.2 vehicle types. The count data provided by the NCDOT is converted to fractions by dividing each count per vehicle type per year by the total number of vehicles in that classification for all years. For example, the number of 2004 light duty vehicles divided by the total number of light duty vehicles for all years. The fractions are arranged into MOBILE5 format for conversion to the 16 vehicle types required by the MOBILE6.2 model using the USEPA conversion utility.

Vehicle Mix Assumptions

The vehicle mix refers to the percentage of different vehicle types on each of the 12 FHWA road types. These road types are listed above in the speed assumptions section. It is critical for estimating mobile emissions in an area to use data that accurately reflects the vehicles types traveling on each of these different road types.

Historically, the North Carolina statewide vehicle mix was created using spreadsheets that were developed in the mid-1990s. In August 2004, the USEPA released the guidance document EPA420-R-04-013, *Technical Guidance on the Use of MOBILE6.2 for Emission Inventory Preparation*. The NCDAQ created a new statewide mix based on this methodology. Outlined below is the methodology used to convert the 13 Highway Performance Monitoring System (HPMS) vehicle types count data reported to FHWA and generate a state specific vehicle mix.

The North Carolina HPMS data that was used to generate the new statewide vehicle mix was based on 1999 through 2001 data counts. This is the latest available statewide count information. Table 4.1.2-3 shows the percent of vehicles per vehicle type for each of the 12 road classes.

Table 4.1.2-3 Percentage of Vehicles Per Vehicle Type by Functional Road Class

	PASS CARS	PICK UPS	BUS	2-A TRK	3-A TRK	4-A TRK	4-A TTST	5-A TTST	6-A TTST	5-A TWIN	6-A TWIN	7-A TWIN	MC
Rural													
Interstate	56.93%	10.80%	1.06%	2.50%	1.56%	1.09%	4.79%	19.23%	0.48%	0.73%	0.24%	0.11%	0.49%
Oth Prin Art*	69.34	15.79	0.71	2.80	1.48	0.25	2.07	6.67	0.26	0.16	0.05	0.04	0.40
Minor Art**	70.58	17.23	0.59	3.19	1.87	0.27	1.79	3.69	0.21	0.05	0.01	0.02	0.49
Major Col*	73.21	17.52	0.51	3.01	1.45	0.24	1.63	1.84	0.18	0.02	0.01	0.02	0.36
Minor Col*	74.00	16.50	0.65	3.00	1.55	0.17	1.75	1.50	0.30	0.05	0.02	0.06	0.45
local	71.93	18.66	0.51	4.09	1.06	0.02	1.54	1.60	0.05	0.00	0.00	0.00	0.55
Urban													
Interstate	68.68	12.84	0.89	2.12	1.68	0.42	2.70	9.29	0.45	0.36	0.09	0.10	0.36
Oth Freeway	74.79	13.97	0.57	2.48	1.17	0.42	2.56	3.42	0.17	0.07	0.01	0.03	0.33
Oth Prin Art**	76.64	14.84	0.46	2.20	1.30	0.13	1.66	2.12	0.21	0.04	0.01	0.04	0.32
Minor Art	79.35	14.43	0.47	2.16	1.08	0.10	1.26	0.66	0.11	0.00	0.00	0.02	0.36
Collectors	81.15	13.42	0.43	2.02	1.12	0.07	0.99	0.40	0.05	0.00	0.00	0.01	0.34
local	75.56	16.59	0.82	2.57	1.73	0.03	0.95	1.05	0.10	0.00	0.00	0.00	0.59

Disaggregating State Specific Information

Section 4.1.5 of *Technical Guidance on the Use of MOBILE6.2 for Emission Inventory Preparation*, illustrates how to map the HPMS statewide vehicle data to general vehicle categories. This mapping is outlined below:

HPMS Category	**General Category**
Motorcycle	Motorcycle (MC)
Passenger Car	Passenger Car (LDV)
Other 2-Axel, 4-Tire Vehicles	Light Truck (LDT)
Busses	Bus (HDB)
All Other Trucks: Single unit, 2-axel, 6-tire Single unit, 3-axel Single unit, 4 or more axel Single trailer, 4 or fewer axel Single trailer, 5-axel Single trailer, 6 or more axel Multi-trailer, 5 or fewer axel Multi-trailer, 6-axel Multi-trailer, 7 or more axel	Heavy Duty Truck (HDV)

The HPMS data in Table 4.1.2-3 was grouped into these five general categories for each road type. In order to expand the five general categories to the 16 vehicle types used in MOBILE6.2, the national average VMT fractions by each vehicle class were used. The 2000 fractions were used since the state specific data is from 1999 through 2001. The national average data was obtained from Table 4.1.2 in *Technical Guidance on the Use of MOBILE6.2 for Emission Inventory Preparation*. An example for rural interstates is illustrated below:

From Table 4.1.2-3 above:

Passenger Cars	=	56.93%	5 axel Trailer	=	19.23%
Pickup Trucks	=	10.80%	6 axel Trailer	=	0.48%
Bus	=	1.06%	5 axel Multi Trailer	=	0.73%
2 axel Trucks	=	2.50%	6 axel Multi Trailer	=	0.24%
3 axel Trucks	=	1.56%	7 axel Multi Trailer	=	0.11%
4 axel Trucks	=	1.09%	Motorcycles	=	0.49%
4 axel Trailer	=	4.79%			

Therefore, the five general categories are:

Motorcycles	=	0.49%
Light Duty Vehciles	=	56.93%
Light Duty Trucks	=	10.80%
Heavy Duty Buses	=	1.06%
Heavy Duty Vehicles	=	30.73%

From Table 4.1.2 in *Technical Guidance on the Use of MOBILE6.2 for Emission Inventory Preparation*, the 2000 national average vehicle mix for light duty trucks, buses and heavy duty trucks are:

Light Duty Trucks

LDT1	=	0.0655
LDT2	=	0.2179
LDT3	=	0.0672
LDT4	=	0.0309
Total	**=**	**0.3815**

Buses

HDBS	=	0.0019
HDBT	=	0.0009
Total	**=**	**0.0028**

Heavy Duty Trucks

HDV2B	=	0.0380
HDV3	=	0.0038
HDV4	=	0.0029
HDV5	=	0.0022
HDV6	=	0.0082
HDV7	=	0.0098
HDV8A	=	0.0108
HDV8B	=	0.0386
Total	**=**	**0.1143**

Using the methodology described in Section 4.1.5 in *Technical Guidance on the Use of MOBILE6.2 for Emission Inventory Preparation* the new 2000 North Carolina statewide mix was developed. The basic formula for developing the mix is shown below,

$$\text{Vehicle Type} = (\text{2000 M6.2 fraction for vehicle}) \times \frac{(\text{99-01 State total for group})}{(\text{2000 M6.2 total for subcategory})}.$$

Table 4.1.2-4 displays the calculation for each vehicle type for the 2000 rural interstate vehicle mix.

Table 4.1.2-4 Calculation of New 2000 Statewide Rural Interstate Vehicle Mix

Vehicle Type		Calculation		New 2000 Mix
LDV	=	LDV	=	0.5693
MC	=	MC	=	0.0049
Light Duty Trucks				
LDT1	=	0.0655 x (0.1080/0.3815)	=	0.0185
LDT2	=	0.2179 x (0.1080/0.3815)	=	0.0617
LDT3	=	0.0672 x (0.1080/0.3815)	=	0.0190
LDT4	=	0.0309 x (0.1080/0.3815)	=	0.0087
Heavy Duty Vehicles				
HDV2B	=	0.0380 x (0.3073/0.1143)	=	0.1022
HDV3	=	0.0038 x (0.3073/0.1143)	=	0.0102
HDV4	=	0.0029 x (0.3073/0.1143)	=	0.0078
HDV5	=	0.0022 x (0.3073/0.1143)	=	0.0059
HDV6	=	0.0082 x (0.3073/0.1143)	=	0.0220
HDV7	=	0.0098 x (0.3073/0.1143)	=	0.0263
HDV8A	=	0.0108 x (0.3073/0.1143)	=	0.0290
HDV8B	=	0.0386 x (0.3073/0.1143)	=	0.1038
Buses				
HDBS	=	0.0019 x (0.0106/0.0028)	=	0.0072
HDBT	=	0.0009 x (0.0106/0.0028)	=	0.0034

2005, 2008, 2011, 2014 and 2017 Statewide Vehicle Mix

Once the 2000 vehicle mix was generated, the other years were created using the methodology described in Section 4.1.4 in *Technical Guidance on the Use of MOBILE6.2 for Emission Inventory Preparation*. This method grouped light duty vehicles, light duty trucks and motorcycles together and heavy duty buses, heavy duty trucks and heavy duty vehicles together. The combined percentages for these groupings are listed below.

Light Duty Vehicles = 68.22%
Heavy Duty Vehicles = 31.78%

The MOBILE6.2 vehicle mix fractions for the year being developed were obtained from Table 4.1.2 in *Technical Guidance on the Use of MOBILE6.2 for Emission Inventory Preparation*. The MOBILE6.2 vehicle fractions for 2005 are listed below.

Light Duty Vehicles

LDV	=	0.4231
LDT1	=	0.0774
LDT2	=	0.2577
LDT3	=	0.0794
LDT4	=	0.0365
MC	=	0.0057
Total	**=**	**0.8798**

Heavy Duty Vehicles

HDV2B	=	0.0387
HDV3	=	0.0038
HDV4	=	0.0031
HDV5	=	0.0023
HDV6	=	0.0086
HDV7	=	0.0102
HDV8A	=	0.0111
HDV8B	=	0.0395
HDBS	=	0.0020
HDBT	=	0.0009
Total	**=**	**0.1202**

The North Carolina 2005 vehicle mix was normalized to the MOBILE6.2 fractions using the following formula:

$$\text{Vehicle Type} = (\text{2005 M6 fraction for vehicle}) \times \frac{(\text{2000 State total for group})}{(\text{2005 M6 total for group})}$$

Table 4.1.2-5 below displays the calculations used to generate the 2005 North Carolina vehicle mix for rural interstate.

Table 4.1.2-5 Calculation of 2005 Statewide Rural Interstate Vehicle Mix

Vehicle Type		Calculation		2005 State Mix
Light Duty Vehicles				
LDV	=	0.4231 x (0.6822/0.8798)	=	0.3281
LDT1	=	0.0774 x (0.6822/0.8798)	=	0.0600
LDT2	=	0.2577 x (0.6822/0.8798)	=	0.1998
LDT3	=	0.0794 x (0.6822/0.8798)	=	0.0616
LDT4	=	0.0365 x (0.6822/0.8798)	=	0.0283
MC	=	0.0057 x (0.6822/0.8798)		0.0044
Heavy Duty Vehicles				
HDV2B	=	0.0387 x (0.3178/0.1202)	=	0.1023
HDV3	=	0.0038 x (0.3178/0.1202)	=	0.0100
HDV4	=	0.0031 x (0.3178/0.1202)	=	0.0082
HDV5	=	0.0023 x (0.3178/0.1202	=	0.0061
HDV6	=	0.0086 x (0.3178/0.1202)	=	0.0227
HDV7	=	0.0102 x (0.3178/0.1202)	=	0.0270
HDV8A	=	0.0111 x (0.3178/0.1202)	=	0.0293
HDV8B	=	0.0395 x (0.3178/0.1202)	=	0.1044
HDBS	=	0.0020 x (0.3178/0.1202)	=	0.0053
HDBT	=	0.0009 x (0.3178/0.1202)	=	0.0024

This method was used to generate all of the future year vehicle mixes that were needed to compute the emission factors. The North Carolina transportation partners consider the statewide vehicle mix to be the best representation of the vehicle population in Edgecombe and Nash Counties.

Temperature, Relative Humidity and Barometric Pressure Assumptions

The MOBILE6.2 command "HOURLY TEMPERATURES" was used to enter 24 hourly temperatures to estimate mobile source emissions. This command requires the command name followed by the 24 hourly temperatures in the data field in the RUN SECTION of the mobile input files. The temperatures must be listed beginning with the 6 a.m. and continuing through 5 a.m. the next day. The first 12 values must be on the same line as the command; the remaining twelve must be on the next line. For the Rocky Mount mobile source emission estimates, the

NCDAQ used average July 2005 24 hour temperature profile from the Automated Surface Observing System at the Rocky Mount/Wilson Regional Airport (KRWI).

The MOBILE6.2 command "RELATIVE HUMIDITY" was used to enter 24 hourly relative humidity values to estimate mobile source emissions. This command requires the 24 hourly values be in the same format as the HOURLY TEMPERATURES command. The relative humidity values are entered in the SCENARIO section of the mobile input files. Just as the temperatures, the relative humidity data represents an average July 2005 profile from KRWI. When the RELATIVE HUMIDITY command is used, the user supplied relative humidity values are converted to absolute humidity. This conversion requires values of temperature and barometric pressure.

The BAROMETRIC PRES command allows the user to change the default value of barometric pressure used in the humidity conversion. The value used was based upon the National Oceanic and Atmospheric Administration Cooperative Institute for Research in Environmental Sciences Climate Diagnostics Center (NOAA-CIRES CDC) reanalysis web page. The Figure below provides the mean barometric pressure for July based upon 1948-2004 data. As one can see, the average July pressure in the Rocky Mount, North Carolina area is between 1016.5 mb and 1017.5 mb or 30.01 and 30.04 inches of mercury. Therefore, a pressure of 30.0 inches of mercury is used in the exercise.

Figure 4.1.2-1. Mean barometric pressure for July based upon 1948-2004 data

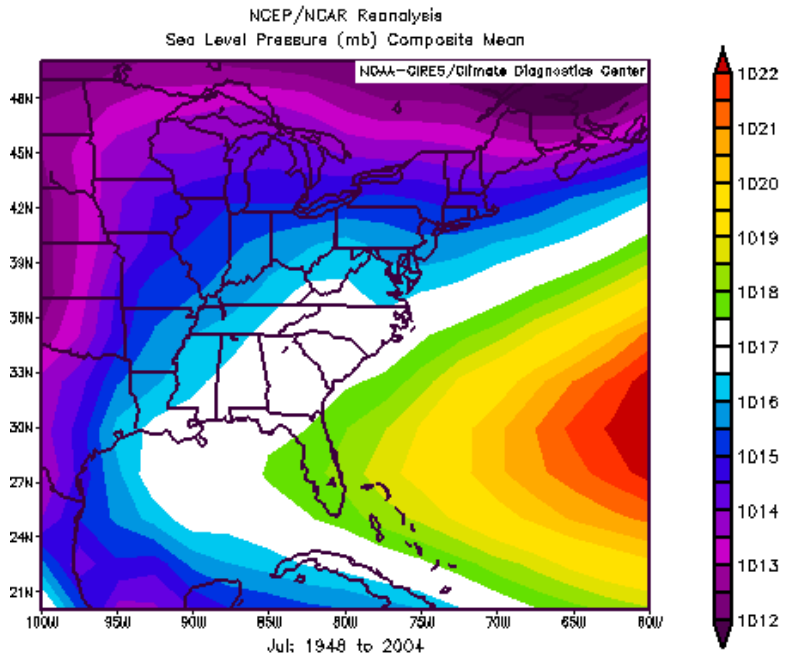


Table 4.1.2-6 provides the tempertatures, relative humidy and barometric pressure data and format used in this analysis.

Table 4.1.2-6 Temperatures, Relative Humidity and Pressure used in Mobile Emission Estimates

HOURLY TEMPERATURES:	73. 73. 74. 76. 78. 80. 82. 84. 86. 88. 88. 88. 86. 85. 84. 81. 79. 77. 75. 74. 73. 73. 73. 73.
RELATIVE HUMIDITY :	97. 96. 89. 81. 79. 71. 64. 56. 54. 51. 51. 52. 58. 62. 68. 71. 77. 83. 87. 92. 95. 95. 96. 97.
BAROMETRIC PRES :	30.0

Vehicle Inspection and Maintenance Program Assumptions

In 2002, North Carolina implemented a new vehicle emissions inspection program referred to as onboard diagnostics (OBDII). This program covers all light duty gasoline powered vehicles that are model year 1996 and newer. The program was initially implemented in 9 counties and was expanded to include a total of 48 counties between July 2002 and January 2006. Edgecombe and Nash Counties were phased-in during Phase 5 which began on January 1, 2005. The OBDII compliance rate used in the mobile source emission estimates is 95 percent. In addtion, the inspection stations are required to administer an anti-tampering check to ensure that emissions control equipment on any vehicle 1968 and newer has not been altered.

Reid Vapor Pressure Assumptions

RVP reflects a gasoline's volatility. An RVP of 9.0 pounds per square inch is required during May through September for the Rocky Mount area. Lower RVP leads to lower VOC emissions from gasoline handling and lowers vapor losses from motor vehicles.

4.1.3 VMT Assumptions

In order to calculate emissions from on-road mobile sources, emission factors are developed as discussed throughout this document. The emission factors are then multiplied by an activity level, which for on-road mobile sources is daily VMT.

The daily VMT for the Rocky Mount area was provided by the NCDOT via e-mail on January 11, 2006 for 2002, 2010, 2020, and 2030 (see Section 4.1.7). A linear interpolation was conducted for the years 2005, 2008, 2011, 2014, and 2017. The VMT was reported as inside the Rocky Mount Urban Area MPO boundary and outside the MPO. This definition is to distinguish

the Rocky Mount urban portion (under the jurisdiction of the MPO) from the remaining rural portion of the area. Because the urban area of Edgecombe and Nash Counties is modeled using the travel demand model, the VMT for the urban portion is derived from this model and the remaining rural area is generated from the NCDOT's "new rural spreadsheet" calculations. The NCDOT's new version of this rural spreadsheet accounts for the impact of added lane miles on forecasted VMT. This adjustment is done using the following formula:

*Road type VMT for the analysis year = Road type HPMS VMT + [(total base year VMT/total base year lane miles) * added lane miles for the road type in analysis year]*

The VMT for Edgecombe and Nash Counties are summarized in Tables 4.1.3-1 and 4.1.3-2.

Table 4.1.3-1 Vehicle Miles Traveled for Edgecombe County

Road Type	2005	2008	2011	2014	2017
Edgecombe County (Urban Area)					
Urban Interstate	0	0	0	0	0
Freeway & Expressway	109,780	123,378	133,720	137,552	141,384
Urban Other Principle Arterial	19,508	20,583	21,495	22,081	22,667
Urban Minor Arterial	101,490	107,816	115,839	127,257	138,675
Urban Collector	15,746	16,557	17,213	17,560	17,907
Urban Local	55,036	59,843	63,988	66,808	69,628
Rural Interstate	0	0	0	0	0
Rural Other Principle Arterial	154,914	179,460	201,164	217,182	233,200
Rural Minor Arterial	8,209	8,356	8,549	8,831	9,113
Rural Major Collector	98,489	90,541	87,401	93,878	100,355
Rural Minor Collector	63,041	65,403	67,869	70,546	73,223
Rural Local	77,237	83,141	88,162	91,416	94,671
Edgecombe County (Rural Area)					
Urban Interstate	0	0	0	0	0
Freeway & Expressway	53,154	61,908	69,088	73,120	77,152
Urban Other Principle Arterial	57,955	62,369	66,608	70,495	74,382
Urban Minor Arterial	83,245	93,910	103,024	109,037	115,049
Urban Collector	9,805	10,842	11,762	12,449	13,135
Urban Local	44,236	47,795	51,162	54,148	57,134
Rural Interstate	0	0	0	0	0
Rural Other Principal Arterial	211,198	225,749	240,120	254,134	268,147
Rural Minor Arterial	79,495	85,851	91,876	97,238	102,600
Rural Major Collector	204,903	212,713	222,244	235,214	248,184
Rural Minor Collector	114,627	124,572	133,805	141,614	149,423
Rural Local	64,591	69,242	73,778	78,084	82,390

Table 4.1.4-2 Vehicle Miles Traveled for Nash County

Road Type	2005	2008	2011	2014	2017
Nash County (Urban Area)					
Urban Interstate	28,247	30,657	33,151	35,811	38,471
Freeway & Expressway	330,360	345,909	357,667	361,842	366,017
Urban Other Principle Arterial	274,611	276,027	282,531	299,208	315,886
Urban Minor Arterial	409,499	446,313	482,286	518,816	544,787
Urban Collector	64,512	71,231	75,927	76,573	77,220
Urban Local	154,814	164,009	171,843	176,954	182,065
Rural Interstate	665,931	727,630	788,957	849,541	910,124
Rural Other Principal Arterial	192,431	201,176	213,157	231,610	250,063
Rural Minor Arterial	65,244	71,079	76,176	79,797	83,418
Rural Major Collector	234,282	258,890	288,777	329,220	369,663
Rural Minor Collector	232,475	257,734	283,053	308,488	333,924
Rural Local	106,788	116,191	124,523	130,714	136,906
Nash County (Rural Area)					
Urban Interstate	0	0	0	0	0
Freeway & Expressway	66,614	72,469	77,520	80,963	84,406
Urban Other Principle Arterial	121,678	133,472	143,458	149,830	156,202
Urban Minor Arterial	97,177	104,817	111,562	116,517	121,472
Urban Collector	27,528	29,613	31,469	32,867	34,265
Urban Local	28,464	30,002	31,493	32,891	34,290
Rural Interstate	318,891	335,398	351,609	367,226	382,843
Rural Other Principal Arterial	225,668	235,034	244,904	255,781	266,659
Rural Minor Arterial	37,454	40,839	43,744	45,686	47,629
Rural Major Collector	191,538	205,173	217,483	227,143	236,802
Rural Minor Collector	127,429	135,643	143,239	149,601	155,963
Rural Local	49,348	51,386	53,537	55,915	58,293

4.1.4 Off Model Calculations

Not all 100 counties in North Carolina have a motor vehicle emission inspection and maintenance (I/M) program to address mobile emissions. As a direct result, such a control measure must be evaluated based on commuting activities to account for the vehicles that are not subject to such a program traveling throughout the nonattainment area. A methodology was developed using accident data that is tracked by the NCDOT as a surrogate for commuting patterns. The accident data used in this analysis is for 2001. This methodology was approved by the USEPA and will be used in this analysis.

Edgecombe and Nash Counties were phased-into the North Carolina emission inspection program on January 1, 2005. The final counties were incorporated into the program on January

1, 2006 so the 2008, 2011, 2014, and 2017 runs will have the same I/M fraction. Table 4.1.4-1 summarizes the I/M fractions used to calculate the tons per day emissions for each of the counties being analyzed.

Table 4.1.4-1 I/M Fractions

County	2005	2008, 2011, 2014 and 2017
Edgecombe	0.46	0.89
Nash	0.47	0.86

The calculation of tons per day is as follows:

$$\text{Emissions} = \frac{[\text{I/M EF x I/M fraction x VMT}] + [\text{Non I/M EF x (1-I/M fraction) x VMT}]}{C}$$

Where:

I/M EF	=	all vehicle emission factor from M6.2 inspection and maintenance run output for each road type (grams/mile)
I/M fraction	=	calculated I/M fraction for the analysis year
VMT	=	daily vehicle miles traveled (miles/day)
Non I/M EF	=	all vehicle emission factor from M6.2 non-inspection and maintenance output for each road type
C	=	conversion factor from grams to tons = 907185 grams per ton

4.1.5 Estimated Emissions From Mobile Sources

Each road type will have a different emission, which is then summed for each county for each year evaluated. A summary of emissions in tons per day, by county, is provided in Tables 4.1.5-1 and 4.1.5-2 for VOC and NOx emissions, respectively.

Table 4.1.5-1 VOC Road Type Emissions by County (tons/day)

Road Type	2005	2008	2011	2014	2017
Edgecombe County					
Urban Freeway & Expressway	0.23	0.21	0.18	0.15	0.13
Urban Other Principle Arterial	0.13	0.11	0.09	0.08	0.06
Urban Minor Arterial	0.30	0.25	0.23	0.19	0.17
Urban Collector	0.05	0.03	0.03	0.02	0.02
Urban Local	0.17	0.14	0.13	0.10	0.08
Rural Other Principal Arterial	0.53	0.46	0.41	0.34	0.29
Rural Minor Arterial	0.13	0.11	0.10	0.08	0.07
Rural Major Collector	0.47	0.36	0.30	0.25	0.21
Rural Minor Collector	0.27	0.23	0.20	0.16	0.13
Rural Local	0.22	0.18	0.16	0.13	0.11
Total VOC for Edgecombe	**2.50**	**2.08**	**1.83**	**1.50**	**1.27**
Nash County					
Urban Interstate	0.04	0.03	0.03	0.02	0.02
Urban Freeway & Expressway	0.56	0.46	0.40	0.33	0.26
Urban Other Principle Arterial	0.63	0.51	0.44	0.34	0.31
Urban Minor Arterial	0.82	0.69	0.61	0.49	0.43
Urban Collector	0.16	0.13	0.11	0.08	0.07
Urban Local	0.31	0.25	0.21	0.17	0.14
Rural Interstate	1.24	1.05	0.94	1.23	0.68
Rural Other Principal Arterial	0.61	0.49	0.42	0.40	0.30
Rural Minor Arterial	0.16	0.13	0.11	0.10	0.08
Rural Major Collector	0.65	0.55	0.50	0.41	0.37
Rural Minor Collector	0.55	0.47	0.42	0.34	0.30
Rural Local	0.25	0.20	0.18	0.14	0.13
Total VOC for Nash	**5.98**	**4.96**	**4.37**	**4.05**	**3.09**

Table 4.1.5-2 NOx Road Type Emissions by County (tons/day)

Road Type	2005	2008	2011	2014	2017
Edgecombe County					
Urban Freeway & Expressway	0.44	0.37	0.29	0.20	0.16
Urban Other Principle Arterial	0.13	0.11	0.08	0.06	0.05
Urban Minor Arterial	0.27	0.23	0.19	0.15	0.12
Urban Collector	0.03	0.03	0.02	0.02	0.02
Urban Local	0.16	0.13	0.11	0.08	0.06
Rural Other Principal Arterial	1.03	0.85	0.67	0.50	0.39
Rural Minor Arterial	0.18	0.14	0.11	0.09	0.07
Rural Major Collector	0.55	0.41	0.31	0.24	0.19
Rural Minor Collector	0.32	0.26	0.20	0.15	0.12
Rural Local	0.25	0.20	0.16	0.13	0.09
Total NOx for Edgecombe	**3.36**	**2.73**	**2.14**	**1.62**	**1.27**
Nash County					
Urban Interstate	0.11	0.09	0.07	0.05	0.04
Freeway & Expressway	1.09	0.86	0.64	0.45	0.34
Urban Other Principle Arterial	0.68	0.53	0.41	0.31	0.25
Urban Minor Arterial	0.77	0.63	0.51	0.40	0.33
Urban Collector	0.13	0.11	0.09	0.07	0.06
Urban Local	0.29	0.23	0.18	0.14	0.11
Rural Interstate	5.92	4.76	3.57	2.49	1.86
Rural Other Principal Arterial	1.14	0.89	0.67	0.49	0.38
Rural Minor Arterial	0.21	0.18	0.14	0.11	0.08
Rural Major Collector	0.79	0.65	0.53	0.41	0.34
Rural Minor Collector	0.66	0.55	0.44	0.34	0.27
Rural Local	0.28	0.22	0.17	0.13	0.10
Total NOx for Nash	**12.07**	**9.70**	**7.42**	**5.39**	**4.16**

4.1.6 Motor Vehicle Emissions Budget for Conformity

Transportation Conformity

The purpose of transportation conformity is to ensure that Federal transportation actions occurring in a nonattainment areas does not hinder the area from maintaining the 8-hour ozone standard. This means that the level of emissions estimated by the NCDOT or the MPOs for the Transportation Implementation Plan and Long Range Transportation Plan must not exceed the MVEB as defined in this maintenance plan.

Highway Mobile Source VOC Insignificance

Section 93.109(k) in the Transportation Conformity Rule Amendments for the new 8-hour ozone and fine particulate matter NAAQS addresses areas with insignificant motor vehicle emissions. It reads:

> *Notwithstanding the other paragraphs in this section, an area is not required to satisfy a regional emissions analysis for §93.118 and/or §93.119 for a given pollutant/precursor and NAAQS, if EPA finds through the adequacy or approval process that a SIP demonstrates that regional motor vehicle emissions are an insignificant contributor to the air quality problem for that pollutant/precursor and NAAQS. The SIP would have to demonstrate that it would be unreasonable to expect that such an area would experience enough motor vehicle emissions growth in that pollutant/precursor for a NAAQS violation to occur.*

The rule suggests that such a finding would be based on a number of factors, including the percentage of motor vehicle emissions in the context of the total State Implementation Plan (SIP) inventory, the current state of air quality as determined by monitoring data for that NAAQS, the absence of SIP motor vehicle control measures, and historical trends and future projections of the growth of motor vehicle emissions.

The NCDAQ has examined the sources of VOC emissions and their contribution to ozone formation in North Carolina. Because of the generally warm and moist climate of North Carolina, vegetation abounds in many forms, and forested lands naturally cover much of the state. The biogenic sector is the most abundant source of VOCs in North Carolina and accounts for approximately 90% of the total VOCs statewide. The overwhelming abundance of biogenic VOCs makes the majority of North Carolina a NO_x limited environment for the formation of ozone. This holds true in Edgecombe and Nash Counties. Since biogenic emissions were not generated specifically for this maintenance plan, we used emission summaries from the NCDAQ's 2002 and 2009 modeling effort underway for the attainment demonstrations in other portions of North Carolina. Figures 4.1.6-1 through 4.1.6-4 provides the percent contributions from point, highway mobile, area, off-road mobile and biogenic sources to the total VOC emissions in Edgecombe and Nash Counties in 2002 and 2009, respectively.

Figure 4.1.6-1 Edgecombe County 2002 Daily Summertime VOC Emissions

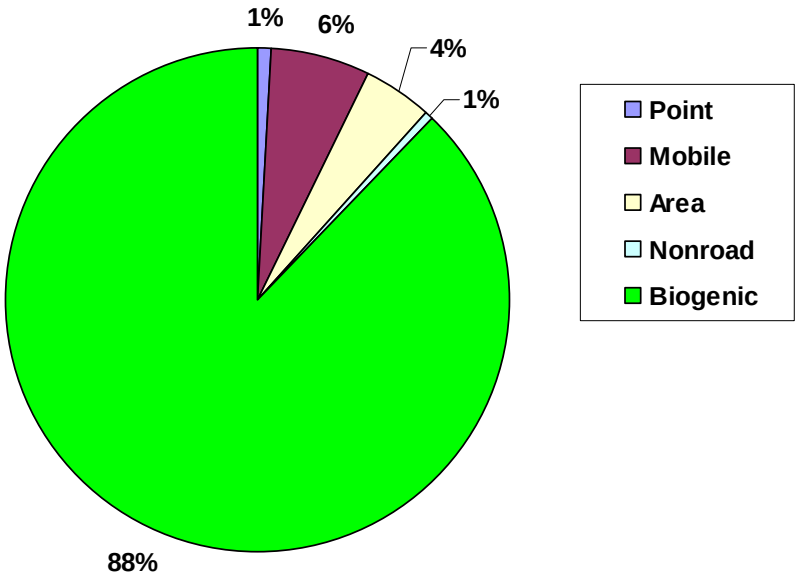


Figure 4.1.6-2 Edgecombe County 2009 Daily Summertime VOC Emissions

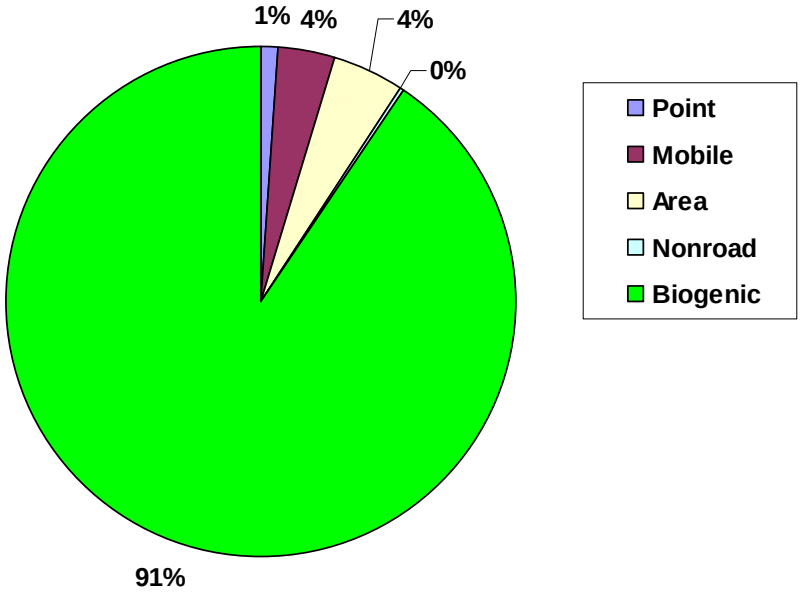


Figure 4.1.6-3 Nash County 2002 Daily Summertime VOC Emissions

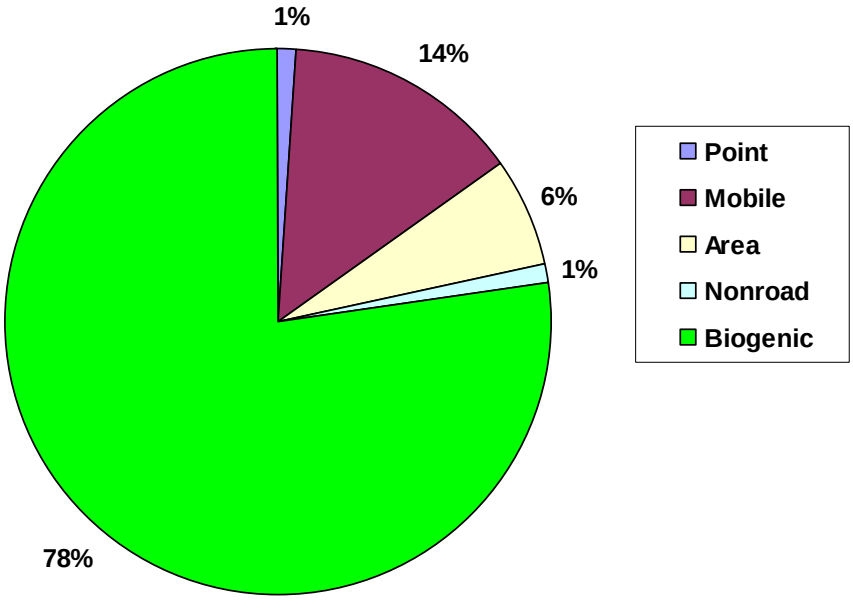
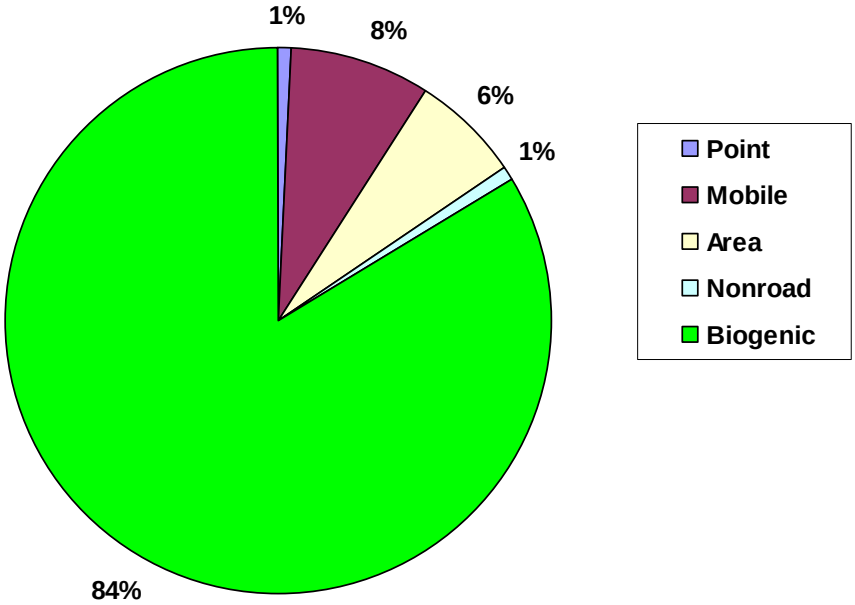


Figure 4.1.6-4 Nash County 2009 Daily Summertime VOC Emissions



In Edgecombe County, highway mobile sources contrbute only 6 and 4 percent of the 2002 and 2009 total VOC inventories, respectively. In Nash County, highway mobile sources contribue only 14 and 8 percent of the 2002 and 2009 total VOC inventories, respectively.

Also noteworthy are the projected decreases in highway mobile VOC emissions through the year 2017 despite projected VMT increases. These reductions are due mainly to the retirement of older vehicles and the growing fleet of Tier 2 vehicles on the roads in future years. Some additional reductions are attributable to North Carolina's I/M program in Edgecombe and Nash Counties. The VMT and VOC projections are summarized in Figures 4.1.6-5 and 4.1.6-6 below.

Figure 4.1.6-5 Edgecombe County VMT and VOC emissions growth

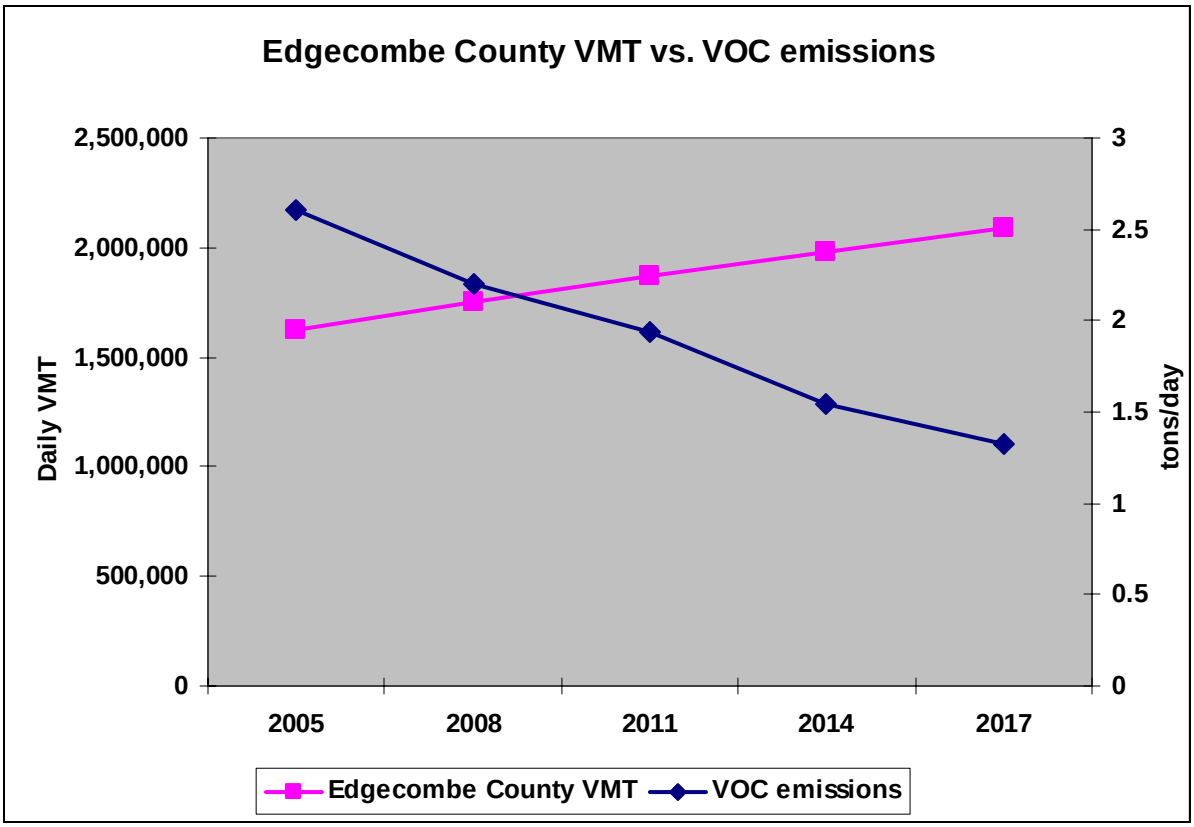
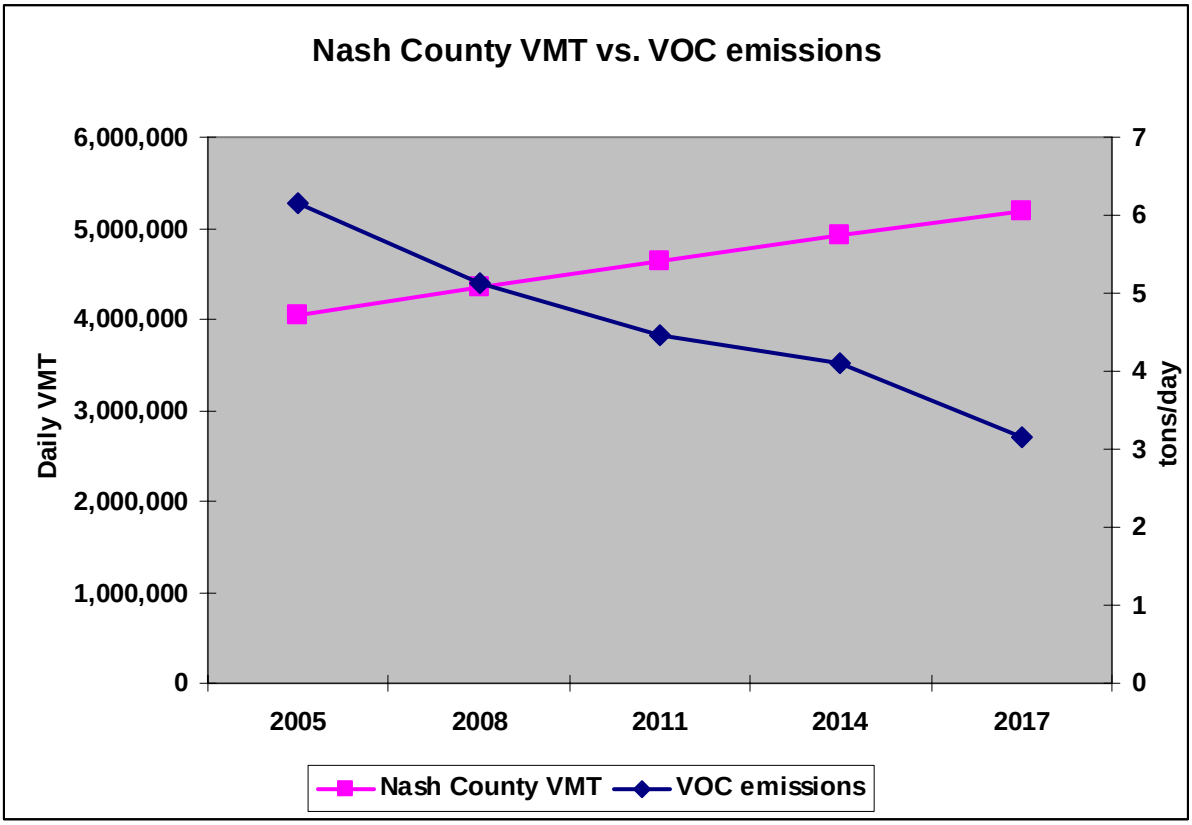


Figure 4.1.6-6 Nash County VMT and VOC emissions growth



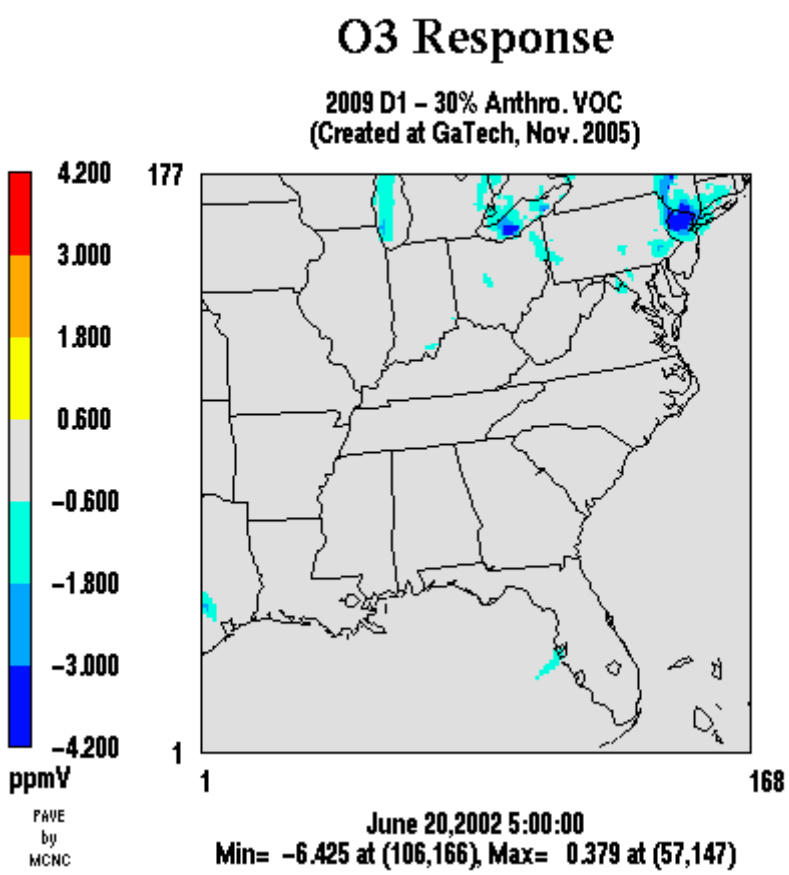
The current state of air quality in the Rocky Mount nonattainment area is steadily improving. The current ozone design value in the Rocky Mount nonattainment area is 0.079 parts per million (ppm) based on data from 2003-2005. This is well below the NAAQS of 0.084 ppm.

A recent modeling sensitivity test was performed by the Association for Southeastern Integrated Planning (ASIP) that allows an analysis of VOC contributions to ozone concentrations in the Southeastern United States. ASIP is a regional collaborative, set up by the Southeastern States Air Resource Managers, Inc. (SESARM), focused on the coordination of planning activities associated with the analysis of fine particulate matter and 8-hour ozone nonattainment areas and development of options for attaining and maintaining the NAAQS. One of the analyses conducted by ASIP is a series of emissions sensitivity modeling runs to quantify the contributions of various emission sources to ozone and fine particles. The modeling system used in this analysis consisted of 3 components: 1) the Penn State University/National Center for Atomospheric Research Mesoscale Model (MM5 version 3.6.1+), 2) the Sparse Matrix Operator Kernel Emissions Modeling System (SMOKE version 2.1), and 3) the Community Multiscale Air Quality (CMAQ version 4.4) model. Model configurations, input data, and modeling

methods are consistent with those suggested by USEPA in "Guidance on the Use of Models and Other Analyses in Attainment Demonstrations for the 8-hour Ozone NAAQS".

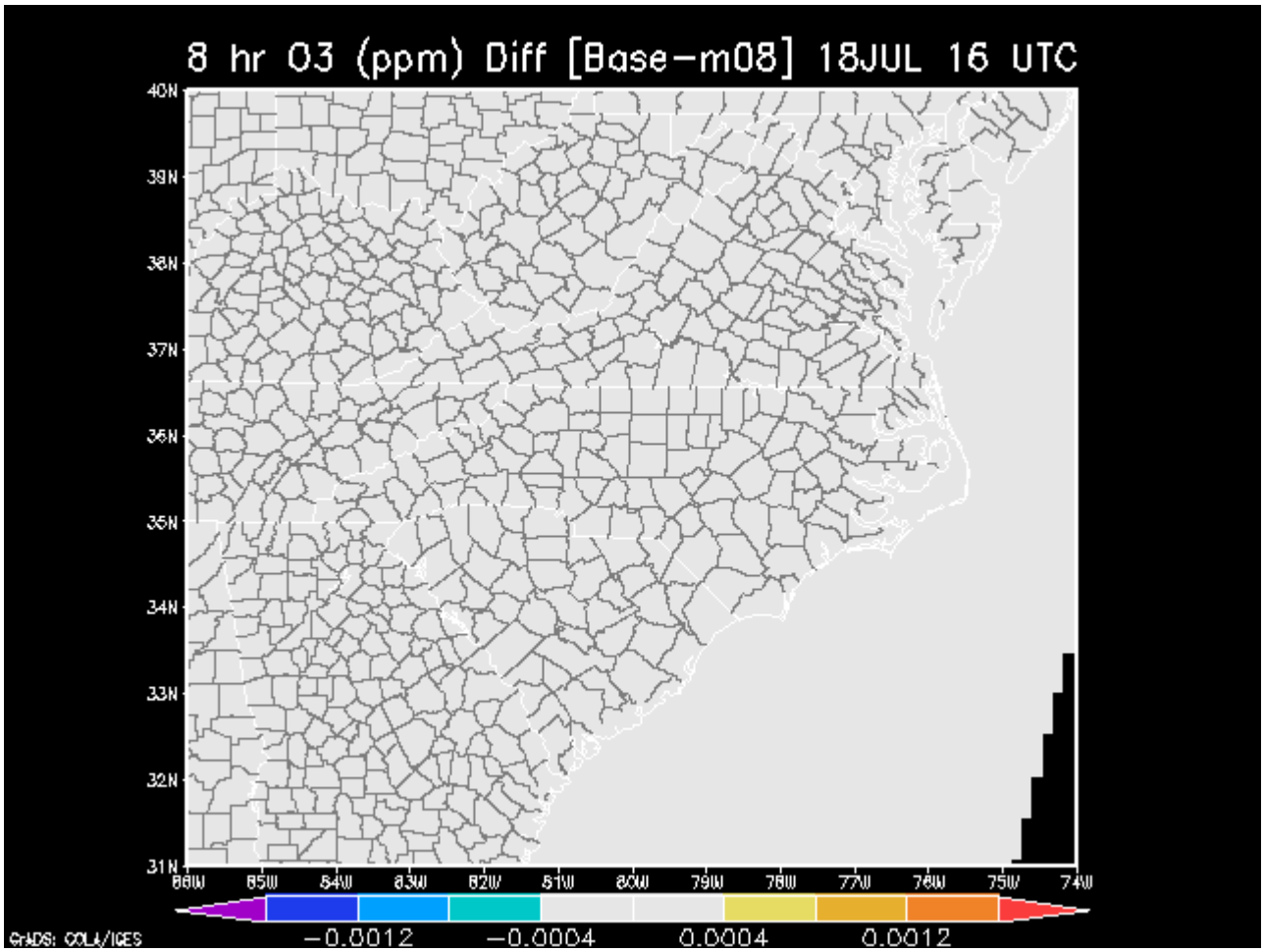
The emissions sensitivities are calculated by taking the difference between two air quality model simulations: one with base case emissions and another with reduced emissions inputs. The emissions sensitivity discussed here reduces *all* athropogenic VOCs in the modeling domain by 30% from 2009 emission levels. Translating this to the Edgecombe and Nash Counties emissions, this 30% athropogenic VOC reduction is equivalent to a 77% highway mobile VOC reduction in Edgecombe County in 2009 and a 60% highway mobile VOC reduction in Nash County in 2009. This emissions sensitivitiy was run for a 39 day period (June 1-July 9). In all 39 days of the modeling simulation, the 8-hour ozone maximum concentrations were unchanged in Edgecombe and Nash Counties – a clear indicator that highway mobile VOC is an insignificant contributor to ozone formation in that area. In fact, there was not an 8-hour ozone response as high as 1 ppb anywhere in North Carolina during the sensitivity simulation. Figure 4.1.6-7 provides an example from the 30% athropogenic VOC reduction modeling illustrating the lack of ozone response North Carolina.

Figure 4.1.6-7 8-hour Ozone response to 30% athropogenic VOC reductions in 2009



Additional mobile source sensitivity simulations have been conducted by the NCDAQ. These modeling runs focused specifically on the impact of mobile source VOC emissions on ozone. The first sensitivity reduced mobile source VOC by 50% in Edgecombe and Nash Counties as well as all of the counties in the Triangle ozone nonattainment area (Person, Granville, Orange, Durham, Chatham, Wake, Franklin, and Johnston Counties) in the year 2008. This emissions sensitivitiy was run for a 7 day period (July 13-19). In all 7 days of the modeling simulation, the 8-hour ozone maximum concentrations were unchanged in Edgecombe and Nash Counties (and all of North Carolina), a clear indicator that highway mobile VOC is an insignificant contributor to ozone formation in that area. Figure 4.1.6-8 provides an example of the lack of an 8-hour ozone response from the 50% mobile VOC reduction sensitivity modeling.

Figure 4.1.6-8 8-hour Ozone Response to 50% mobile VOC decrease in 2008



The second sensitivity conducted by the NCDAQ focused on a 50% increase of mobile source VOC in the same counties and over the same 7-day period mentioned above. The results were identical, no change in 8-hour ozone concentrations indicating highway mobile VOC is an insignificant contributor to ozone formation in the Rocky Mount area.

Based on the information discussed above, the NCDAQ steadfastly believes highway mobile VOCs are insignificant contributors to ozone formation in Edgecombe and Nash Counties. Emission estimates indicate highway mobile VOC is a small percentage of the total VOC emissions inventory. Highway mobile VOC emissions are projected to decrease into the future notwithstanding VMT increases. The area is currently well below the NAAQS and emission sensitivity modeling performed by ASIP and the NCDAQ indicates no change in future ozone concentrations when VOC emissions are significantly changed. Further, the NCDAQ considers it unreasonable to expect that Edgecombe and Nash Counties will experience enough motor vehicle emissions growth for a future ozone violation to occur. For these reasons, the NCDAQ will not be setting MVEB for VOC for the Rocky Mount area.

Safety Margin

A safety margin is the difference between the attainment level of emissions from all source categories (i.e., point, area, and mobile) and the projected level of emissions from all source categories. 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 source categories remains equal to or less than the attainment level of emissions.

The NCDAQ has decided to allocate safety margin to the MVEB to account for new emissions models, VMT projections models, as well as changes to future vehicle mix assumptions, etc. that influence the emission estimations. Since 2008 is a historic year, the NCDAQ decided to allocate the entire safety margin available to the MVEBs. For 2017, the NCDAQ estimated the amount needed to account for the current emission model and VMT projections model and then added an additional 21% to account for any future changes to the emission model, projection model and other input data.

Motor Vehicle Emission Budgets

The NCDAQ did not receive any comments regarding the geographic extent of the MVEB from any of the Rocky Mount transportation partners during the maintenance plan interagency consultation process. However, there was discussion through the interagency consultation process on the years to set MVEB for the Rocky Mount maintenance plan. According to Section 93.118 of the transportation conformity rule, a maintenance plan must establish a MVEB for the last year of the maintenance plan (in this case, 2017). Through the interagency consultation process, it was decided that another MVEB would be set for the year 2008 in the Rocky Mount maintenance plan.

The NCDAQ will set MVEB, for transportation conformity purposes, as county budgets within the Rocky Mount nonattainment area for 2008 and 2017. Tables 4.1.6-1 and 4.1.6-2 below list out the NOx MVEB, for transportation conformity purposes, by county for the years 2008 and 2017. Upon the USEPA's approval of these county-by-county sub-area MVEB, these MVEB will become the applicable MVEB for each county.

Table 4.1.6-1 Edgecombe County MVEB in kilograms per day

	2008	2017
NOx Emissions (kg/day)		
Base Emissions	2,483	1,143
Safety Margin Allocated to MVEB	1,674	1,108
NOx Conformity MVEB	**4,157**	**2,251**

Table 4.1.6-2 Nash County MVEB in kilograms per day

	2008	2017
NOx Emissions (kg/day)		
Base Emissions	8,790	3,767
Safety Margin Allocated to MVEB	1,655	2,374
NOx Conformity MVEB	**10,444**	**6,141**

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4.1.7 Speed and VMT provided in January 11, 2006 email from NCDOT

EDGECOMBE COUNTY				
Modeled Area				
Functional Class>Code	**2002**	**2010**	**2020**	**2030**
U-Inter>11	0	0	0	0
Frwy/Exway>12	96,183	132,442	145,217	181,269
U-OtherPrincipal>13	18,434	21,299	23,253	26,477
U-MinorArterial>14	95,164	112,033	150,093	178,359
Collector>15	14,935	17,097	18,254	19,974
U-Local>18	50,229	63,048	72,449	84,957
R-Inter>21	-	-	-	-
R-OtherPrincipal>23	130,368	195,824	249,218	321,288
R-MinorArterial>24	8,061	8,455	9,395	10,339
MajorCollector>26	106,438	85,241	106,833	137,766
MinorCollector>27	60,680	66,977	75,900	100,975
R-Local>28	71,333	87,077	97,925	111,287
Total from Model	**651,825**	**789,495**	**948,535**	**1,172,690**
Rural spreadsheet Portion	851,465	1,042,781	1,249,659	1,456,538
County total	**1,503,290**	**1,832,275**	**2,198,194**	**2,629,229**
County total from Universe file	**1,548,100**	**1,895,942**	**2,272,058**	**2,648,173**
	2002	**2010**	**2020**	**2030**
Rural VMT(Outside MPO)				
Urban Interstate	0.0	0.0	0.0	0.0
Urban Other Freeway	44,399.5	67,744	81,184	94,624
Urban Other PA	53,540.0	65,312	78,270	91,227
Urban Minor Arterial	72,580.5	101,020	121,062	141,103
Urban Collector	8,768.0	11,533	13,822	16,110
Urban Local	40,677.5	50,167	60,120	70,072
Rural Functional Classes				
Rural Interstate	0.0	0.0	-	-
Rural Other PA	196,647.0	235,449	282,160	328,871
Rural Minor Arterial	73,139.0	90,089	107,962	125,834
Rural Major Collector	197,092.5	217,920	261,154	304,387
Rural Minor Collector	104,681.5	131,202	157,232	183,261
Rural Local	59,939.0	72,343	86,695	101,048
Total	**851,464.50**	**1,042,781**	**1,249,659**	**1,456,538**

Edgecombe County	2005	2008, 2011 & 2014	2017		
Year	2002	2010	2020	2030	
Urban Functional Classification					
Interstate	0	0	0	0	
Freeway	65	65	65	65	
Other P-A	35	35	35	35	
Minor Arterial	41	42	42	42	
Collector	40	40	40	40	
Local	37	38	38	38	
Rural Functional Classification					
Interstate	0	0	0	0	
Other P-A	65	65	65	65	
Minor Arterial	51	51	52	53	
Major Collector	53	53	53	58	
Minor Collector	52	52	52	52	
Local	47	47	47	48	
Rural Speeds for Edgecomb County			2008 & 2011	2014 and 2017	
	2002	2005	2010	2020	2030
Urban Interstate	0	0	0	0	0
Other Freeway & Expressway	55	56	55	55	55
Other Principle Arterial	28	29	29	29	28
Minor Arterial	31	32	32	32	31
Urban Collector	31	31	31	31	31
Urban Local	28	30	30	29	28
Rural Interstate	0	0	0	0	0
Other PA	45	45	45	45	45
Minor Arterial	44	44	44	44	44
Rural Major Collector	43	43	43	43	43
Rural Minor Collector	42	42	42	42	42
Rural Local	42	42	42	42	42

NASH COUNTY				
Modeled Area				
Functional Class>Code	**2002**	**2010**	**2020**	**2030**
No Functional Class>0				
U-Inter>11	25,837	32,264	41,131	54,594
Frwy/Exway>12	314,810	356,275	370,192	482,062
U-OtherPrincipal>13	273,194	276,972	332,563	405,190
U-MinorArterial>14	372,685	470,856	590,758	699,255
Collector>15	57,793	75,711	77,867	95,041
U-Local>18	145,619	170,139	187,176	221,480
R-Inter>21	604,232	768,762	970,708	1,272,578
R-OtherPrincipal>23	183,686	207,006	268,516	364,092
R-MinorArterial>24	59,409	74,969	87,039	103,279
MajorCollector>26	209,675	275,296	410,106	552,903
MinorCollector>27	207,215	274,574	359,359	464,709
R-Local>28	97,386	122,459	143,097	190,190
	2,551,542	3,105,283	3,838,513	4,905,373
Rural part	1,209,732	1,428,551	1,643,229	1,857,906
Sum from model and rural spreadshe	**3,761,274**	**4,533,835**	**5,481,742**	**6,763,279**
County total from Universe file	**3,486,300**	**4,116,843**	**4,735,493**	**5,354,144**

	2002	**2010**	**2020**	**2030**
Rural VMT(Outside MPO)				
Urban Interstate	0.0	0.0	0.0	0.0
Urban Other Freeway	60,759.7	76,372	87,849	99,326
Urban Other PA	109,884.5	141,334	162,574	183,813
Urban Minor Arterial	89,536.4	109,910	126,427	142,944
Urban Collector	25,442.0	31,004	35,663	40,322
Urban Local	26,927.2	31,026	35,689	40,351
Rural Functional Classes				
Rural Interstate	302,382.7	346,403.6	398,460	450,516
Rural Other PA	216,302.5	241,278	277,536	313,795
Rural Minor Arterial	34,068.5	43,096	49,572	56,048
Rural Major Collector	177,903.4	214,263	246,462	278,661
Rural Minor Collector	119,215.3	141,119	162,325	183,532
Rural Local	47,310.0	52,745	60,671	68,597
Total	**1,209,732.22**	**1,428,551**	**1,643,229**	**1,857,906**

Model Speed for Urban area (MPO covered by TDM)					
NASH County	2005	2008, 2011 & 2014	2017		
Year	2002	2010	2020	2030	
Urban Functional Classification					
Interstate	65	65	65	65	
Freeway	65	65	65	65	
Other P-A	46	45	45	44	
Minor Arterial	44	44	44	45	
Collector	39	39	40	40	
Local	34	34	35	35	
Rural Functional Classification					
Interstate	65	65	65	65	
Other P-A	60	61	61	61	
Minor Arterial	53	53	53	53	
Major Collector	52	52	52	52	
Minor Collector	50	50	50	51	
Local	41	42	42	42	
Rural Speeds for Nash County			2008 & 2011	2014 and 2017	
	2002	2005	2010	2020	2030
Urban Interstate	0	0	0	0	0
Other Freeway & Expressway	55	56	56	56	56
Other Principle Arterial	28	29	29	29	29
Minor Arterial	31	32	32	32	32
Urban Collector	31	31	31	31	31
Urban Local	26	30	30	30	30
Rural Interstate	65	66	66	65	65
Other PA	47	47	47	47	47
Minor Arterial	43	44	44	44	44
Rural Major Collector	43	43	43	43	43
Rural Minor Collector	42	42	42	42	42
Rural Local	42	42	42	42	42

4.2 NON-HIGHWAY MOBILE SOURCES

Off-road 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. All but the aircraft engine and railroad locomotive emissions are estimated using the USEPA off-road mobile model NONROAD2005a, which was released February 10, 2006. The emissions from aircraft engines are estimated using the FAA model EDMS and the emissions from railroad locomotives are estimated in a more traditional way of using activity levels and emission factors. The methodology used to calculate the emissions from these off-road mobile sources are described in detail in the subsections that follow. Table 4.2-1 summarize the total VOC and NOx emissions from all off-road mobile source categories.

Table 4.2-1 Off-Road Mobile Source VOC Emissions by County

County	2005	2008	2011	2014	2017
VOC Emissions					
Edgecombe	0.95	0.78	0.70	0.68	0.65
Nash	1.39	1.17	1.07	1.05	1.08
Total	2.34	1.95	1.77	1.73	1.73
NOx Emissions					
Edgecombe	2.35	2.10	1.82	1.60	1.40
Nash	2.10	1.90	1.69	1.48	1.29
Total	4.45	4.00	3.51	3.08	2.69

4.2.1 NONROAD Model Mobile Sources

The nonroad mobile source category includes a diverse collection of equipment such as lawn mowers, chain saws, tractors, all terrain vehicles, fork lifts and construction equipment. The USEPA included more than 80 different types of equipment in the NONROAD2005a model. To facilitate analysis and reporting, the USEPA grouped the equipment types into ten equipment categories. These include:

Agricultural equipment	Lawn and garden equipment
Airport ground support equipment	Logging equipment
Commercial equipment	Railroad maintenance equipment
Construction equipment	Recreational marine equipment
Industrial equipment	Recreational equipment

Additionally, the emissions are broken out by five different engine types. These include: 2-stroke and 4-stroke spark engines, diesel engines, liquid propane gas and compressed natural gas fueled engines.

The NONROAD2005a model version was used to estimate emissions for the 8-hour ozone maintenance plan. This latest version of the model was released to the public on February 10, 2006.

NONROAD2005a is the latest final release of the USEPA NONROAD model that was first released in June 2000, and incorporates many revisions to improve the model's predictive ability. The final version of the model also incorporates all the USEPA final nonroad engine emission standards, including the recreational and large spark-ingintion engines rules that were published in the Federal Register in November 2002. Although this model is considered to be a final model, an updated version is planned that may incorporate revised inputs for the small spark iginition (SI) (<19 kW) and recreational marine SI categories in conjunction with additional promulgated nonroad engine standards.

One of the default input files was edited to reflect North Carolina specific information. In the "SEASON.DAT" file, the region representative of North Carolina was changed from Mid-Atlantic to Southeast. A copy of the revised seasonality input data file is in Section 5.

The options files used in the NONROAD2005a model were tailored to reflect North Carolina specific information also. Copies of the options input files are in Section 5. Default data was used for the remaining input files used in the NONROAD model.

For reporting purposes, the resulting emissions from the NONROAD2005a model were totaled for each equipment category by county. The model generates VOC and NOx emissions directly. The results for most of the equipment categories by county indicate a reduction in emissions with time into the out-years. These reduced emisson projections are influenced by several factors, including expected future changes in emission factors and activity levels. These future emission factors and activity levels are accounted for in the model.

Future changes in emission factors are primarily the result of future regulations. With the latest final version of the model, the USEPA has incorporated the final nonroad engine emission standards, including the recreational and large spark-ingintion engines rules that were published in the Federal Register in November 2002. Future changes in activity levels are the result of estimated engine populations, which are based on growth rates and scrappage functions of the equipment.

The summary of these results are tabulated in Tables 4.2.1-1 through 4.2.1-10. In Table 4.2.1-11 summaries of the NONROAD model categories emissions for each county within the nonattainment area.

Table 4.2.1-1 Agricultural Equipment Emissions by County

County	2005	2008	2011	2014	2017
VOC Emissions					
Edgecombe	0.08	0.07	0.06	0.05	0.04
Nash	0.07	0.06	0.05	0.04	0.04
Total	0.15	0.13	0.11	0.09	0.08
NOx Emissions					
Edgecombe	0.59	0.55	0.50	0.44	0.37
Nash	0.53	0.49	0.45	0.39	0.33
Total	1.12	1.04	0.95	0.83	0.70

Table 4.2.1-2 Airport Ground Support Equipment Emissions by County

County	2005	2008	2011	2014	2017
VOC Emissions					
Edgecombe	0.0000	0.0000	0.0000	0.0000	0.0000
Nash	0.0008	0.0007	0.0005	0.0005	0.0004
Total	0.001	0.001	0.001	0.001	0.000
NOx Emissions					
Edgecombe	0.0000	0.0000	0.0000	0.0000	0.0000
Nash	0.0079	0.0074	0.0060	0.0050	0.0038
Total	0.008	0.007	0.006	0.005	0.004

Table 4.2.1-3 Commercial Equipment Emissions by County

County	2005	2008	2011	2014	2017
VOC Emissions					
Edgecombe	0.05	0.05	0.04	0.05	0.05
Nash	0.18	0.16	0.15	0.16	0.17
Total	0.23	0.21	0.19	0.21	0.22
NOx Emissions					
Edgecombe	0.03	0.03	0.03	0.03	0.02
Nash	0.10	0.10	0.09	0.09	0.08
Total	0.13	0.13	0.12	0.12	0.10

Table 4.2.1-4 Construction Equipment Emissions by County

County	2005	2008	2011	2014	2017
VOC Emissions					
Edgecombe	0.03	0.02	0.02	0.02	0.01
Nash	0.08	0.06	0.06	0.05	0.04
Total	0.11	0.08	0.08	0.07	0.05
NOx Emissions					
Edgecombe	0.15	0.14	0.12	0.10	0.08
Nash	0.47	0.43	0.38	0.31	0.23
Total	0.62	0.57	0.50	0.41	0.31

Table 4.2.1-5 Industrial Equipment Emissions by County

County	2005	2008	2011	2014	2017
VOC Emissions					
Edgecombe	0.13	0.09	0.06	0.03	0.02
Nash	0.05	0.04	0.02	0.01	0.01
Total	0.18	0.13	0.08	0.04	0.03
NOx Emissions					
Edgecombe	0.53	0.40	0.27	0.17	0.12
Nash	0.23	0.18	0.13	0.09	0.07
Total	0.76	0.58	0.40	0.26	0.19

Table 4.2.1-6 Lawn and Garden Equipment Emissions by County

County	2005	2008	2011	2014	2017
VOC Emissions					
Edgecombe	0.55	0.45	0.42	0.43	0.44
Nash	0.87	0.72	0.67	0.68	0.70
Total	1.42	1.17	1.09	1.11	1.14
NOx Emissions					
Edgecombe	0.07	0.07	0.06	0.06	0.06
Nash	0.11	0.11	0.10	0.10	0.10
Total	0.18	0.18	0.16	0.16	0.16

Table 4.2.1-7 Logging Equipment Emissions by County

County	2005	2008	2011	2014	2017
VOC Emissions					
Edgecombe	0.01	0.01	0.01	0.01	0.01
Nash	0.02	0.02	0.02	0.02	0.02
Total	0.03	0.03	0.03	0.03	0.03
NOx Emissions					
Edgecombe	0.02	0.02	0.01	0.01	0.00
Nash	0.04	0.03	0.02	0.01	0.01
Total	0.06	0.05	0.03	0.02	0.01

Table 4.2.1-8 Railroad Maintenance Equipment Emissions by County

County	2005	2008	2011	2014	2017
VOC Emissions					
Edgecombe	0.0004	0.0005	0.0005	0.0005	0.0006
Nash	0.0007	0.0008	0.0008	0.0009	0.0010
Total	0.001	0.001	0.001	0.001	0.002
NOx Emissions					
Edgecombe	0.0019	0.0020	0.0021	0.0023	0.0025
Nash	0.0031	0.0033	0.0035	0.0038	0.0041
Total	0.005	0.005	0.006	0.006	0.007

Table 4.2.1-9 Recreational Equipment Emissions by County

County	2005	2008	2011	2014	2017
VOC Emissions					
Edgecombe	0.01	0.01	0.02	0.02	0.02
Nash	0.02	0.02	0.02	0.02	0.02
Total	0.03	0.03	0.04	0.04	0.04
NOx Emissions					
Edgecombe	0.003	0.003	0.003	0.003	0.004
Nash	0.004	0.004	0.004	0.004	0.004
Total	0.01	0.01	0.01	0.01	0.01

Table 4.2.1-10 Recreational Marine Equipment Emissions by County

County	2005	2008	2011	2014	2017
VOC Emissions					
Edgecombe	0.05	0.05	0.04	0.04	0.03
Nash	0.08	0.07	0.06	0.05	0.05
Total	0.13	0.12	0.10	0.09	0.08
NOx Emissions					
Edgecombe	0.00	0.00	0.01	0.01	0.01
Nash	0.01	0.01	0.01	0.01	0.01
Total	0.01	0.01	0.02	0.02	0.02

Table 4.2.1-11 Total NONROAD2005a Model Engine Emissions by County

County	2005	2008	2011	2014	2017
VOC Emissions					
Edgecombe	0.91	0.75	0.67	0.65	0.62
Nash	1.37	1.15	1.05	1.03	1.05
Total	2.28	1.90	1.72	1.68	1.67
NOx Emissions					
Edgecombe	1.39	1.22	1.01	0.83	0.67
Nash	1.51	1.36	1.19	1.01	0.84
Total	2.90	2.58	2.20	1.84	1.51

4.2.2 Aircraft Engines

Aircraft engines, like other engines, emit pollutants whenever the engines are in operation. However, the only emissions that are of concern for this inventory are the portion of the operation that occurs below the mixing layer. This is because the emissions tend to disperse whenever the aircraft is above the mixing layer and therefore has little or no effect on ground level ozone.

The aircraft operations of interest are termed the landing and takeoff (LTO) cycle. The cycle begins when the aircraft approaches the airport, descending below the mixing layer, lands and taxis to the gate. It continues as the aircraft idles at the gate and then taxis back out to the runway for the subsequent takeoff and climbout as it heads back to cruising altitudes, above the mixing layer.

Aircrafts can be categorized by use into four classifications: commercial, air taxis, general aviation and military. Commercial aircraft include those used for scheduled service transporting passengers, freight or both. Air taxis, or commuter aircraft, also fly scheduled service carrying passengers and/or freight but usually are smaller aircraft and operate on a more limited basis than commercial carriers. General aviation include all other non-military aircraft used for recreational flying, personal transportation, and various other activities. Military aircraft cover a wide range of sizes, uses and operating missions. The military aircraft are treated as a separate classification since the LTO operations reported at the airports group all military aircraft together.

Base year 2005 emissions for aircraft engines were projected from the 2002 Base F emissions inventory prepared for the southeast regional haze planning organization Visibility Improvement State and Tribal Association of the Southeast (VISTAS). The projection from 2002 to 2005 was made using growth factors generated from the Economic Growth Analysis System Version 5.0 Beta (E-GAS 5.0).

For 2002 aircraft emissions, VISTAS used 1999 emission estimates developed for the USEPA's 1999 National Emission Inventory (NEI) Version 2 as base year estimates for the VISTAS region. VISTAS then projected the revised 1999 inventory to 2002 using surrogate growth indicators. For the aircraft category, 1999 and 2002 approach operations by airport and aircraft type were compiled by VISTAS from the Federal Aviation Administration's Air Traffic Activity Data System (ATADS).The airport-level LTOs were assigned to counties and summed for the county. For counties with aircraft emissions without a county match in ATADS, state-average growth factors were calculated and applied.

Table 4.2.2-1 summarizes the VOC and NOx emissions for aircraft engines.

Table 4.2.2-1 Aircraft Engine Emissions by County

County	2005	2008	2011	2014	2017
VOC Emissions					
Edgecombe	0.0012	0.0013	0.0015	0.0016	0.0017
Nash	0.0036	0.0040	0.0044	0.0048	0.0051
Total	0.005	0.005	0.006	0.006	0.007
NOx Emissions					
Edgecombe	0.0002	0.0002	0.0002	0.0002	0.0002
Nash	0.0005	0.0005	0.0006	0.0006	0.0007
Total	0.001	0.001	0.001	0.001	0.001

4.2.3 Railroad Locomotives

Railroads are categorized by size (Class I, Class 2) and passenger service (Amtrak and NCDOT Rail Division). Class I railroads are long haul operations, consisting of Norfolk Southern Corporation and CSX Corporation. Class II and Class III railroads are short lines, serving localized markets. Passenger service is provided by Amtrak and the NCDOT Rail Division. These entities lease trackage from Class I railroads. Base year 2005 emissions for railroad locomotive engines were projected from the 2002 VISTAS Base F emissions inventory. The projection from 2002 to 2005 was made using growth factors generated from the E-GAS 5.0.

For 2002 railroad locomotive engine emissions, VISTAS used 1999 emission estimates developed for the USEPA's 1999 NEI Version 2 as base year estimates for the VISTAS region. Projected emissions for 2002 were developed in two steps as described below. For 1999 to 2001, State-level rail fuel consumption was obtained from the Department of Energy, Energy Information Administration's (EIA's) *Fuel Oil and Kerosene Sales.* For 2001 to 2002, VISTAS applied national growth factors developed from fuel consumption projections in EIA's *Annual Energy Outlook.* A growth factor of 1.4 was used for locomotives and applied to 1999 emissions to first develop 2001 emissions. Table 4.2.3.1 lists the growth factors used to generate 2002 emissions.

Table 4.2.3-1 2002 National Rail Transportation Energy Use by Fuel Type (Trillion BTU)

	2001	2002	Growth Factor (GF)
Intercity Rail (Electric)	10.17	10.40	1.0226
Intercity Rail (Diesel)	16.60	16.88	1.0169
Transit Rail (Electric)	46.36	47.40	1.0224
Intercity/Transit Rail Average (SCC 2285002008)			**1.0206**
Commuter Rail (Electric)	16.13	16.49	1.0223
Commuter Rail (Diesel)	26.31	26.76	1.0171
Commuter Rail Average (SCC 2285002009)			**1.0197**
Freight Rail (Distillate) (SCCs 2285002000, 2285002005, 2285002006, 2285002007, 2285002010)	512.81	492.32	0.9600

Source: Department of Energy, Energy Information Administration, Annual Energy Outlook 2003: Table 34. Transportation Sector Energy Use by Fuel Type Within a Mode

The summary of emissions from all railroad locomotives in each county are in Table 4.2.3-2.

Table 4.2.3-2 Railroad Locomotive Engine Emissions by County

County	2005	2008	2011	2014	2017
VOC Emissions					
Edgecombe	0.04	0.03	0.03	0.03	0.03
Nash	0.02	0.02	0.02	0.02	0.02
Total	0.06	0.05	0.05	0.05	0.05
NOx Emissions					
Edgecombe	0.96	0.88	0.81	0.77	0.73
Nash	0.59	0.54	0.50	0.47	0.45
Total	1.55	1.42	1.31	1.24	1.18