Appendix B

Emission Inventory Documentation

Appendix B.1

Point Source Emissions Inventory Documentation

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1.0 INTRODUCTION AND SCOPE

The point source inventory consists of emissions from individual facilities. Primarily, these are industrial or commercial facilities that must have permits issued by the North Carolina Division of Air Quality (NCDAQ) and the Mecklenburg County Air Quality (MACQ).

Although both the State and County agencies inventory all the criteria pollutants and a large number of toxic pollutants, only the nitrogen oxides (NOx) and volatile organic compounds (VOC) are reported here since they are the precursor pollutants for ozone formation. The emissions in this report are for 2010 (the base year), 2013, 2016, 2019, 2022, and 2025.

The point source inventories detailed in this document are for the North Carolina portion of the Charlotte-Gastonia –Rock Hill 1997 8-hour ozone nonattainment area, referred to as the Metrolina nonattainment area. The Metrolina nonattainment area includes the North Carolina counties of Cabarrus, Gaston, Lincoln, Mecklenburg, Rowan, and Union; Coddle Creek and Davidson Townships in Iredell County, North Carolina; and the rock Hill Metropolitan Planning Organization boundary in York County, South Carolina. All emissions are calculated on a ton per summer day basis.

The South Carolina Department of Health and Environmental Control (SCDHEC) developed a maintenance plan for the South Carolina Portion of the nonattainment area. A copy of the SCDEEC redesignation demonstration and maintenance plan is available upon request.

2.0 OVERALL METHODOLOGY

Permitted sources of emissions are required to periodically submit their emissions inventory to either NCDAQ or MCAQ. All large permitted sources are required to report emissions annually. Smaller permitted sources are required to submit an emissions inventory every five years. Additionally, the U.S. Environmental Protection Agency (USEPA) requires the NCDAQ and the MCAQ to submit emissions data for large stationary point sources to them on an annual basis. The latest year available for the point source inventory submitted to the USEPA is 2009. For the smaller sources that report emissions every five years, the most recent emissions inventory available was used and was assumed to be equivalent to 2009 emissions since these smaller sources' emissions do not vary much from year to year. For the sources that report to the USEPA's Clean Air Markets Division (CAMD), the actual 2010 average summer day emissions were used. The 2009 emissions were projected to 2010, a year that falls within the attaining design value period of 2008-2010, and then to future years 2013, 2016, 2019, 2022, and 2025 using the USEPA's EGAS model. The emissions data upon which this document is based were from files maintained by the NCDAQ and the MCAQ.

2.1 SOURCE IDENTIFICATION

All facilities required to have permits to operate sources of air pollution are known and are required to submit emission inventories.

2.2 EMISSION ESTIMATION APPROACH

The documentation of emission estimates used for emission inventories is a very important aspect of the inventory. The documentation is used as basis for quality assurance and verification of the validity of information submitted on NCDAQ forms or via internet based data system. NCDAQ documentation titled "Uniform Policy and Documentation Standards for Emission Estimates" is provided to reporting facilities and NCDAQ inventory reviewers as a guide to support quality inventory development efforts.

The emission inventory information reported to the NCDAQ and the local county air quality agencies was transferred to a state developed emissions inventory program that helps ensure required data elements are not omitted. It also performs some calculations, thereby minimizing the occurrence of errors. Depending on the particular process and facility, emissions may be calculated by various means. In many cases, emissions are estimated using emission factors published in the USEPA's AP-42, Compilation of Air Pollutant Emission Factors. In a few cases, site-specific emission factors may be used. Sometimes, a mass balance calculation can be employed. In some cases, there is direct continuous monitoring of emissions that are reported.

Emissions reported to and maintained by the NCDAQ or the MACQ are annual emissions. A variety of detailed operating data, source configuration, and other process parameters are also reported according to NCDAQ reporting guidelines. This operational data is used to estimate the average summer weekday emissions. NCDAQ provides specific instructions and guidelines for submitting emissions data to the agency via its website.

A number of facilities changed their permit status to inactive in calendar year 2009. These facilities were included in the Metrolina baseline inventory and their emissions were projected to 2025. This was to allow for any facilities that quit operating during the economic downturn to become active again without affecting the Metrolina SIP inventory. Planned utility plant closings were still removed, however. Table 2.2-1 lists all the Metrolina facilities that were listed as inactive in 2009 and their associated NOx and VOC emissions.

Table 2.2-1 NO_X and VOC Emissions from Metrolina Inactive Facilities (tons/day)

NOx Emissions (tons/day) from Inactive Facilities								
Facility name	**County**	**SIC**	**2010**	**2013**	**2016**	**2019**	**2022**	**2025**
Coddle Creek WTP ** INACTIVE **	Cabarrus	4931	0.01	0.01	0.01	0.01	0.01	0.01
Fieldcrest Cannon Plant #1 ** INACTIVE **	Cabarrus	2211	0.00	0.00	0.00	0.01	0.01	0.01
Gelder Thompson Asphalt Plant - Midland ** INACTIVE **	Cabarrus	2951	0.01	0.01	0.01	0.01	0.01	0.01
Kannapolis Energy Partners LLC-Kannapolis ** INACTIVE **	Cabarrus	4961	1.05	1.14	1.21	1.29	1.36	1.44
City of Gastonia - Duhart Creek Pump Station ** INACTIVE **	Gaston	4941	0.00	0.00	0.00	0.01	0.01	0.01
Eagle Mountain Finishing LLC ** INACTIVE **	Gaston	2231	0.06	0.06	0.07	0.08	0.08	0.09
Fleischmanns Yeast Inc **Inactive**	Gaston	2099	0.01	0.01	0.01	0.01	0.01	0.01
Gastonia Water Treatment Plant ** INACTIVE **	Gaston	4941	0.01	0.01	0.01	0.01	0.02	0.02
RADICISPANDEX Corporation ** INACTIVE **	Gaston	2824	0.12	0.13	0.15	0.16	0.17	0.19
Rea Contracting, LLC 075 Bessemer City Plant ** INACTIVE **	Gaston	2951	0.01	0.01	0.02	0.02	0.02	0.02
Yorkshire Americas, Inc. ** INACTIVE **	Gaston	2865	0.01	0.02	0.02	0.02	0.02	0.02
Matsushita Compressor Corp **Inactive**	Iredell	3639	0.01	0.01	0.01	0.01	0.01	0.01
La-Z-Boy Chair - Burris Division ** INACTIVE **	Lincoln	2512	0.02	0.03	0.03	0.04	0.04	0.04
Bloomsburg Mills, Inc. ** INACTIVE **	Union	2269	0.02	0.02	0.02	0.03	0.03	0.03
Boggs Paving, Inc. ** INACTIVE **	Union	2951	0.02	0.02	0.02	0.03	0.03	0.03
Brooks Food Group - Monroe Plant ** INACTIVE **	Union	2015	0.03	0.03	0.03	0.03	0.03	0.03
Genwove US Ltd ** INACTIVE **	Union	2435	0.03	0.03	0.03	0.03	0.03	0.03
Total NO_X Emissions			**1.41**	**1.54**	**1.65**	**1.76**	**1.87**	**1.99**
VOC Emissions (tons/day) from Inactive Facilities								
Facility name	**County**	**SIC**	**2010**	**2013**	**2016**	**2019**	**2022**	**2025**
Young Cleaners ** INACTIVE **	Cabarrus	7219	0.00	0.01	0.01	0.01	0.01	0.01
DNP IMS America Corporation ** INACTIVE **	Cabarrus	3955	0.00	0.01	0.01	0.01	0.01	0.01
Pass & Seymour/legrand ** INACTIVE **	Cabarrus	3644	0.04	0.05	0.05	0.05	0.06	0.06
Fieldcrest Cannon Plant #1 ** INACTIVE *	Cabarrus	2211	0.13	0.14	0.16	0.17	0.18	0.20
Rea Contracting, LLC 075 Bessemer City Plant ** INACTIVE **	Gaston	2951	0.01	0.01	0.01	0.01	0.01	0.01
Metso Minerals, Inc. ** INACTIVE **	Gaston	3429	0.03	0.03	0.03	0.04	0.04	0.04
Affinia Group, Inc., Wix Filtration Corp. - D ** INACTIVE **	Gaston	3714	0.03	0.04	0.04	0.04	0.04	0.05

Facility name	County	SIC	2010	2013	2016	2019	2022	2025
United Memorial Bible Services Inc ** INACTIVE **	Gaston	2499	0.04	0.04	0.04	0.05	0.05	0.05
Fleischmanns Yeast Inc **Inactive**	Gaston	2099	0.07	0.07	0.08	0.08	0.08	0.08
RADICISPANDEX Corporation ** INACTIVE *	Gaston	2824	0.58	0.64	0.71	0.77	0.84	0.92
Matsushita Compressor Corp **Inactive**	Iredell	3639	0.01	0.01	0.01	0.01	0.01	0.02
La-Z-Boy Chair - Burris Division ** INACTIVE	Lincoln	4911	0.01	0.01	0.01	0.01	0.01	0.01
Robert Bosch Tool Corporation ** INACTIVE **	Lincoln	3425	0.03	0.03	0.03	0.04	0.04	0.04
B R Lee Industries, Inc. ** INACTIVE **	Lincoln	3537	0.04	0.04	0.04	0.05	0.05	0.05
Cochrane Furniture Divisions 10 20 35 and 55 ** INACTIVE **	Lincoln	2653	0.20	0.21	0.23	0.25	0.27	0.29
Woodard, LLC ** INACTIVE **	Rowan	2514	0.00	0.00	0.01	0.01	0.01	0.01
GDX Automotive ** INACTIVE **	Rowan	3053	0.03	0.03	0.04	0.04	0.04	0.05
Rock - Tenn Company ** INACTIVE **	Union	2657	0.01	0.01	0.01	0.01	0.01	0.01
Genwove US Ltd ** INACTIVE **	Union	2435	0.01	0.01	0.01	0.01	0.01	0.01
Boggs Paving, Inc. ** INACTIVE **	Union	2951	0.02	0.02	0.02	0.02	0.02	0.02
Bloomsburg Mills, Inc. ** INACTIVE **	Union	2269	0.02	0.02	0.02	0.02	0.03	0.03
Total VOC Emissions			**1.30**	**1.43**	**1.56**	**1.69**	**1.82**	**1.97**

2.3 EMISSION PROJECTION

With the exception of those sources that report to CAMD, the data most recently submitted to NCDAQ or MCAQ was used for the projected emissions in this report. For the Title V sources 2009 data was used (i.e., major sources that are required to report emissions annually). For small sources that report emissions every five years, the most recently submitted emissions data was used and treated as 2009 data. The emissions inventory was projected to future years by utilizing the USEPA's Economic Growth Analysis System (E-GAS) version 5 software. There are two major data sources that are used as growth indicators in EGAS 5.0: the Department of Energy (DOE)'s *Annual Energy Outlook* and version 5.5 of Regional Economic Models, Inc. (REMI)'s state-level economic models (DOE, 2004; Houyoux, 2004). In general, DOE data are expected to be used as growth indicators for fuel combustion/production categories, while REMI data will be used for all other source categories.

Duke Energy Carolinas Allen Steam Station and Riverbend Steam Station, located in Gaston County; and Duke Energy Carolinas Buck Steam Station, located in Rowan County, are the exception. These three facilities report to CAMD and so their actual 2010 average summer day emissions were used. For these source the 2010 May through September emissions were summed and then divided by the number days during that period (153 days) to estimate the average summer day emissions. For the future year inventories, the projected emissions for these three facilities were provided by Duke Energy.

Philip Morris located in Cabarrus County (Facility ID 1300048) shut down several processes which emit VOC in 2009. The facility was issued a Title V renewal permit in 2012 which incorporates the shutdown of the process units. The facility plans to obtain VOC emission reduction credits (ERCs) relative to these processes. The North Carolina rules for banking of ERCs are stated under 15A NCAC .2300 *Banking Emission Reduction Credits* and includes rules .2301 through .2311. Per 15A NCAC .2300, the DAQ has determined that the bankable ERCs are 473 tons per year or 1.30 tons per day. Therefore, this value, 1.30 TPD of VOC, is used in the Metrolina Redesignation Demonstration and Maintenance Plan emissions inventory for the base year 2010 and held constant for all future projection years through 2025.

2.4 FUTURE EMISSION REDUCTIONS

The North Carolina Clean Smokestacks Act requires coal-fired power plants achieve a 77-percent cut in NOx emissions by 2009. Affected sources include Duke Energy Carolinas Allen Steam Station and Riverbend Steam Station, located in Gaston County; and Duke Energy Carolinas Buck Steam Station, located in Rowan County. The Metrolina area will also benefit from NOx reductions required at large electrical generation facilities nearby but not located within the nonattainment area.

The Maximum Achievable Control Technology (MACT) regulations are intended to reduce emissions of hazardous air pollutants (HAPs), some of which are VOCs. In some cases, reduction of HAPs that are VOCs is accomplished by switching to VOCs that are not HAPs, resulting in no reductions of VOC emissions. In other cases, compliance with a MACT regulation can be expected to reduce VOC emissions. It is likely there will be some additional VOC emission reductions due to new MACT regulations in the Metrolina nonattainment area, although the MACT regulations do not always make a clear statement of how much VOC emission reductions will result from the HAPs emission reductions. Often it is not possible to determine the plant VOC emission reduction until a particular affected source considers possible control options. Therefore, no emission reductions, as a result of MACT regulations, will be taken in this plan.

3.0 QUALITY ASSURANCE

The emission inventory has undergone a number of quality assurance checks so that it meets the standards for submitting the annual inventory to the USEPA. The state emissions inventory database program helps insure that important data elements are present. Where the program performs calculations, it helps avoid calculation errors. In addition, since the State began collecting annual fees for emissions from Title V sources, both the State and the sources are careful that the tons-per-year emissions reported are accurate.

The detail quality assurance and quality control procedures and measures, as outlined in the North Carolina Division of Air Quality (NCDAQ) Emissions Inventory Quality Assurance Project Plan (QAPP) and approved by the USEPA, were applied to ensure the data meets specific data indicator goals and objectives.

4.0 TOTAL POINT SOURCES EMISSIONS

In the following sections, the emissions for the North Carolina portion of the Metrolina nonattainment area are totaled, as well as, the estimated facility emissions for each county in the nonattainment area are identified for the base year (2010) and the future maintenance years (2013, 2016, 2019, 2022, and 2025).

4.1 METROLINA NONATTAINMENT AREA SUMMARY

Table 4.1-1 Metrolina Total NOx Emissions in Tons per Day

County	2010	2013	2016	2019	2022	2025
Cabarrus	1.93	2.08	2.23	2.38	2.53	2.70
Gaston	23.75	8.87	8.08	8.29	6.41	6.34
Iredell*	3.28	3.54	3.80	4.05	4.29	4.57
Lincoln	0.61	0.67	0.72	0.78	0.84	0.90
Mecklenburg	1.29	1.39	1.48	1.57	1.67	1.78
Rowan	6.69	3.03	2.50	2.70	2.90	3.14
Union	0.42	0.45	0.48	0.51	0.55	0.59
TOTAL	37.97	20.03	19.29	20.28	19.19	20.02

* Iredell County Emissions for Nonattainment area only

Table 4.1-2 Metrolina Total VOC Emissions in Tons per Day

County	2010	2013	2016	2019	2022	2025
Cabarrus	2.17	2.23	2.29	2.36	2.43	2.51
Gaston	2.14	2.14	2.39	2.61	2.76	2.94

Iredell*	0.88	0.95	1.03	1.10	1.16	1.24
Lincoln	1.19	1.30	1.42	1.53	1.64	1.77
Mecklenburg	3.24	3.51	3.77	4.04	4.31	4.62
Rowan	3.76	4.12	4.50	4.91	5.31	5.78
Union	1.40	1.53	1.64	1.77	1.89	2.01
TOTAL	14.78	15.78	17.04	18.32	19.5	20.87

* Iredell County Emissions for Nonattainment area only

4.2 SUMMARY OF EMISSIONS FOR 2010, 2013, 2016, 2019, 2022, and 2025

In the following summary tables, any facilities whose daily NOx or VOC emissions that are smaller than 0.01 tons/day are not included in the summary.

For the three large utility facilities located in Metrolina nonattainment area: Allen and Riverbend in Gaston County, and Buck in Rowan County, the average daily emissions for the future years were provided by the Duke Energy Carolinas and the base year (2010) were estimated using the CAMD database. Additionally, Plant Rowan located in Rowan County and Duke Energy Corporation LCTS located in Lincoln County report emissions to CAMD and therefore the base year emissions for these two facilities were estimated from the 2010 CAMD data. For the sources reporting to CAMD, the 2010 May through September emissions were summed and then divided by the total number of days during this period (153 days) to estimate the average summer day emissions.

Table 4.2-1a Cabarrus County Total NOx Emissions in Tons per Day

PLANT	SIC#	2010	2013	2016	2019	2022	2025
Americhem, Inc.	3087	0.00	0.00	0.00	0.01	0.01	0.01
BFI Waste Systems of North America, CMS Landfill V	4953	0.14	0.15	0.16	0.17	0.18	0.19
Blythe Brothers Asphalt Co., LLC - Concord Plant	2951	0.02	0.02	0.03	0.03	0.03	0.04
Blythe Construction, Inc., Plant No. 2	2951	0.01	0.01	0.01	0.01	0.01	0.01
Chemical Specialties, Inc.	2819	0.03	0.03	0.03	0.04	0.04	0.04
CMC - Northeast, Inc.	8062	0.03	0.03	0.03	0.03	0.03	0.03
Coddle Creek WTP ** INACTIVE **	4931	0.01	0.01	0.01	0.01	0.01	0.01
Concord City Generating Plant #1	4911	0.06	0.06	0.06	0.07	0.07	0.08
Concord City Generating Plant #2	4911	0.04	0.05	0.05	0.05	0.05	0.06
Corning Incorporated	3229	0.28	0.30	0.32	0.35	0.38	0.41
Ferebee Asphalt Corporation	2951	0.01	0.01	0.01	0.01	0.01	0.01
Fieldcrest Cannon Plant #1 ** INACTIVE **	2211	0.00	0.00	0.00	0.01	0.01	0.01
Galvan Industries, Inc.	3479	0.01	0.01	0.01	0.01	0.01	0.02
Gelder Thompson Asphalt Plant - Midland ** INACTIVE **	2951	0.01	0.01	0.01	0.01	0.01	0.01
Greif Packaging, LLC - Southeastern Packaging	2653	0.01	0.01	0.01	0.01	0.01	0.01
Kannapolis Energy Partners LLC-Kannapolis *INACTIVE *	4961	1.05	1.14	1.21	1.29	1.36	1.44

Table 4.2-1a Cabarrus County Total NOx Emissions in Tons per Day

PLANT	SIC#	2010	2013	2016	2019	2022	2025
Martin Marietta Materials, Inc. - Bonds Quarry	1423	0.04	0.04	0.05	0.05	0.05	0.06
Perdue Farms Incorporated, Concord	2015	0.02	0.02	0.02	0.02	0.02	0.03
Philip Morris USA Inc., Cabarrus Mfg. Facility	2111	0.12	0.13	0.14	0.15	0.16	0.18
S & D Coffee, Inc.	2095	0.01	0.01	0.01	0.01	0.01	0.02
Vulcan Construction Materials LP - Gold Hill	1411	0.01	0.01	0.01	0.01	0.01	0.01
WSACC - Rocky River Regional WWTP	4952	0.04	0.04	0.04	0.05	0.05	0.05
Total		**1.93**	**2.08**	**2.23**	**2.38**	**2.53**	**2.70**

Table 4.2-1b Cabarrus County Total VOC Emissions in Tons per Day

PLANT	SIC#	2010	2013	2016	2019	2022	2025
Berenfield Containers SE Ltd	3412	0.21	0.23	0.24	0.26	0.27	0.29
BFI Waste Systems of North America, CMS Landfill V	4953	0.07	0.07	0.08	0.08	0.09	0.09
Blythe Brothers Asphalt Co., LLC - Concord Plant	2951	0.02	0.02	0.02	0.02	0.03	0.03
Blythe Construction, Inc., Plant No. 2	2951	0.01	0.01	0.01	0.01	0.01	0.01
Carolina Counters Corporation	3088	0.01	0.02	0.02	0.02	0.02	0.02
Chemical Specialties, Inc.	2819	0.02	0.02	0.02	0.02	0.03	0.03
Corning Incorporated	3229	0.06	0.06	0.07	0.08	0.08	0.09
DNP IMS America Corporation ** INACTIVE **	3955	0.00	0.01	0.01	0.01	0.01	0.01
Ferebee Asphalt Corporation	2951	0.01	0.01	0.02	0.02	0.02	0.02
Fieldcrest Cannon Plant #1 ** INACTIVE **	2211	0.13	0.14	0.16	0.17	0.18	0.20
Pass & Seymour/legrand ** INACTIVE **	3644	0.04	0.05	0.05	0.05	0.06	0.06
Philip Morris USA Inc., Cabarrus Mfg Facility	2111	1.3	1.3	1.3	1.3	1.3	1.3
S & D Coffee, Inc.	2095	0.17	0.18	0.18	0.19	0.19	0.20
Young Cleaners ** INACTIVE **	7219	0.00	0.01	0.01	0.01	0.01	0.01
Whitley Handle, Inc.	2499	0.10	0.11	0.12	0.13	0.13	0.14
WSACC - Rocky River Regional WWTP	4952	0.01	0.01	0.01	0.02	0.02	0.02
Total		**2.17**	**2.23**	**2.29**	**2.36**	**2.43**	**2.51**

Table 4.2-2a Gaston County Total NOx Emissions in Tons per Day

PLANT	SIC#	2010	2013	2016	2019	2022	2025
Affinia Group, Inc., Wix Filtration Corp. - Allen Plant	3714	0.02	0.02	0.02	0.02	0.02	0.03
American & Efird Plants #5 & #15	2284	0.03	0.03	0.03	0.04	0.04	0.04
Apex Tool Group (Gastonia Operations)	3423	0.01	0.01	0.01	0.01	0.01	0.01
Buckeye Mt. Holly, LLC	2676	0.04	0.05	0.05	0.06	0.06	0.06
Caromont Health, Gaston Memorial Hospital	8062	0.03	0.03	0.03	0.03	0.03	0.03
Chemtura Corporation	2821	0.01	0.01	0.01	0.01	0.01	0.01

Table 4.2-2a Gaston County Total NOx Emissions in Tons per Day

PLANT	SIC#	2010	2013	2016	2019	2022	2025
City of Gastonia - Duhart Creek Pump Station ** INACTIVE **	4941	0.00	0.00	0.00	0.01	0.01	0.01
Crowders Creek WWTP	4952	0.00	0.01	0.01	0.01	0.01	0.01
Duke Energy Carolinas, LLC - Riverbend Steam Station	4911	6.31	0.39	0.00	0.00	0.00	0.00
Duke Power Company, LLC - Allen Steam Station	4911	16.70	7.68	7.21	7.32	5.38	5.21
Eagle Mountain Finishing LLC ** INACTIVE **	2231	0.06	0.06	0.07	0.08	0.08	0.09
Firestone Fibers & Textiles Company, LLC	2296	0.02	0.02	0.03	0.03	0.03	0.03
Firestone Fibers and Textiles Co., Kings Mountain Plant	2296	0.09	0.10	0.11	0.12	0.13	0.15
Fleischmanns Yeast Inc **Inactive**	2099	0.01	0.01	0.01	0.01	0.01	0.01
FMC Corporation - Lithium Division	2819	0.05	0.05	0.05	0.06	0.06	0.07
Freightliner LLC--Mount Holly Truck Mfg. Plant	3711	0.01	0.01	0.01	0.01	0.01	0.01
Gastonia Components & Logistics, LLC	3714	0.01	0.01	0.01	0.01	0.01	0.01
Gastonia Water Treatment Plant ** INACTIVE **	4941	0.01	0.01	0.01	0.01	0.02	0.02
Long Creek WWTP	4952	0.01	0.01	0.01	0.02	0.02	0.02
Lubrizol Advanced Materials, Inc.	2821	0.02	0.02	0.02	0.02	0.02	0.03
Modern Polymers, Inc.	3089	0.00	0.00	0.00	0.01	0.01	0.01
NC Municipal Power Agency No. 1 - Gastonia Freightliner	4911	0.01	0.01	0.01	0.01	0.01	0.01
NC Municipal Power Agency No. 1-Gastonia Plant 2	4911	0.01	0.01	0.01	0.01	0.01	0.01
Pharr Yarns Complex 46	2281	0.03	0.04	0.04	0.04	0.05	0.05
Pharr Yarns, Inc., Space Dye Plant	2269	0.01	0.01	0.01	0.01	0.02	0.02
RADICISPANDEX Corporation ** INACTIVE **	2824	0.12	0.13	0.15	0.16	0.17	0.19
Rea Contracting, LLC 075 Bessemer City Plant ** INACTIVE **	2951	0.01	0.01	0.02	0.02	0.02	0.02
Spartan Dyers, Inc., Sterling Division	2281	0.01	0.01	0.01	0.01	0.01	0.02
Stabilus, Inc.	3499	0.00	0.00	0.00	0.01	0.01	0.01
Valley Proteins, Inc. dba Carolina By-Products - Gastonia	2077	0.10	0.10	0.11	0.11	0.12	0.13
Yorkshire Americas, Inc. ** INACTIVE **	2865	0.01	0.02	0.02	0.02	0.02	0.02
Total		**23.75**	**8.87**	**8.08**	**8.29**	**6.41**	**6.34**

Table 4.2-2b Gaston County Total VOC Emissions in Tons per Day

PLANT	SIC#	2010	2013	2016	2019	2022	2025
Affinia Group, Inc., Wix Filtration Corp. - Allen Plant	3714	0.23	0.25	0.27	0.30	0.32	0.35
Affinia Group, Inc., Wix Filtration Corp. - D ** INACTIVE **	3714	0.03	0.04	0.04	0.04	0.04	0.05
American & Efird Plants #5 & #15	2284	0.09	0.11	0.12	0.14	0.15	0.15
Bradington-Young LLC, Cherryville Plant	3433	0.03	0.03	0.04	0.04	0.04	0.04
Buckeye Mt. Holly, LLC	2676	0.03	0.03	0.03	0.03	0.04	0.04
Duke Energy Carolinas, LLC - Riverbend Steam Station	4911	0.04	0.01	0.00	0.00	0.00	0.00
Duke Power Company, LLC - Allen Steam Station	4911	0.21	0.10	0.16	0.18	0.14	0.13
Firestone Fibers & Textiles Company, LLC	2296	0.01	0.01	0.01	0.02	0.02	0.02
Firestone Fibers and Textiles Co, Kings Mountain Plant	2296	0.02	0.02	0.02	0.02	0.03	0.03
Fleischmanns Yeast Inc **Inactive**	2099	0.07	0.07	0.08	0.08	0.08	0.08
FMC Corporation - Lithium Division	2819	0.02	0.02	0.02	0.02	0.03	0.03
Freightliner LLC--Mount Holly Truck Mfg Plant	3711	0.08	0.08	0.09	0.10	0.11	0.12
Gastonia Components & Logistics, LLC	3714	0.04	0.04	0.04	0.05	0.05	0.06
Gatza Marble Products	3088	0.02	0.02	0.02	0.02	0.02	0.03
J. Charles Saunders Company	2284	0.03	0.04	0.04	0.04	0.05	0.05
Keystone Powdered Metal Company	3499	0.01	0.01	0.01	0.01	0.01	0.01
LNS Turbo, Inc. - Kings Mountain	3499	0.02	0.02	0.03	0.03	0.03	0.03
Lubrizol Advanced Materials, Inc.	2821	0.02	0.02	0.02	0.02	0.03	0.03
Metso Minerals, Inc. ** INACTIVE **	3429	0.03	0.03	0.03	0.04	0.04	0.04
Modern Polymers, Inc.	3089	0.15	0.16	0.18	0.19	0.21	0.22
Orograin - Gastonia	2051	0.01	0.01	0.01	0.01	0.01	0.01
Parker Hannifan Corporation	3594	0.02	0.02	0.02	0.02	0.02	0.02
Pharr Yarns Complex 46	2281	0.05	0.06	0.07	0.08	0.09	0.09
Pharr Yarns, Inc., Space Dye Plant	2269	0.03	0.03	0.04	0.04	0.04	0.04
RADICISPANDEX Corporation ** INACTIVE **	2824	0.58	0.64	0.71	0.77	0.84	0.92
Rea Contracting, LLC 075 Bessemer City Plant ** INACTIVE **	2951	0.01	0.01	0.01	0.01	0.01	0.01
Stabilus, Inc.	3499	0.19	0.19	0.21	0.23	0.23	0.26
United Memorial Bible Services Inc ** INACTIVE **	2499	0.04	0.04	0.04	0.05	0.05	0.05
Valley Proteins, Inc. dba Carolina By-Products - Gastonia	2077	0.03	0.03	0.03	0.03	0.03	0.03
Total		**2.14**	**2.14**	**2.39**	**2.61**	**2.76**	**2.94**

Table 4.2-3a Iredell County Total NOx Emissions in Tons per Day

PLANT	SIC#	2010	2013	2016	2019	2022	2025
BestSweet, Inc.	2064	0.01	0.01	0.01	0.01	0.01	0.01
Lake Norman Regional Medical Center	8062	0.01	0.01	0.01	0.01	0.01	0.01
Matsushita Compressor Corp **Inactive**	3639	0.01	0.01	0.01	0.01	0.01	0.01
NGK Ceramics USA, Inc.	3299	0.03	0.03	0.04	0.04	0.04	0.05
Transcontinental Gas Pipeline Company, LLC	4922	3.23	3.49	3.73	3.98	4.22	4.49
Total		**3.28**	**3.54**	**3.80**	**4.05**	**4.29**	**4.57**

Table 4.2-3b Iredell County Total VOC Emissions in Tons per Day

PLANT	SIC#	2010	2013	2016	2019	2022	2025
Custom Products, Inc.	3728	0.02	0.02	0.02	0.02	0.03	0.03
D&F Consolidated, Inc. dba Car-Mel Products, Inc.	2299	0.01	0.01	0.02	0.02	0.02	0.02
EGA Products, Inc.	3479	0.00	0.00	0.01	0.01	0.01	0.01
General Microcircuits, Inc.	3672	0.00	0.01	0.01	0.01	0.01	0.01
Matsushita Compressor Corp **Inactive**	3639	0.01	0.01	0.01	0.01	0.01	0.02
NGK Ceramics USA, Inc.	3999	0.00	0.01	0.01	0.01	0.01	0.01
Transcontinental Gas Pipeline Company, LLC	4922	0.83	0.89	0.96	1.02	1.08	1.15
Total		**0.88**	**0.95**	**1.03**	**1.10**	**1.16**	**1.24**

Table 4.2-4a Lincoln County Total NOx Emissions in Tons per Day

PLANT	SIC#	2010	2013	2016	2019	2022	2025
Blythe Construction, Inc., Plant No. 8	2951	0.01	0.01	0.01	0.01	0.01	0.01
Cataler North America Corporation	3714	0.10	0.11	0.12	0.13	0.14	0.15
Duke Energy Corporation LCTS	4911	0.26	0.28	0.30	0.32	0.34	0.36
HOF Textiles, Inc.	2297	0.01	0.01	0.01	0.01	0.02	0.02
La-Z-Boy Chair - Burris Division ** INACTIVE **	2512	0.02	0.03	0.03	0.04	0.04	0.04
Lincolnton Wastewater Treatment Plant	4952	0.01	0.02	0.02	0.02	0.02	0.02
McMurray Fabrics, Inc. - Lincolnton	2262	0.03	0.03	0.03	0.04	0.04	0.04
Mohican Mills, Inc.	2258	0.08	0.09	0.09	0.10	0.11	0.12
National Fruit Product Company, Inc.	2033	0.02	0.02	0.02	0.03	0.03	0.03
Rea Contracting (Denver)	2951	0.01	0.02	0.02	0.02	0.02	0.02
South Fork Industries, Inc.	2257	0.02	0.02	0.02	0.02	0.03	0.03

PLANT	SIC#	2010	2013	2016	2019	2022	2025
Textile Piece Dyeing Co., Inc.	2262	0.01	0.01	0.01	0.01	0.01	0.01
The Timken Company, Lincolnton Bearing Plant	3562	0.03	0.03	0.03	0.03	0.04	0.04
Total		**0.61**	**0.67**	**0.72**	**0.78**	**0.84**	**0.90**

Table 4.2-4b Lincoln County Total VOC Emissions in Tons per Day

PLANT	SIC#	2010	2013	2016	2019	2022	2025
Blythe Construction, Inc., Plant No. 8	2951	0.01	0.01	0.01	0.01	0.01	0.01
B R Lee Industries, Inc. ** INACTIVE **	3537	0.04	0.04	0.04	0.05	0.05	0.05
Cochrane Furniture Divisions 10 20 35 and 55 ** INACTIVE **	2653	0.20	0.21	0.23	0.25	0.27	0.29
CPI Packaging, Inc.	3086	0.61	0.68	0.73	0.80	0.86	0.92
Duke Energy Corporation LCTS	4911	0.00	0.00	0.00	0.00	0.00	0.01
HOF Textiles, Inc.	2297	0.06	0.07	0.08	0.09	0.10	0.10
La-Z-Boy Chair - Burris Division ** INACTIVE **	4911	0.01	0.01	0.01	0.01	0.01	0.01
McMurray Fabrics, Inc. - Lincolnton	2262	0.06	0.07	0.07	0.08	0.09	0.10
Mohican Mills, Inc.	2258	0.02	0.02	0.03	0.03	0.03	0.03
Rea Contracting (Denver)	2951	0.01	0.01	0.01	0.01	0.01	0.01
Robert Bosch Tool Corporation ** INACTIVE **	3425	0.03	0.03	0.03	0.04	0.04	0.04
South Fork Industries, Inc.	2257	0.01	0.01	0.01	0.01	0.01	0.01
Textile Piece Dyeing Co., Inc.	2951	0.02	0.02	0.02	0.03	0.03	0.03
The Timken Company, Lincolnton Bearing Plant	3562	0.00	0.00	0.01	0.01	0.01	0.01
VT LeeBoy, Inc.	3531	0.03	0.04	0.04	0.04	0.04	0.04
Wireway/Husky Systems	3499	0.07	0.07	0.08	0.09	0.09	0.10
Total		**1.19**	**1.30**	**1.42**	**1.53**	**1.64**	**1.77**

Table 4.2-5a Mecklenburg County Total NOx Emissions in Tons per Day

PLANT	SIC#	2010	2013	2016	2019	2022	2025
Barnhardt Manufacturing Company	2269	0.02	0.02	0.02	0.02	0.02	0.03
Barrday Corporation	2221	0.00	0.00	0.00	0.00	0.01	0.01
Blythe Construction, Inc. - East Plant	2951	0.00	0.01	0.01	0.01	0.01	0.01
Blythe Construction, Inc. - North Plant	2951	0.01	0.01	0.01	0.01	0.01	0.01

Table 4.2-5a Mecklenburg County Total NOx Emissions in Tons per Day

PLANT	SIC#	2010	2013	2016	2019	2022	2025
C & M Recycling, Inc.	3272	0.01	0.01	0.01	0.01	0.02	0.02
Cargill, Inc.	2079	0.10	0.10	0.11	0.11	0.12	0.13
Carolinas Medical Center	8062	0.02	0.02	0.02	0.02	0.03	0.03
Carolinas Medical Center - Mercy	8062	0.01	0.01	0.01	0.01	0.01	0.01
Carolinas Medical Center - Pineville	8062	0.01	0.01	0.01	0.01	0.01	0.01
Charlotte Douglas International Airport	4581	0.01	0.01	0.01	0.01	0.01	0.01
Charlotte Pipe & Foundry Company, Inc.	3321	0.06	0.07	0.08	0.08	0.09	0.10
Clariant Corporation	2865	0.03	0.03	0.04	0.04	0.04	0.05
C-MUD: Franklin Water Treatment Plant	4941	0.02	0.02	0.02	0.02	0.02	0.02
C-MUD: Mallard Creek Water Reclamation Facility	4952	0.01	0.01	0.01	0.01	0.01	0.01
C-MUD: McAlpine Creek Wastewater Treatment Plant	4953	0.05	0.05	0.05	0.06	0.06	0.06
C-MUD: McDowell Creek Wastewater Treatment Plant	4952	0.01	0.01	0.01	0.01	0.01	0.01
Coca-Cola Bottling Co. Consolidated (Snyder Fac)	2086	0.01	0.01	0.01	0.01	0.01	0.01
Davidson College	8221	0.02	0.02	0.02	0.02	0.02	0.02
Duke Energy - McGuire Nuclear Station	4911	0.05	0.05	0.05	0.06	0.06	0.06
Emerald Carolina Chemical, LLC	2821	0.01	0.01	0.01	0.01	0.02	0.02
Exopack Advanced Coatings	3083	0.02	0.02	0.02	0.02	0.02	0.03
Ferebee Asphalt Corp - Charlotte South Plant	2951	0.01	0.01	0.01	0.02	0.02	0.02
Ferebee Asphalt Corporation- Statesville Rd. Plant	2951	0.02	0.02	0.02	0.02	0.03	0.03
Flextronics	3679	0.02	0.02	0.03	0.03	0.03	0.04
Forbo Siegling, LLC	2295	0.01	0.01	0.01	0.01	0.01	0.02
Frito-Lay, Incorporated	2096	0.16	0.17	0.17	0.18	0.18	0.19
General Steel Drum Corporation	3412	0.00	0.00	0.01	0.01	0.01	0.01
Gerdau Ameristeel US Inc. Charlotte Steel Mill Div	3312	0.16	0.17	0.19	0.20	0.22	0.24
Huntersville Hardwoods	2426	0.07	0.07	0.08	0.08	0.09	0.10
IGM Resins Charlotte, Inc	2869	0.01	0.01	0.01	0.01	0.01	0.01
Industrial Container Services -NC, LLC (Charlotte)	7699	0.00	0.00	0.00	0.01	0.01	0.01
International Paper Company	2653	0.01	0.01	0.01	0.01	0.01	0.01
Interstate Custom Crushing, LLC	3295	0.01	0.01	0.01	0.01	0.01	0.01
Keebler Company	2052	0.01	0.01	0.01	0.01	0.01	0.01
Lance, Incorporated	2052	0.06	0.06	0.06	0.06	0.06	0.07
Lincoln Harris, LLC	6099	0.01	0.01	0.01	0.01	0.01	0.02
Mallard Creek Polymers, Inc.	2821	0.01	0.01	0.01	0.02	0.02	0.02

Table 4.2-5a Mecklenburg County Total NOx Emissions in Tons per Day

PLANT	SIC#	2010	2013	2016	2019	2022	2025
Metrolina Greenhouses, Inc.	0181	0.05	0.05	0.05	0.05	0.06	0.06
MNC Holdings, LLC	4953	0.01	0.01	0.01	0.01	0.01	0.01
Novant Healthcare's Presbyterian Hospital	8062	0.02	0.02	0.02	0.02	0.02	0.02
Piedmont Natural Gas Co., Inc.	5541	0.01	0.01	0.01	0.01	0.01	0.02
Presbyterian Hospital Huntersville	8062	0.01	0.01	0.01	0.01	0.01	0.01
Quala Services, LLC	7699	0.01	0.01	0.01	0.01	0.01	0.02
Rea Contracting - Mallard Creek	2951	0.01	0.01	0.01	0.01	0.01	0.01
Rea Contracting (069 Arrowood)	2951	0.01	0.01	0.01	0.02	0.02	0.02
Rea Contracting, LLC. (068 Matthews)	2951	0.01	0.01	0.01	0.01	0.01	0.01
Red Clay Industries	1499	0.02	0.02	0.02	0.02	0.02	0.03
RR Donnelley	2752	0.01	0.01	0.01	0.01	0.01	0.01
Siemens Power Generation, Inc.	3511	0.03	0.03	0.03	0.03	0.03	0.03
Sterigenics U.S. LLC	7389	0.01	0.01	0.01	0.01	0.01	0.01
Stork Prints America, Inc.	3471	0.00	0.00	0.00	0.01	0.01	0.01
Trane U.S., Inc.	3585	0.01	0.01	0.01	0.01	0.01	0.01
Transflo Terminal Services, Inc.	4214	0.01	0.01	0.01	0.01	0.01	0.01
University of North Carolina at Charlotte	8221	0.06	0.06	0.07	0.07	0.07	0.08
Vertis, Inc.	2752	0.01	0.01	0.01	0.01	0.01	0.01
Total		**1.29**	**1.39**	**1.48**	**1.57**	**1.67**	**1.78**

Table 4.2-5b Mecklenburg County Total VOC Emissions in Tons per Day

PLANT	SIC#	2010	2013	2016	2019	2022	2025
Alphagary Corporation	3087	0.01	0.01	0.01	0.01	0.01	0.01
Altec Industries, Inc.	3713	0.01	0.01	0.02	0.02	0.02	0.02
Americh Corporation	3082	0.03	0.04	0.04	0.04	0.05	0.05
Anilox Roll Co., Inc. (ARC Intl.)	3479	0.01	0.01	0.01	0.02	0.02	0.02
Aplix, Incorporated	2295	0.03	0.03	0.03	0.04	0.04	0.04
Arjobex America	3081	0.01	0.01	0.01	0.01	0.01	0.01
Barrday Corporation	2221	0.00	0.00	0.00	0.00	0.01	0.01
Belk Printing Technologies	2759	0.01	0.01	0.01	0.01	0.01	0.01
Bendel Corporation	3443	0.01	0.01	0.01	0.01	0.01	0.01
Blythe Brothers Asphalt Company, LLC Old Nations	2951	0.01	0.01	0.01	0.01	0.01	0.02
Blythe Construction, Inc.	2951	0.01	0.01	0.01	0.01	0.01	0.01
Blythe Construction, Inc. - East Plant	2951	0.01	0.01	0.01	0.01	0.01	0.01

Table 4.2-5b Mecklenburg County Total VOC Emissions in Tons per Day

PLANT	SIC#	2010	2013	2016	2019	2022	2025
Blythe Construction, Inc. - North Plant	2951	0.01	0.01	0.01	0.01	0.02	0.02
Boston Gear	3566	0.00	0.00	0.00	0.01	0.01	0.01
Cadmus	2752	0.07	0.08	0.09	0.09	0.10	0.11
Caraustar Carolina Carton	2759	0.03	0.03	0.03	0.04	0.04	0.04
Cargill, Inc.	2079	0.01	0.01	0.01	0.01	0.01	0.01
Carrier Corporation (Charlotte Chiller Ops)	3585	0.02	0.03	0.03	0.03	0.03	0.03
CCL Label, Inc.	2759	0.04	0.04	0.05	0.05	0.05	0.06
Charlotte BP Terminal	5171	0.06	0.06	0.07	0.07	0.08	0.08
Charlotte Douglas International Airport	4581	0.03	0.03	0.03	0.03	0.03	0.04
Charlotte Mecklenburg Schools Building Services	5541	0.01	0.01	0.01	0.01	0.01	0.01
Charlotte Pipe & Foundry Company, Inc.	3321	0.09	0.10	0.11	0.12	0.13	0.14
Charlotte-Mecklenburg School Facilities	5541	0.01	0.01	0.01	0.01	0.01	0.01
Citgo Petroleum Corporation	5171	0.03	0.04	0.04	0.04	0.04	0.05
Clariant Corporation	2865	0.03	0.03	0.04	0.04	0.04	0.05
Classic Graphics, Inc.	2752	0.03	0.03	0.03	0.03	0.04	0.04
Colonial Pipeline Company	4613	0.04	0.04	0.04	0.04	0.05	0.05
Cumulus Fibres	2299	0.00	0.00	0.00	0.00	0.01	0.01
D.C. Paint Works, Inc.	1721	0.02	0.02	0.02	0.02	0.02	0.02
Davidson College	8221	0.01	0.01	0.01	0.01	0.01	0.01
Detrex Corporation	2869	0.00	0.00	0.00	0.01	0.01	0.01
Duff Norton	3599	0.02	0.02	0.02	0.02	0.02	0.02
Emerald Carolina Chemical, LLC	2821	0.04	0.05	0.05	0.06	0.06	0.07
Exopack Advanced Coatings	3083	0.05	0.05	0.06	0.06	0.07	0.07
Ferebee Asphalt Corp - Charlotte South Plant	2951	0.01	0.01	0.01	0.01	0.01	0.01
Ferebee Asphalt Corporation- Statesville Rd. Plant	2951	0.01	0.01	0.01	0.01	0.02	0.02
Flextronics	3679	0.02	0.02	0.03	0.03	0.03	0.03
Foamex Innovations, Inc.	2821	0.02	0.02	0.03	0.03	0.03	0.03
Forbo Movement Systems	3052	0.07	0.08	0.09	0.09	0.10	0.11
Forbo Siegling, LLC	2295	0.04	0.04	0.04	0.05	0.05	0.05
Frito-Lay, Incorporated	2096	0.02	0.03	0.03	0.03	0.03	0.03
G & K Services	7218	0.02	0.02	0.02	0.02	0.02	0.02
General Steel Drum Corporation	3412	0.20	0.22	0.23	0.25	0.26	0.28
Genpak LLC	3086	0.17	0.19	0.21	0.23	0.24	0.26
Gerdau Ameristeel US Inc. Charlotte Steel Mill Div	3312	0.07	0.08	0.08	0.09	0.10	0.11
Graphic Packaging International, Inc.	2657	0.06	0.07	0.07	0.08	0.08	0.09
Harper Corporation of America	3449	0.01	0.01	0.01	0.01	0.01	0.01
Herff Jones Incorporated	2752	0.01	0.01	0.01	0.01	0.01	0.01
IGM Resins Charlotte, Inc	2869	0.06	0.07	0.08	0.08	0.09	0.10
Industrial Container Services - NC, LLC (Matthews)	7699	0.11	0.11	0.12	0.13	0.14	0.15
Industrial Container Services -NC, LLC (Charlotte)	7699	0.15	0.17	0.18	0.19	0.20	0.21

Table 4.2-5b Mecklenburg County Total VOC Emissions in Tons per Day

PLANT	SIC#	2010	2013	2016	2019	2022	2025
International Paper Company	2653	0.02	0.02	0.02	0.03	0.03	0.03
INX International Ink Company	2893	0.03	0.04	0.04	0.04	0.05	0.05
Journalbooks/Timeplanner	2782	0.00	0.00	0.00	0.00	0.01	0.01
Keebler Company	2052	0.03	0.03	0.03	0.03	0.03	0.03
Keller Crescent Company	2652	0.02	0.02	0.02	0.02	0.02	0.02
Kinder Morgan SE Terminals - (CT#1 & CT#2)	5171	0.05	0.05	0.05	0.06	0.06	0.07
Kurz Transfer Products, L.P.	2754	0.01	0.01	0.01	0.01	0.01	0.01
Labeltec, Inc./Pharmaprint, Inc.	2759	0.01	0.01	0.02	0.02	0.02	0.02
Lance, Incorporated	2052	0.24	0.25	0.26	0.27	0.28	0.29
Loftin & Company, Inc.	2752	0.01	0.01	0.02	0.02	0.02	0.02
Magellan Terminals Holdings, L.P. - Charlotte I	5171	0.04	0.04	0.05	0.05	0.05	0.06
Magellan Terminals Holdings, L.P. - Charlotte II	5171	0.02	0.02	0.02	0.02	0.02	0.03
Mallard Creek Polymers, Inc.	2821	0.01	0.01	0.01	0.01	0.01	0.01
Marathon Petroleum Company LP	5171	0.03	0.03	0.04	0.04	0.04	0.04
Masonite-Stanley Door Systems	3442	0.01	0.01	0.01	0.01	0.01	0.02
Metromont Corporation	3272	0.01	0.01	0.01	0.01	0.01	0.01
Motiva Enterprises LLC - Motiva Charlotte Complex	5171	0.08	0.09	0.10	0.10	0.11	0.12
Mount Hope Machinery Company	3552	0.02	0.02	0.02	0.03	0.03	0.03
New South Fabricators LLC	3441	0.01	0.01	0.01	0.01	0.01	0.01
Nexeo Solutions, LLC	5169	0.02	0.02	0.02	0.02	0.02	0.03
Norfolk Southern Railway Company	4011	0.01	0.01	0.01	0.02	0.02	0.02
Pan-Glo Charlotte	7699	0.05	0.05	0.05	0.06	0.06	0.06
Prairie Packaging, Inc.	3086	0.02	0.02	0.02	0.02	0.02	0.03
Rea Contracting - Mallard Creek	2951	0.01	0.01	0.01	0.01	0.01	0.01
Rea Contracting (069 Arrowood)	2951	0.01	0.01	0.01	0.01	0.01	0.01
Rea Contracting, LLC. (068 Matthews)	2951	0.01	0.01	0.01	0.01	0.01	0.01
Reman Technologies	3519	0.01	0.01	0.01	0.01	0.01	0.01
Rohm and Haas Chemicals, LLC	2821	0.00	0.01	0.01	0.01	0.01	0.01
RR Donnelley	2752	0.06	0.07	0.08	0.08	0.09	0.09
Siemens Power Generation, Inc.	3511	0.09	0.10	0.11	0.11	0.11	0.12
Sign Art	3499	0.01	0.01	0.01	0.01	0.01	0.01
Southern Converters Inc.	2675	0.05	0.06	0.06	0.06	0.07	0.07
Southwood Corporation	2499	0.01	0.01	0.01	0.01	0.01	0.01
Spectrum Graphics, Inc.	2752	0.01	0.02	0.02	0.02	0.02	0.02
SteelFab, Inc.	3441	0.04	0.04	0.05	0.05	0.05	0.06
Sun Chemical Corporation - Printing & Ink	2893	0.04	0.04	0.04	0.04	0.05	0.05
The Charlotte Observer Publishing Company	2711	0.02	0.02	0.03	0.03	0.03	0.03
Trane U.S., Inc.	3585	0.01	0.01	0.01	0.01	0.01	0.01
Transflo Charlotte West Terminal	4212	0.01	0.01	0.01	0.01	0.01	0.01
TransMontaigne - Charlotte Piedmont Terminal	5171	0.04	0.05	0.05	0.06	0.06	0.06

Table 4.2-5b Mecklenburg County Total VOC Emissions in Tons per Day

PLANT	SIC#	2010	2013	2016	2019	2022	2025
US Airways, Four (4) Site Locations	4581	0.04	0.04	0.04	0.05	0.05	0.06
US Polymers, Inc.	2899	0.02	0.02	0.03	0.03	0.03	0.03
Vertis, Inc.	2752	0.10	0.11	0.12	0.12	0.13	0.14
WorkflowOne	2761	0.02	0.02	0.03	0.03	0.03	0.03
Zepsa Industries, Incorporated	2499	0.03	0.03	0.04	0.04	0.04	0.05
Total		**3.24**	**3.51**	**3.77**	**4.04**	**4.31**	**4.62**

Table 4.2-6a Rowan County Total NOx Emissions in Tons per Day

PLANT	SIC#	2010	2013	2016	2019	2022	2025
Akzo Nobel Surface Chemistry LLC.	2869	0.02	0.02	0.02	0.02	0.02	0.03
APAC-Atlantic, Inc., Salisbury Plant # 69	2951	0.01	0.01	0.01	0.01	0.01	0.01
Boral Bricks Inc - Salisbury Plant	3251	0.04	0.04	0.04	0.05	0.05	0.05
Carolina Stalite Company	3281	1.61	1.73	1.86	2.00	2.15	2.34
Cronland Lumber Co., Inc.	2421	0.02	0.02	0.02	0.02	0.03	0.03
Daimler Trucks North America - Cleveland Plant	3711	0.02	0.02	0.02	0.02	0.03	0.03
Duke Power Company, LLC - Buck Steam Station	4911	4.53	0.70	0.00	0.00	0.00	0.00
HBD Industries Inc.	3069	0.01	0.01	0.01	0.01	0.01	0.01
Hitachi Metals North Carolina, Ltd.	3264	0.01	0.01	0.01	0.01	0.01	0.01
Indopco, Inc. dba Henkel,	2869	0.03	0.03	0.03	0.04	0.04	0.04
Innospec Performance Chemicals U.S. Company	2843	0.01	0.01	0.01	0.01	0.01	0.01
Magna Composites LLC - Salisbury Operations	3089	0.01	0.01	0.01	0.01	0.01	0.01
Norandal USA Inc	3353	0.04	0.04	0.05	0.05	0.06	0.06
Old Carolina Brick Company	3251	0.01	0.01	0.01	0.01	0.01	0.01
Packaging Corporation Of America	2653	0.01	0.01	0.01	0.01	0.01	0.01
Performance Fibers Operations, Inc. - Salisbury Plant	2824	0.07	0.08	0.09	0.10	0.11	0.12
Pinnacle Corrugated LLC	2653	0.01	0.01	0.01	0.01	0.01	0.01
Plant Rowan County	4911	0.20	0.22	0.23	0.25	0.26	0.28
Rea Contracting (Kannapolis)	2951	0.02	0.02	0.02	0.02	0.03	0.03
Rowan Regional Medical Center	8062	0.01	0.01	0.01	0.01	0.01	0.01
Taylor Clay Products, Inc.	3251	0.04	0.04	0.04	0.04	0.05	0.05
Total		**6.69**	**3.03**	**2.50**	**2.70**	**2.90**	**3.14**

Table 4.2-6b Rowan County Total VOC Emissions in Tons per Day

PLANT	SIC#	2010	2013	2016	2019	2022	2025
Akzo Nobel Surface Chemistry LLC.	2869	0.22	0.24	0.26	0.28	0.31	0.34
APAC-Atlantic, Inc., Salisbury Plant # 69	2951	0.00	0.00	0.00	0.01	0.01	0.01
Athena Marble Inc.	3088	0.02	0.02	0.03	0.03	0.03	0.03
B & E Custom Cabinets, Inc.	2434	0.01	0.01	0.01	0.01	0.01	0.01
Baja Products Ltd.	3089	0.01	0.01	0.01	0.01	0.01	0.01

Table 4.2-6b Rowan County Total VOC Emissions in Tons per Day

PLANT	SIC#	2010	2013	2016	2019	2022	2025
Carolina Stalite Company	3281	0.00	0.00	0.00	0.01	0.01	0.01
CMH Manufacturing Inc. d/b/a Schult Homes - Plant 957	2451	0.01	0.01	0.01	0.02	0.02	0.02
Cronland Lumber Co., Inc.	2421	0.00	0.01	0.01	0.01	0.01	0.01
Daimler Trucks North America - Cleveland Plant	3711	0.54	0.60	0.65	0.70	0.75	0.82
Duke Power Company, LLC - Buck Steam Station	4911	0.04	0.01	0.00	0.00	0.00	0.00
GDX Automotive ** INACTIVE **	3053	0.03	0.03	0.04	0.04	0.04	0.05
Goodman Millwork, Inc.	2431	0.02	0.02	0.02	0.02	0.02	0.02
HBD Industries Inc.	3069	0.02	0.02	0.02	0.02	0.02	0.03
Indopco, Inc. dba Henkel,	2869	0.33	0.36	0.40	0.43	0.47	0.51
Johnson Concrete Company, Inc., Central Division	3273	0.01	0.01	0.01	0.01	0.01	0.01
Magna Composites LLC - Salisbury Operations	3089	0.03	0.03	0.04	0.04	0.04	0.05
McKenzie Sports Products, Inc.	3999	0.01	0.01	0.02	0.02	0.02	0.02
Norandal USA Inc	3353	2.31	2.57	2.83	3.09	3.34	3.65
Packaging Corporation Of America	2653	0.01	0.01	0.01	0.01	0.01	0.01
Performance Fibers Operations, Inc. - Salisbury Plant	2824	0.08	0.09	0.10	0.11	0.12	0.13
Perma-flex Roller Technology - Salisbury, LLC	3069	0.01	0.01	0.01	0.01	0.01	0.01
Plant Rowan County	4911	0.02	0.02	0.02	0.02	0.02	0.02
Rea Contracting (Kannapolis)	2951	0.01	0.01	0.01	0.01	0.01	0.01
W A Brown and Son Inc - Plant 2	3585	0.01	0.01	0.01	0.01	0.01	0.01
Wingfoot Commercial Tire Systems, LLC	7534	0.01	0.01	0.01	0.01	0.01	0.01
Woodard, LLC ** INACTIVE **	2514	0.00	0.00	0.01	0.01	0.01	0.01
Total		**3.76**	**4.12**	**4.50**	**4.91**	**5.31**	**5.78**

Table 4.2-7a Union County Total NOx Emissions in Tons per Day

PLANT	SIC#	2010	2013	2016	2019	2022	2022
Archer Daniels Midland Company, Golden Grain & Feeds, Inc.	5153	0.01	0.01	0.01	0.01	0.01	0.01
Bakery Feeds	2048	0.10	0.10	0.11	0.11	0.12	0.13
Bloomsburg Mills, Inc. ** INACTIVE **	2269	0.02	0.02	0.02	0.03	0.03	0.03
Boggs Paving, Inc. ** INACTIVE **	2951	0.02	0.02	0.02	0.03	0.03	0.03
Brooks Food Group - Monroe Plant ** INACTIVE **	2015	0.03	0.03	0.03	0.03	0.03	0.03
Carolina Wood Products of Marshville, Inc.	2448	0.00	0.01	0.01	0.01	0.01	0.01
Consolidated Metco, Inc.	3365	0.05	0.05	0.06	0.06	0.07	0.07
Cooper Tools, LLC - Monroe Operation	3423	0.06	0.07	0.08	0.08	0.09	0.10
Edwards Wood Products, Inc.	2421	0.02	0.02	0.02	0.02	0.03	0.03
Genwove US Ltd ** INACTIVE **	2435	0.03	0.03	0.03	0.03	0.03	0.03

Table 4.2-7a Union County Total NOx Emissions in Tons per Day

PLANT	SIC#	2010	2013	2016	2019	2022	2022
Hanson Brick East, LLC, dba Hanson Brick-Monroe	3255	0.01	0.01	0.01	0.01	0.01	0.01
OMNOVA Solutions, Inc.	2754	0.01	0.01	0.01	0.01	0.01	0.01
Pilgrim's Pride Corporation of Virginia, Inc.	2048	0.02	0.02	0.02	0.03	0.03	0.03
Tyson Foods, Monroe Processing Plant and Feed Mill	2015	0.04	0.04	0.04	0.04	0.04	0.04
Yale Security Inc., Norton Door Controls	3442	0.01	0.01	0.01	0.02	0.02	0.02
Total		0.42	0.45	0.48	0.51	0.55	0.59

Table 4.2-7b Union County Total VOC Emissions in Tons per Day

PLANT	SIC#	2010	2013	2016	2019	2022	2022
AEP Industries, Inc.	3081	0.03	0.04	0.04	0.04	0.05	0.05
Bakery Feeds	2048	0.34	0.37	0.39	0.41	0.43	0.46
Bloomsburg Mills, Inc. ** INACTIVE **	2269	0.02	0.02	0.02	0.02	0.03	0.03
Boggs Paving, Inc. ** INACTIVE **	2951	0.02	0.02	0.02	0.02	0.02	0.02
Caledonian Alloys, Inc.	3356	0.07	0.07	0.08	0.09	0.10	0.10
Charlotte Pipe and Foundry Company - Plastics Div.	3084	0.02	0.03	0.03	0.03	0.03	0.04
Colfax Pump Group, IMO Pump Division	3561	0.01	0.01	0.02	0.02	0.02	0.02
Conn-Selmer Ludwig Facility Plant 2	3365	0.01	0.01	0.01	0.01	0.01	0.01
Conn-Selmer Ludwig Facility, Plant 3	3931	0.01	0.01	0.01	0.01	0.01	0.01
Cooper Tools, LLC - Monroe Operation	3423	0.01	0.02	0.02	0.02	0.02	0.02
Darnel, Inc.	3086	0.21	0.23	0.26	0.28	0.30	0.32
Decore-ative Specialties, Inc.	2431	0.01	0.01	0.01	0.01	0.02	0.01
Edwards Wood Products, Inc.	2421	0.02	0.02	0.02	0.03	0.03	0.03
Genwove US Ltd ** INACTIVE **	2435	0.01	0.01	0.01	0.01	0.01	0.01
Hudson Bros. Trailer Mfg., Inc.	3715	0.01	0.01	0.02	0.02	0.02	0.02
McGee Corporation	3444	0.01	0.01	0.01	0.01	0.01	0.01
Mint Hill Cabinet Shop, Inc.	5021	0.04	0.04	0.04	0.05	0.05	0.05
Nina Plastics	2759	0.37	0.40	0.43	0.46	0.49	0.53
OMNOVA Solutions, Inc.	2754	0.15	0.17	0.18	0.19	0.21	0.22
Rock - Tenn Company ** INACTIVE **	2657	0.01	0.01	0.01	0.01	0.01	0.01
Yale Security Inc., Norton Door Controls	3442	0.03	0.03	0.03	0.03	0.04	0.04
Total		**1.40**	**1.53**	**1.64**	**1.77**	**1.89**	**2.01**

5.0 DISCUSSION OF POINT SOURCE CATEGORIES

Industrial processes in the inventory are identified with 8-digit numbers known as the Source Classification Codes (SCC). These are grouped numerically into a number of categories for convenience. The following is the projected 2010 inventory reported by SCC by county. In general, the first three digits of the SCC code describe the process and the last five digits give more detail as to the fuel used, size of source, etc. The sections that follow are grouped by the first three digits of the SCC code.

It should be remembered that the SCC in any particular instance was selected by an individual entering inventory data into a computer maintained record. It may be that in some cases, other individuals would have selected other codes. In some cases, there are two or three parallel codes that describe the same sort of equipment, the difference being size. In other cases, one is able to select a general code for an overall process or use several more specific codes that together would be covered by the more general one. If, upon consideration, it appears that a more appropriate code could have been selected, that does not mean that the reported emissions are inaccurate.

A listing of SCC with descriptions may be found in FIRE Version 5.0 Source Classification Codes And Emission Factor Listing For Criteria Air Pollutants , EPA-454/R-95-012. Occasionally, new SCC are defined so it may be useful to search the USEPA's website for new entries.

5.1 EXTERNAL COMBUSTION BOILERS

Table 5.1-1 tabulates the emissions for the SCC codes 1-01-xxx-xx, boilers for electrical generation. The emissions for the SCC codes 1-02-xxx-xx, industrial boilers, are tabulated in Table 5.1-2. The emissions from commercial and institutional boilers, SCC codes 1-03-xxx-xx, are tabulated in Table 5.1-3. These are primarily of interest due to NOx emissions.

For the Allen and Riverbend units located in Gaston County and the Buck and Plant Rowan units located in Rowan County, the average summer day NOx emissions were estimated using the CAMD data for 2010. Since VOC emissions are not reported to CAMD, the VOC emissions for Allen were estimated by determining a NOx to VOC ratio based on data provided by Duke Energy Corportation. The VOC emissions for the other utility sources are effectively zero.

In the following summary tables, NOx or VOC emissions daily emissions that are smaller than 0.01 tons/day are not included in the summary.

Table 5.1-1a Summary Of SCC 1-01-xxx-xx NOx Emissions

County /Plant/SCC	2010 NOx

Gaston	
Duke Energy Carolinas, LLC - Riverbend Steam Station	**6.31**
10100202	6.31
Duke Power Company, LLC - Allen Steam Station	**16.7**
10100202	16.7
Rowan	
Duke Power Company, LLC - Buck Steam Station	**4.53**
10100202	4.53
Plant Rowan County	**0.51**
10100602	0.28
10100604	0.23
Grand Total	**28.05**

Table 5.1-1b Summary Of SCC 1-01-xxx-xx VOC Emissions

County /Plant/SCC	2010 VOC
Gaston	
Duke Power Company, LLC - Allen Steam Station	**0.21**
10100202	0.21
Grand Total	**0.21**

Table 5.1-2a Summary Of SCC 1-02-xxx-xx NOx Emissions

County /Plant/SCC	2010 NOx
Cabarrus	
Galvan Industries, Inc.	**0.01**
10200603	0.01
Greif Packaging, LLC - Southeastern Packaging	**0.01**
10200602	0.01
Philip Morris USA Inc., Cabarrus Manufacturing Facility	**0.11**
10200401	0.04
10200601	0.06
10200602	0.01
Gaston	
FMC Corporation - Lithium Division	**0.04**
10200602	0.04
Lubrizol Advanced Materials, Inc.	**0.02**
10200602	0.02
Spartan Dyers, Inc., Sterling Division	**0.01**

Table 5.1-2a Summary Of SCC 1-02-xxx-xx NOx Emissions

County /Plant/SCC	2010 NOx
10200602	0.01
Valley Proteins, Inc. dba Carolina By-Products - Gastonia	**0.10**
10200602	0.05
10201303	0.05
Lincoln	
South Fork Industries, Inc.	**0.01**
10200602	0.01
Textile Piece Dyeing Co., Inc.	**0.01**
10200603	0.01
The Timken Company, Lincolnton Bearing Plant	**0.02**
10200602	0.02
Mecklenburg	
Barnhardt Manufacturing Company	**0.01**
10200602	0.01
Cargill, Inc.	**0.09**
10200204	0.05
10200602	0.03
10200603	0.01
Clariant Corporation	**0.03**
10200603	0.03
Emerald Carolina Chemical, LLC	**0.01**
10200602	0.01
Exopack Advanced Coatings	**0.01**
10200602	0.01
Flextronics	**0.02**
10200603	0.02
Frito-Lay, Incorporated	**0.14**
10200204	0.14
IGM Resins Charlotte, Inc	**0.01**
10200602	0.01
Mallard Creek Polymers, Inc.	**0.01**
10200602	0.01
Siemens Power Generation, Inc.	**0.01**
10200602	0.01
Sterigenics U.S. LLC	**0.01**
10200603	0.01
Rowan	
Daimler Trucks North America - Cleveland Plant	**0.02**

Table 5.1-2a Summary Of SCC 1-02-xxx-xx NOx Emissions

County /Plant/SCC	2010 NOx
10200603	0.02
Magna Composites LLC - Salisbury Operations	**0.01**
10200602	0.01
Performance Fibers Operations, Inc. - Salisbury Plant	**0.07**
10200602	0.07
Rea Contracting (Kannapolis)	**0.02**
10200503	0.02
Union	
Pilgrim's Pride Corporation of Virginia, Inc.	**0.02**
10200401	0.02
Grand Total	**0.82**

Table 5.1-2b Summary Of SCC 1-02-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
Mecklenburg	
Frito-Lay, Incorporated	**0.02**
10200204	0.02
Grand Total	**0.02**

Table 5.1-3a Summary Of SCC 1-03-xxx-xx NOx Emissions

County/Plant/SCC	2010 NOx
Cabarrus	
Chemical Specialties, Inc.	**0.01**
10300602	0.01
CMC - Northeast, Inc.	**0.02**
10300502	0.01
10300602	0.01
Perdue Farms Incorporated, Concord	**0.02**
10300602	0.02
Gaston	
Apex Tool Group (Gastonia Operations)	**0.01**
10300603	0.01
Buckeye Mt. Holly, LLC	**0.04**
10300602	0.04
Caromont Health, Gaston Memorial Hospital	**0.01**
10300602	0.01

Table 5.1-3a Summary Of SCC 1-03-xxx-xx NOx Emissions

County/Plant/SCC	2010 NOx
Chemtura Corporation	**0.01**
10300603	0.01
Pharr Yarns Complex 46	**0.03**
10300404	0.02
10300602	0.02
Pharr Yarns, Inc., Space Dye Plant	**0.01**
10300602	0.01
Iredell	
BestSweet, Inc.	**0.01**
10300603	0.01
Lake Norman Regional Medical Center	**0.01**
10300602	0.01
Lincoln	
McMurray Fabrics, Inc. - Lincolnton	**0.02**
10300602	0.02
10300603	0.01
Mohican Mills, Inc.	**0.07**
10300209	0.06
10300602	0.01
Mecklenburg	
Carolinas Medical Center - Mercy	**0.01**
10300602	0.01
Carolinas Medical Center - Pineville	**0.01**
10300603	0.01
C-MUD: McAlpine Creek Wastewater Treatment Plant	**0.01**
10300701	0.01
Coca-Cola Bottling Co. Consolidated (Snyder Fac)	**0.01**
10300601	0.01
Davidson College	**0.01**
10300602	0.01
Huntersville Hardwoods	**0.07**
10300903	0.07
International Paper Company	**0.01**
10300603	0.01
Lance, Incorporated	**0.01**
10300602	0.01
Presbyterian Hospital Huntersville	**0.01**
10300602	0.01

Table 5.1-3a Summary Of SCC 1-03-xxx-xx NOx Emissions

County/Plant/SCC	2010 NOx
Quala Services, LLC	**0.01**
10300603	0.01
Transflo Terminal Services, Inc.	**0.01**
10300603	0.01
University of North Carolina at Charlotte	**0.06**
10300602	0.04
10300603	0.02
Rowan	
Cronland Lumber Co., Inc.	**0.02**
10300903	0.02
Packaging Corporation Of America	**0.01**
10300602	0.01
Pinnacle Corrugated LLC	**0.01**
10300602	0.01
Rowan Regional Medical Center	**0.01**
10300602	0.01
Union	
Consolidated Metco, Inc.	**0.04**
10300603	0.04
Edwards Wood Products, Inc.	**0.02**
10300903	0.02
Genwove US Ltd ** INACTIVE **	**0.03**
10300903	0.03
Tyson Foods, Monroe Processing Plant and Feed Mill	**0.03**
10300602	0.03
Grand Total	**0.68**

Table 5.1-3b Summary Of SCC 1-03-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
Gaston	
Buckeye Mt. Holly, LLC	**0.03**
10300602	0.03
Lincoln	
HOF Textiles, Inc.	**0.02**
10300603	0.02

County/Plant/SCC	2010 VOC
Grand Total	**0.05**

5.2 INTERNAL COMBUSTION ENGINES

Stationary internal combustion (IC) engines can be used on a daily basis or used only for backup power. Fuels can be gasoline, oil or various combustible gases depending on the engine design. Engines may be either turbines or reciprocating. The SCC codes 2-01-xxx-xx represent IC engines for electrical generation. The emissions from these sources are tabulated in Table 5.2-1. Industrial engines are classified in the 2-02-xxx-xx group (summarized in Table 5.2-2) while engines for commercial and institutional use are in the 2-03-xxx-xx group (summarized in Table 5.2-3). The emissions from internal combustion engines for engine testing (SCC group 2-04-xxx-xx) are summarized in Table 5.2-4.

Duke Energy Corporation LCTS reports to CAMD, therefore the average summer day emissions for 2010 were estimated using the CAMD database.

In the following summary tables, NOx or VOC emissions daily emissions that are smaller than 0.01 tons/day are not included in the summary.

Table 5.2-1 Summary Of SCC 2-01-xxx-xx NOx Emissions

County/Plant/SCC	2010 NOx
Cabarrus	
Concord City Generating Plant #1	**0.06**
20100102	0.06
Concord City Generating Plant #2	**0.04**
20100102	0.04
Martin Marietta Materials, Inc. - Bonds Quarry	**0.04**
20100102	0.04
Gaston	
Caromont Health, Gaston Memorial Hospital	**0.01**
20100102	0.01
Long Creek WWTP	**0.01**
20100102	0.01
NC Municipal Power Agency No. 1 - Gastonia Freightliner	**0.01**
20100102	0.01
NC Municipal Power Agency No. 1-Gastonia Plant 2	**0.01**

Table 5.2-1 Summary Of SCC 2-01-xxx-xx NOx Emissions

County/Plant/SCC	2010 NOx
20100101	0.01
Lincoln	
Duke Energy Corporation LCTS	**0.26**
20100101	0.26
Lincolnton Wastewater Treatment Plant	**0.01**
20100102	0.01
Mecklenburg	
C & M Recycling, Inc.	**0.01**
20100102	0.01
Ferebee Asphalt Corp - Charlotte South Plant	**0.01**
20100102	0.01
Ferebee Asphalt Corporation- Statesville Rd. Plant	**0.01**
20100102	0.01
Forbo Siegling, LLC	**0.01**
20100102	0.01
Red Clay Industries	**0.02**
20100102	0.02
Union	
Cooper Tools, LLC - Monroe Operation	**0.01**
20100102	0.01
Grand Total	**0.50**

Table 5.2-2a Summary Of SCC 2-02-xxx-xx NOx Emissions

County/Plant/SCC	2010 NOx
Cabarrus	
Vulcan Construction Materials LP - Gold Hill	**0.01**
20200401	0.01
Iredell	
Transcontinental Gas Pipeline Company, LLC	**3.23**
20200202	3.23
Lincoln	
Lincolnton Wastewater Treatment Plant	**0.01**
20200401	0.01

Table 5.2-2a Summary Of SCC 2-02-xxx-xx NOx Emissions

County/Plant/SCC	2010 NOx
Mecklenburg	
C-MUD: Franklin Water Treatment Plant	**0.02**
20200102	0.02
C-MUD: McAlpine Creek Wastewater Treatment Plant	**0.03**
20200102	0.03
Duke Energy - McGuire Nuclear Station	**0.04**
20200401	0.04
Interstate Custom Crushing, LLC	**0.01**
20200102	0.01
Siemens Power Generation, Inc.	**0.02**
20200107	0.02
Union	
Yale Security Inc., Norton Door Controls	**0.01**
20200401	0.01
Grand Total	**3.36**

Table 5.2-2b Summary Of SCC 2-02-xxx-xxVOC Emissions

County/Plant/SCC	2010 VOC
Iredell	
Transcontinental Gas Pipeline Company, LLC	**0.81**
20200202	0.81
Mecklenburg	
Carrier Corporation (Charlotte Chiller Ops)	**0.01**
20200202	0.01
Grand Total	**0.82**

Table 5.2-3 Summary Of SCC 2-03-xxx-xxNOx Emissions

County/Plant/SCC	2010 NOx
Cabarrus	
Coddle Creek WTP ** INACTIVE **	**0.01**
20300101	0.01

Table 5.2-3 Summary Of SCC 2-03-xxx-xxNOx Emissions

County/Plant/SCC	2010 NOx
Gaston	
Caromont Health, Gaston Memorial Hospital	**0.01**
20300101	0.01
Mecklenburg	
Carolinas Medical Center	**0.02**
20300101	0.02
Charlotte Douglas International Airport	**0.01**
20300101	0.01
Lincoln Harris, LLC	**0.01**
20300101	0.01
Novant Healthcare's Presbyterian Hospital	**0.02**
20300101	0.02
Piedmont Natural Gas Co., Inc.	**0.01**
20300201	0.01
Trane U.S., Inc.	**0.01**
20300101	0.01
Union	
Archer Daniels Midland Company, Golden Grain & Feeds, Inc.	**0.01**
20300101	0.01
Tyson Foods, Inc., Monroe Processing Plant and Feed Mill	**0.01**
20300101	0.01
Grand Total	**0.11**

Table 5.2-4 Summary Of SCC 2-04-xxx-xx NOx Emissions

County/Plant/SCC	2010 NOx
Union	**0.01**
Consolidated Metco, Inc.	**0.01**
20400302	0.01
Grand Total	**0.01**

5.3 INDUSTRIAL PROCESSES

There are a large number of SCC under the heading of industrial processes. The majority of these processes emit VOC but some do emit NOx. Codes 3-01-xxx-xx are chemical manufacturing.

Codes 3-02-xxx-xx are for processes particular to food and agriculture. Codes 3-03-xxx-xx are for processes of primary metal production. Codes 3-04-xxx-xx pertain to secondary metal production. Mineral products processes are in SCC 3-05-xxx-xx and pulp and paper and wood products are in 3-07-xxx-xx. Codes 3-08-xxx-xx pertain to rubber and miscellaneous plastics products. Fabricated metal products are 3-09-xxx-xx. 3-12-xxx-xx is miscellaneous machinery. Processes for textile products are found under 3-30-xxx-xx. In-process fuel use can result in significant NOx emissions and is in category 3-90-xxx-xx. Miscellaneous manufacturing industries are in group 3-99-xxx-xx.

In the following summary tables, NOx or VOC emissions daily emissions that are smaller than 0.01 tons/day are not included in the summary.

Table 5.3-1a Summary Of SCC 3-01-xxx-xx NOx Emissions

County/Plant/SCC	2010 NOx
Cabarrus	
Chemical Specialties, Inc.	**0.02**
30107001	0.02
Grand Total	**0.02**

Table 5.3-1b Summary Of SCC 3-01-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
Cabarrus	
Chemical Specialties, Inc.	**0.01**
30107002	0.01
Gaston	
FMC Corporation - Lithium Division	**0.01**
30199998	0.01
Lubrizol Advanced Materials, Inc.	**0.01**
30102641	0.01
Mecklenburg	
Alphagary Corporation	**0.01**
30199998	0.01
Clariant Corporation	**0.03**
30112199	0.01
30182002	0.02

Table 5.3-1b Summary Of SCC 3-01-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
Emerald Carolina Chemical, LLC	**0.04**
30199998	0.04
IGM Resins Charlotte, Inc	**0.06**
30101822	0.05
30199998	0.01
INX International Ink Company	**0.03**
30112199	0.03
Masonite-Stanley Door Systems	**0.01**
30101881	0.01
Sun Chemical Corporation - Printing & Ink	**0.04**
30102005	0.01
30102099	0.03
US Polymers, Inc.	**0.02**
30182002	0.02
Rowan	
Indopco, Inc. dba Henkel,	**0.29**
30199998	0.29
Performance Fibers Operations, Inc. - Salisbury Plant	**0.05**
30102403	0.02
30102499	0.03
Grand Total	**0.61**

Table 5.3-2a Summary Of SCC 3-02-xxx-xx NOx Emissions

County/Plant/SCC	2010 NOx
Cabarrus	
S & D Coffee, Inc.	**0.01**
30200220	0.01
Mecklenburg	
Cargill, Inc.	**0.01**
30290003	0.01
Frito-Lay, Incorporated	**0.01**
30299998	0.01
Keebler Company	**0.01**
30203205	0.01
Lance, Incorporated	**0.03**
30290003	0.03

Table 5.3-2a Summary Of SCC 3-02-xxx-xx NOx Emissions

County/Plant/SCC	2010 NOx
Union	
Bakery Feeds	**0.09**
30200801	0.05
30200804	0.05
Grand Total	**0.16**

Table 5.3-2b Summary Of SCC 3-02-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
Cabarrus	
Philip Morris USA Inc., Cabarrus Manufacturing Facility	**1.30**
30203399	1.30
S & D Coffee, Inc.	**0.17**
30200220	0.14
30200221	0.03
Gaston	
Orograin - Gastonia	**0.01**
30203201	0.01
Valley Proteins, Inc. dba Carolina By-Products - Gastonia	**0.02**
30203801	0.02
Mecklenburg	
Cargill, Inc.	**0.01**
30201918	0.01
Frito-Lay, Incorporated	**0.01**
30203601	0.01
Keebler Company	**0.03**
30203205	0.03
Lance, Incorporated	**0.23**
30203202	0.23
Union	
Bakery Feeds	**0.34**
30200801	0.18
30200804	0.16
Grand Total	**1.09**

Table 5.3-3 Summary Of SCC 3-03-xxx-xx NOx Emissions

County/Plant/SCC	2010 NOx
Rowan	
Hitachi Metals North Carolina, Ltd.	**0.01**
30399999	0.01
Union	
Cooper Tools, LLC - Monroe Operation	**0.05**
30390003	0.05
Grand Total	**0.06**

Table 5.3-4a Summary Of SCC 3-04-xxx-xx NOx Emissions

County/Plant/SCC	2010 NOx
Mecklenburg	
Charlotte Pipe & Foundry Company, Inc.	**0.06**
30400301	0.05
30400371	0.01
Gerdau Ameristeel US Inc. Charlotte Steel Mill Div	**0.16**
30400701	0.05
30400799	0.09
30490003	0.01
Rowan	
Norandal USA Inc	**0.04**
30490033	0.04
Grand Total	**0.26**

Table 5.3-4b Summary Of SCC 3-04-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
Mecklenburg	
Charlotte Pipe & Foundry Company, Inc.	**0.09**
30400320	0.07
30400360	0.01
30400371	0.01
Gerdau Ameristeel US Inc. Charlotte Steel Mill Div	**0.07**
30400701	0.07

County/Plant/SCC	2010 VOC
Rowan	
Norandal USA Inc	**2.31**
30400150	2.24
30488801	0.01
30490033	0.07
Grand Total	**2.47**

Table 5.3-5a Summary Of SCC 3-05-xxx-xx NOx Emissions

County/Plant/SCC	2010 NOx
Cabarrus	
Blythe Brothers Asphalt Co., LLC - Concord Plant	**0.02**
30500242	0.02
Blythe Construction, Inc., Plant No. 2	**0.01**
30500255	0.01
Ferebee Asphalt Corporation	**0.01**
30500255	0.01
Gelder Thompson Asphalt Plant - Midland ** INACTIVE **	**0.01**
30500240	0.01
Gaston	
Rea Contracting, LLC 075 Bessemer City Plant ** INACTIVE **	**0.01**
30500258	0.01
Iredell	
NGK Ceramics USA, Inc.	**0.02**
30500850	0.02
Lincoln	
Blythe Construction, Inc., Plant No. 8	**0.01**
30500242	0.01
Cataler North America Corporation	**0.10**
30515002	0.10
Rea Contracting (Denver)	**0.01**
30500258	0.01
Mecklenburg	
Blythe Construction, Inc. - North Plant	**0.01**
30500206	0.01
Ferebee Asphalt Corporation- Statesville Rd. Plant	**0.01**
30500206	0.01

Table 5.3-5a Summary Of SCC 3-05-xxx-xx NOx Emissions

County/Plant/SCC	2010 NOx
30500257	0.01
Rea Contracting (069 Arrowood)	**0.01**
30500210	0.01
Rea Contracting, LLC. (068 Matthews)	**0.01**
30500206	0.01
Rowan	
Boral Bricks Inc - Salisbury Plant	**0.04**
30500310	0.04
Carolina Stalite Company	**1.61**
30502910	1.61
Old Carolina Brick Company	**0.01**
30500331	0.01
Rea Contracting (Kannapolis)	**0.01**
30500252	0.01
Taylor Clay Products, Inc.	**0.03**
30500311	0.01
30500331	0.02
Union	
Boggs Paving, Inc.	**0.02**
30500240	0.02
Hanson Brick East, LLC, dba Hanson Brick-Monroe	**0.01**
30500311	0.01
Grand Total	**1.96**

Table 5.3-5b Summary Of SCC 3-05-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
Cabarrus	
Blythe Brothers Asphalt Co., LLC - Concord Plant	**0.02**
30500242	0.02
Blythe Construction, Inc., Plant No. 2	**0.01**
30500255	0.01
Ferebee Asphalt Corporation	**0.01**
30500255	0.01
Gaston	
Rea Contracting, LLC 075 Bessemer City Plant ** INACTIVE **	**0.01**

Table 5.3-5b Summary Of SCC 3-05-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
30500258	0.01
Lincoln	
Blythe Construction, Inc., Plant No. 8	**0.01**
30500242	0.01
Rea Contracting (Denver)	**0.01**
30500258	0.01
Mecklenburg	
Blythe Brothers Asphalt Company, LLC Old Nations	**0.01**
30500255	0.01
Blythe Construction, Inc. - North Plant	**0.01**
30500206	0.01
Ferebee Asphalt Corp - Charlotte South Plant	**0.01**
30500257	0.01
Ferebee Asphalt Corporation- Statesville Rd. Plant	**0.01**
30500257	0.01
Rea Contracting - Mallard Creek	**0.01**
30500257	0.01
Rea Contracting (069 Arrowood)	**0.01**
30500210	0.01
Rowan	
Johnson Concrete Company, Inc., Central Division	**0.01**
30501101	0.01
Union	
Boggs Paving, Inc.	**0.02**
30500240	0.02
Grand Total	**0.12**

Table 5.3-6 Summary Of SCC 3-07-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
Gaston	
Bradington-Young LLC, Cherryville Plant	**0.03**
30703099	0.03
Mecklenburg	
International Paper Company	**0.02**

Table 5.3-6 Summary Of SCC 3-07-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
30701399	0.01
30799998	0.01
Union	
Edwards Wood Products, Inc.	**0.01**
30700898	0.01
Genwove US Ltd ** INACTIVE **	**0.01**
30700720	0.01
Grand Total	**0.07**

Table 5.3-7 Summary Of SCC 3-08-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
Mecklenburg	
Altec Industries, Inc.	**0.01**
30800724	0.01
Americh Corporation	**0.03**
30800722	0.03
Arjobex America	**0.01**
30899999	0.01
Prairie Packaging, Inc.	**0.01**
30801002	0.01
Union	
Charlotte Pipe and Foundry Company - Plastics Division	**0.02**
30801002	0.02
Darnel, Inc.	**0.19**
30800112	0.19
Grand Total	**0.27**

Table 5.3-8 Summary Of SCC 3-09-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
Mecklenburg	
Industrial Container Services - NC, LLC (Matthews)	**0.11**
30902501	0.11
SteelFab, Inc.	**0.04**
30988801	0.04

County/Plant/SCC	2010 VOC
Union	
Colfax Pump Group, IMO Pump Division	**0.01**
30900198	0.01
Grand Total	**0.15**

Table 5.3-9a Summary Of SCC 3-12-xxx-xx NOx Emissions

County/Plant/SCC	2010 NOx
Rowan	
Akzo Nobel Surface Chemistry LLC.	**0.01**
31299999	0.01
Grand Total	**0.01**

Table 5.3-9b Summary Of SCC 3-12-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
Gaston	
Stabilus, Inc.	**0.01**
31299999	0.01
Rowan	
HBD Industries Inc.	**0.02**
31299999	0.02
Grand Total	**0.03**

Table 5.3-10a Summary Of SCC 3-30-xxx-xx NOx Emissions

County/Plant/SCC	2010 NOx
Gaston	
Firestone Fibers & Textiles Company, LLC	**0.02**
33000199	0.02
Grand Total	**0.02**

Table 5.3-10b Summary Of SCC 3-30-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC

Table 5.3-10b Summary Of SCC 3-30-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
Cabarrus	
Fieldcrest Cannon Plant #1 ** INACTIVE **	**0.12**
33000499	0.07
33088801	0.05
Gaston	
Firestone Fibers & Textiles Company, LLC	**0.01**
33000199	0.01
J. Charles Saunders Company	**0.03**
33000103	0.03
Pharr Yarns, Inc., Space Dye Plant	**0.02**
33000306	0.02
Lincoln	
Textile Piece Dyeing Co., Inc.	**0.02**
33000104	0.02
Mecklenburg	
Forbo Movement Systems	**0.07**
33000212	0.01
33000297	0.04
33000299	0.02
Grand Total	**0.27**

Table 5.3-11 Summary Of SCC 3-90-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
Lincoln	
South Fork Industries, Inc.	**0.01**
39000699	0.01
Grand Total	**0.01**

Table 5.3-12a Summary Of SCC 3-99-xxx-xx NOx Emissions

County/Plant/SCC	2010 NOx
Cabarrus	
Corning Incorporated	**0.27**

County/Plant/SCC	2010 NOx
39999994	0.27
Gaston	
Affinia Group, Inc., Wix Filtration Corp. - Allen Plant	**0.01**
39999994	0.01
Grand Total	**0.28**

Table 5.3-12b Summary Of SCC 3-99-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
Cabarrus	
Carolina Counters Corporation	**0.01**
39999994	0.01
Gaston	
Affinia Group, Inc., Wix Filtration Corp. - Allen Plant	**0.10**
39999994	0.10
Affinia Group, Inc., Wix Filtration Corp. - D ** INACTIVE **	**0.03**
39999994	0.03
Lubrizol Advanced Materials, Inc.	**0.01**
39999996	0.01
Iredell	
Transcontinental Gas Pipeline Company, LLC	**0.01**
39999997	0.01
Mecklenburg	
Foamex Innovations, Inc.	**0.02**
39999989	0.02
Union	
Cooper Tools, LLC - Monroe Operation	**0.01**
39999994	0.01
Grand Total	**0.19**

5.4 PETROLEUM AND SOLVENT EVAPORATION

This group of sources emits volatile organic compounds (VOC). SCCs in the 4-01-xxx-xx group are sources for organic solvent evaporation. Surface coating operations are grouped under SCC

4-02-xxx-xx. Non-refinery petroleum liquids storage falls under group 4-04-xxx-xx. Printing and publishing are in the 4-05-xxx-xx group of SCC. SCC group 4-07-xxx-xx covers organic chemical storage. SCC 4-08-xxx-xx pertains to organic chemical transportation. Organic solvent evaporation falls under 4-90-xxx-xx.

In the following summary tables, NOx or VOC emissions daily emissions that are smaller than 0.01 tons/day are not be included in the summary.

Table 5.4-1 Summary Of SCC 4-01-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
Lincoln	
CPI Packaging, Inc.	**0.31**
40188898	0.31
Robert Bosch Tool Corporation ** INACTIVE **	**0.01**
40188898	0.01
Mecklenburg	
Anilox Roll Co., Inc. (ARC Intl.)	**0.01**
40188801	0.01
Duff Norton	**0.01**
40100295	0.01
Flextronics	**0.02**
40100335	0.02
Harper Corporation of America	**0.01**
40100398	0.01
Mount Hope Machinery Company	**0.02**
40100251	0.02
US Airways, Four (4) Site Locations	**0.04**
40100257	0.04
Rowan	
Akzo Nobel Surface Chemistry LLC.	**0.01**
40100501	0.01
GDX Automotive ** INACTIVE **	**0.03**
40188898	0.03
Union	
AEP Industries, Inc.	**0.03**
40188898	0.03
Caledonian Alloys, Inc.	**0.07**
40100255	0.07

Table 5.4-1 Summary Of SCC 4-01-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
Grand Total	**0.54**

Table 5.4-2a Summary Of SCC 4-02-xxx-xx NOx Emissions

County/Plant/SCC	2010 NOx
Gaston	
American & Efird Plants #5 & #15	**0.01**
40288822	0.01
Firestone Fibers and Textiles Company, Kings Mountain Plant	**0.09**
40204230	0.08
40204330	0.01
Lincoln	
Mohican Mills, Inc.	**0.01**
40201101	0.01
Mecklenburg	
Exopack Advanced Coatings	**0.01**
40290013	0.01
Grand Total	**0.12**

Table 5.4-2b Summary Of SCC 4-02-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
Cabarrus	
Berenfield Containers SE Ltd	**0.21**
40202601	0.21
Corning Incorporated	**0.03**
40202899	0.03
Whitley Handle, Inc.	**0.10**
40200501	0.10
Gaston	
Affinia Group, Inc., Wix Filtration Corp. - Allen Plant	**0.12**
40200101	0.10
40201301	0.03
Firestone Fibers and Textiles Company, Kings Mountain Plant	**0.01**
40204330	0.01

Table 5.4-2b Summary Of SCC 4-02-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
Freightliner LLC--Mount Holly Truck Manufacturing Plant	**0.08**
40201631	0.08
Gastonia Components & Logistics, LLC	**0.04**
40202501	0.01
40202520	0.02
40299998	0.01
LNS Turbo, Inc. - Kings Mountain	**0.02**
40202501	0.02
Parker Hannifan Corporation	**0.01**
40200101	0.01
Pharr Yarns, Inc., Space Dye Plant	**0.01**
40201121	0.01
Stabilus, Inc.	**0.18**
40201801	0.18
Iredell	
Custom Products, Inc.	**0.02**
40201101	0.02
Lincoln	
HOF Textiles, Inc.	**0.04**
40204230	0.04
McMurray Fabrics, Inc. - Lincolnton	**0.06**
40206030	0.06
Mohican Mills, Inc.	**0.02**
40201101	0.01
40206030	0.01
Robert Bosch Tool Corporation ** INACTIVE **	**0.02**
40202501	0.02
40202502	0.01
VT LeeBoy, Inc.	**0.03**
40299998	0.03
Wireway/Husky Systems	**0.07**
40201806	0.06
40202501	0.01
Mecklenburg	
Aplix, Incorporated	**0.03**
40201101	0.03
Carrier Corporation (Charlotte Chiller Ops)	**0.02**
40200701	0.01

Table 5.4-2b Summary Of SCC 4-02-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
40201401	0.01
D.C. Paint Works, Inc.	**0.02**
40299995	0.02
Duff Norton	**0.01**
40200110	0.01
Exopack Advanced Coatings	**0.05**
40201301	0.02
40299995	0.02
Forbo Siegling, LLC	**0.03**
40201103	0.02
40299995	0.01
General Steel Drum Corporation	**0.20**
40202607	0.20
Industrial Container Services -NC, LLC (Charlotte)	**0.15**
40202607	0.15
New South Fabricators LLC	**0.01**
40200101	0.01
Norfolk Southern Railway Company	**0.01**
40202537	0.01
Pan-Glo Charlotte	**0.04**
40201799	0.04
Reman Technologies	**0.01**
40202502	0.01
Sign Art	**0.01**
40299995	0.01
Southwood Corporation	**0.01**
40202103	0.01
Trane U.S., Inc.	**0.01**
40202501	0.01
Zepsa Industries, Incorporated	**0.03**
40202111	0.03
Rowan	
Athena Marble Inc.	**0.02**
40200711	0.01
40299998	0.01
B & E Custom Cabinets, Inc.	**0.01**
40202111	0.01
Baja Products Ltd.	**0.01**
40299998	0.01
Daimler Trucks North America - Cleveland Plant	**0.54**

Table 5.4-2b Summary Of SCC 4-02-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
40202501	0.54
Goodman Millwork, Inc.	**0.02**
40201901	0.02
Magna Composites LLC - Salisbury Operations	**0.01**
40202201	0.01
McKenzie Sports Products, Inc.	**0.01**
40288822	0.01
Perma-flex Roller Technology - Salisbury, LLC	**0.01**
40200701	0.01
W A Brown and Son Inc - Plant 2	**0.01**
40202501	0.01
Union	
Conn-Selmer Ludwig Facility Plant 2	**0.01**
40201901	0.01
Conn-Selmer Ludwig Facility, Plant 3	**0.01**
40200101	0.01
Darnel, Inc.	**0.02**
40202299	0.02
Decore-ative Specialties, Inc.	**0.01**
40201901	0.01
Hudson Bros. Trailer Mfg., Inc.	**0.01**
40202106	0.01
McGee Corporation	**0.01**
40202543	0.01
Mint Hill Cabinet Shop, Inc.	**0.04**
40201901	0.04
Yale Security Inc., Norton Door Controls	**0.02**
40202501	0.02
Grand Total	**2.53**

Table 5.4-3 Summary Of SCC 4-04-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
Mecklenburg	
Charlotte BP Terminal	**0.06**
40400117	0.01
40400153	0.02
40400171	0.01

Table 5.4-3 Summary Of SCC 4-04-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
40400250	0.01
40400261	0.01
Citgo Petroleum Corporation	**0.03**
40400199	0.01
40400250	0.02
Colonial Pipeline Company	**0.03**
40400130	0.01
40400199	0.01
40400251	0.02
Kinder Morgan SE Terminals - (CT#1 & CT#2)	**0.04**
40400153	0.02
40400199	0.02
Magellan Terminals Holdings, L.P. - Charlotte I	**0.04**
40400140	0.01
40400152	0.01
40400153	0.01
40400170	0.01
Magellan Terminals Holdings, L.P. - Charlotte II	**0.01**
40400199	0.01
Marathon Petroleum Company LP	**0.02**
40400107	0.01
40400250	0.01
Motiva Enterprises LLC - Motiva Charlotte Complex	**0.08**
40400153	0.04
40400161	0.01
40400199	0.03
TransMontaigne - Charlotte Piedmont Terminal	**0.04**
40400116	0.04
40400153	0.01
Grand Total	**0.36**

Table 5.4-4a Summary Of SCC 4-05-xxx-xx NOx Emissions

County/Plant/SCC	2010 NOx
Mecklenburg	
RR Donnelley	**0.01**
40500101	0.01
Union	

County/Plant/SCC	2010 NOx
OMNOVA Solutions, Inc.	**0.01**
40500101	0.01
Grand Total	**0.02**

Table 5.4-4b Summary Of SCC 4-05-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
Iredell	
D&F Consolidated, Inc. dba Car-Mel Products, Inc.	**0.01**
40500301	0.01
Mecklenburg	
Belk Printing Technologies	**0.01**
40500401	0.01
Caraustar Carolina Carton	**0.03**
40588801	0.03
CCL Label, Inc.	**0.04**
40588801	0.04
Classic Graphics, Inc.	**0.03**
40500401	0.03
Graphic Packaging International, Inc.	**0.06**
40588801	0.06
Herff Jones Incorporated	**0.01**
40588801	0.01
Keller Crescent Company	**0.02**
40588801	0.02
Kurz Transfer Products, L.P.	**0.01**
40500597	0.01
Labeltec, Inc./Pharmaprint, Inc.	**0.01**
40500301	0.01
Loftin & Company, Inc.	**0.01**
40588801	0.01
RR Donnelley	**0.06**
40500401	0.06
Southern Converters Inc.	**0.05**
40500501	0.05
The Charlotte Observer Publishing Company	**0.02**
40588801	0.02
Vertis, Inc.	**0.10**
40500411	0.05

Table 5.4-4b Summary Of SCC 4-05-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
40500412	0.05
WorkflowOne	**0.02**
40500201	0.02
Union	
Nina Plastics	**0.37**
40500301	0.37
OMNOVA Solutions, Inc.	**0.15**
40500801	0.09
40588801	0.06
Rock - Tenn Company ** INACTIVE **	**0.01**
40500301	0.01
Grand Total	**1.01**

Table 5.4-5 Summary Of SCC 4-07-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
Mecklenburg	
Nexeo Solutions, LLC	**0.01**
40799997	0.01
Rowan	
Indopco, Inc. dba Henkel,	**0.04**
40799999	0.04
Grand Total	**0.05**

Table 5.4-6a Summary Of SCC 4-90-xxx-xx NOx Emissions

County/Plant/SCC	2010 NOx
Rowan	
Akzo Nobel Surface Chemistry LLC.	**0.01**
49000199	0.01
Grand Total	**0.01**

Table 5.4-6b Summary Of SCC 4-90-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC

Table 5.4-6b Summary Of SCC 4-90-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
Cabarrus	
Corning Incorporated	**0.03**
49099998	0.03
Gaston	
Gatza Marble Products	**0.02**
49099998	0.02
Modern Polymers, Inc.	**0.15**
49099998	0.15
Pharr Yarns Complex 46	**0.05**
49099998	0.05
Lincoln	
CPI Packaging, Inc.	**0.31**
49099998	0.31
Mecklenburg	
Cadmus	**0.07**
49099998	0.07
G & K Services	**0.02**
49000199	0.02
Genpak LLC	**0.17**
49099998	0.15
49099999	0.03
Kinder Morgan SE Terminals - (CT#1 & CT#2)	**0.01**
49099999	0.01
Mallard Creek Polymers, Inc.	**0.01**
49099998	0.01
Metromont Corporation	**0.01**
49099998	0.01
Siemens Power Generation, Inc.	**0.09**
49099998	0.09
Spectrum Graphics, Inc.	**0.01**
49099998	0.01
Rowan	
Akzo Nobel Surface Chemistry LLC.	**0.20**
49099998	0.20
Magna Composites LLC - Salisbury Operations	**0.02**
49099998	0.02

Table 5.4-6b Summary Of SCC 4-90-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
Union	
Cooper Tools, LLC - Monroe Operation	**0.01**
49090013	0.01
Grand Total	**1.17**

5.5 WASTE DISPOSAL

Waste disposal includes government solid waste disposal, in group 5-01-xxx-xx. Commercial and institutional solid waste disposal processes are in the 5-02-xxx-xx SCC group. Industrial solid waste disposal falls into group 5-03-xxx-xx.

In the following summary tables, NOx or VOC emissions daily emissions that are smaller than 0.01 tons/day are not be included in the summary.

Table 5.5-1 Summary Of SCC 5-01-xxx-xx NOx Emissions

County/Plant/SCC	2010 NOx
Mecklenburg	
C-MUD: McAlpine Creek Wastewater Treatment Plant	**0.01**
50100701	0.01
MNC Holdings, LLC	**0.01**
50200101	0.01
Grand Total	**0.02**

Table 5.5-2a Summary Of SCC 5-03-xxx-xx NOx Emissions

County/Plant/SCC	2010 NOx
Cabarrus	
BFI Waste Systems of North America, CMS Landfill V	**0.14**
50300601	0.14
WSACC - Rocky River Regional WWTP	**0.04**
50382501	0.04
Grand Total	**0.17**

Table 5.5-2b Summary Of SCC 5-03-xxx-xx VOC Emissions

County/Plant/SCC	2010 VOC
Cabarrus	
BFI Waste Systems of North America, CMS Landfill V	**0.07**
50300601	0.07
WSACC - Rocky River Regional WWTP	**0.01**
50382501	0.01
Grand Total	**0.08**

6.0 2009 ANNUAL EMISSIONS

Metrolina 2009 NOx annual emissions by facility are listed in Table 6.0-1 and Metrolina 2009 VOC annual emissions by facility are list in Table 6.0-2. Emissions for Duke Energy Allen Steam Station and Riverbend Steam Station, located in Gaston County; and Duke Energy Buck Steam Station, located in Rowan County, are 2010 emissions provided by Duke Energy.

Table 6.0-1 Metrolina 2009 NOx Annual Emissions by Facility

County	Facility ID	PLANT	SIC#	2009 (ton/yr)
Cabarrus	1300078	Americhem, Inc.	3087	1.46
Cabarrus	1300027	Berenfield Containers SE Ltd	3412	0.94
Cabarrus	1300110	BFI Waste Systems of North America, CMS Landfill V	4953	48.99
Cabarrus	1300101	Blythe Brothers Asphalt Co., LLC - Concord Plant	2951	7.80
Cabarrus	1300074	Blythe Construction, Inc., Plant No. 2	2951	2.39
Cabarrus	1300140	Carolina Counters Corporation	3088	0.16
Cabarrus	1300040	Chemical Specialties, Inc.	2819	10.72
Cabarrus	1300005	CMC - Northeast, Inc.	8062	9.90
Cabarrus	1300144	Coddle Creek WTP ** INACTIVE **	4931	2.50
Cabarrus	1300103	Concord City Generating Plant #1	4911	20.00
Cabarrus	1300104	Concord City Generating Plant #2	4911	15.00
Cabarrus	1300065	Concrete Supply Company, Concord Plant	3273	0.06
Cabarrus	1300117	Corning Incorporated	3229	98.38
Cabarrus	1300135	Ferebee Asphalt Corporation	2951	2.91
Cabarrus	1300006	Fieldcrest Cannon Plant #1 ** INACTIVE **	2211	1.47
Cabarrus	1300029	Galvan Industries, Inc.	3479	3.18
Cabarrus	1300146	Gelder Thompson Asphalt Plant - Midland ** INACTIVE **	2951	2.02
Cabarrus	1300083	Greif Packaging, LLC - Southeastern Packaging	2653	3.44
Cabarrus	1300047	Johnson Concrete Company, Piedmont Block Division	3273	0.58

Table 6.0-1 Metrolina 2009 NOx Annual Emissions by Facility

County	Facility ID	PLANT	SIC#	2009 (ton/yr)
Cabarrus	1300113	Kannapolis Energy Partners LLC-Kannapolis ** INACTIVE **	4961	380.3
Cabarrus	1300136	Martin Marietta Materials, Inc. - Bonds Quarry	1423	14.02
Cabarrus	1300098	McGee Brothers Company, Inc.	3273	0.01
Cabarrus	1300102	Pass & Seymour/legrand ** INACTIVE **	3644	0.75
Cabarrus	1300107	Perdue Farms Incorporated, Concord	2015	7.51
Cabarrus	1300048	Philip Morris USA Inc., Cabarrus Manufacturing Facility	2111	42.79
Cabarrus	1300086	Rinker Materials Concrete Pipe Division	3272	0.36
Cabarrus	1300051	S & D Coffee, Inc.	2095	4.72
Cabarrus	1300129	Southern Concrete Materials - Concord Plant	3273	0.01
Cabarrus	1300075	Technicon Acoustics	3089	0.12
Cabarrus	1300131	Thomas Concrete Company, Inc., Concord Plant	3273	0.18
Cabarrus	1300151	Thomas Concrete of Carolina, Inc. - Harrisburg Plant	3273	0.35
Cabarrus	1300067	Vulcan Construction Materials LP - Gold Hill	1411	2.24
Cabarrus	1300002	WSACC - Rocky River Regional WWTP	4952	13.93
Cabarrus	1300137	WSACC-Lower Rocky River Pump Station	4952	0.39
Cabarrus		**Total**		**699.58**
Gaston	3600137	Affinia Group, Inc., Wix Filtration Corp. - Allen Plant	3714	6.27
Gaston	3600144	Apex Tool Group (Gastonia Operations)	3423	2.00
Gaston	3600233	Buckeye Mt. Holly, LLC	2676	15.91
Gaston	3600049	Caromont Health, Gaston Memorial Hospital	8062	9.16
Gaston	3600315	Catawba Creek Pump Station	4941	0.64
Gaston	3600124	Chemtura Corporation	2821	2.18
Gaston	3600307	City of Gastonia - Duhart Creek Pump Station ** INACTIVE **	4941	1.50
Gaston	3600327	City of Gastonia - Duhart Creek Pump Station ** INACTIVE **	4911	1.09
Gaston	3600031	City of Gastonia - Duhart Creek Pump Station ** INACTIVE **	3273	0.02
Gaston	3600316	Crowders Creek WWTP	4952	1.80
Gaston	3600040	Duke Energy Carolinas, LLC - Riverbend Steam Station	4911	1538.20
Gaston	3600039	Duke Power Company, LLC - Allen Steam Station	4911	5045.10
Gaston	3600020	Eagle Mountain Finishing LLC ** INACTIVE **	2231	20.93
Gaston	3600044	Firestone Fibers & Textiles Company, LLC	2296	7.95
Gaston	3600251	Firestone Fibers and Textiles Company, Kings Mountain	2296	34.02
Gaston	3600172	Fleischmanns Yeast Inc **Inactive**	2099	2.11
Gaston	3600078	FMC Corporation - Lithium Division	2819	16.81
Gaston	3600153	Freightliner LLC--Mount Holly Truck Manufacturing	3711	2.93

Table 6.0-1 Metrolina 2009 NOx Annual Emissions by Facility

County	Facility ID	PLANT	SIC#	2009 (ton/yr)
Gaston	3600285	Gaston Community College	8221	0.95
Gaston	3600152	Gastonia Components & Logistics, LLC	3714	2.05
Gaston	3600299	Gastonia Water Treatment Plant ** INACTIVE **	4941	4.20
Gaston	3600219	J. Charles Saunders Company	2284	0.33
Gaston	3600314	Long Creek WWTP	4952	4.50
Gaston	3600128	Lubrizol Advanced Materials, Inc.	2821	5.90
Gaston	3600246	Modern Polymers, Inc.	3089	1.39
Gaston	3600330	NC Municipal Power Agency No. 1 - Cherryville City Hall Unit	4911	0.70
Gaston	3600325	NC Municipal Power Agency No. 1 - Gastonia Freightliner	4911	2.24
Gaston	3600338	NC Municipal Power Agency No. 1 - Gastonia Prime Power Park	4911	0.95
Gaston	3600312	NC Municipal Power Agency No. 1-Gastonia Plant 1	4911	0.47
Gaston	3600313	NC Municipal Power Agency No. 1-Gastonia Plant 2	4911	2.16
Gaston	3600281	Orograin - Gastonia	2051	1.11
Gaston	3600157	Parker Hannifan Corporation	3594	0.42
Gaston	3600094	Pharr Yarns I-85 Complex	2281	0.55
Gaston	3600091	Pharr Yarns Complex 46	2281	12.02
Gaston	3600310	Pharr Yarns, Inc., Space Dye Plant	2269	4.02
Gaston	3600142	Smith Textile Apron	2429	0.05
Gaston	3600093	Spartan Dyers, Inc., Sterling Division	2281	3.57
Gaston	3600167	Stabilus, Inc.	3499	1.42
Gaston	3600053	RADICISPANDEX Corporation ** INACTIVE **	2824	42.50
Gaston	3600252	Rea Contracting, LLC 075 Bessemer City Plant ** INACTIVE **	2951	4.77
Gaston	3600026	Valley Proteins, Inc. dba Carolina By-Products - Gastonia	2077	34.82
Gaston	3600056	Yorkshire Americas, Inc. ** INACTIVE **	2865	5.35
Gaston		**Total**		**6845.06**
Iredell	4900292	BestSweet, Inc.	2064	3.43
Iredell	4900264	Lake Norman Regional Medical Center	8062	2.88
Iredell	4900201	Matsushita Compressor Corp **Inactive**	3639	1.92
Iredell	4900172	NGK Ceramics USA, Inc.	3299	11.80
Iredell	4900225	Transcontinental Gas Pipeline Company, LLC	4922	1153.46
Iredell		**Total**		**1173.49**

Table 6.0-1 Metrolina 2009 NOx Annual Emissions by Facility

County	Facility ID	PLANT	SIC#	2009 (ton/yr)
Lincoln	5500093	Blythe Construction, Inc., Plant No. 8	2951	3.30
Lincoln	5500106	Cataler North America Corporation	3714	35.22
Lincoln	5500089	CPI Packaging, Inc.	3086	0.14
Lincoln	5500082	Duke Energy Corporation LCTS	4911	10.24
Lincoln	5500091	HOF Textiles, Inc.	2297	4.11
Lincoln	5500005	La-Z-Boy Chair - Burris Division ** INACTIVE **	2512	9.23
Lincoln	5500110	Lincolnton Wastewater Treatment Plant	4952	5.20
Lincoln	5500090	McMurray Fabrics, Inc.	3552	1.08
Lincoln	5500043	McMurray Fabrics, Inc. - Lincolnton	2262	9.71
Lincoln	5500029	Mohican Mills, Inc.	2258	27.70
Lincoln	5500027	National Fruit Product Company, Inc.	2033	8.65
Lincoln	5500115	NC Municipal Power Agency No. 1 -Lincolnton High School Unit	4911	0.61
Lincoln	5500111	Rea Contracting (Denver)	2951	4.80
Lincoln	5500044	Robert Bosch Tool Corporation ** INACTIVE **	3425	0.49
Lincoln	5500080	South Fork Industries, Inc.	2257	6.14
Lincoln	5500013	Textile Piece Dyeing Co., Inc.	2262	2.52
Lincoln	5500046	The Timken Company, Lincolnton Bearing Plant	3562	10.51
Lincoln	5500114	VT LeeBoy, Inc.	3531	0.05
Lincoln	5500075	Wireway/Husky Systems	3499	0.04
Lincoln		**Total**		**139.74**
Mecklenburg	R508	Aloft Charlotte Ballantyne	6799	
Mecklenburg	0756	ALSCO, Inc.	7213	1.09
Mecklenburg	0063	Aplix, Incorporated	2295	0.32
Mecklenburg	0177	ARAMark Uniform Services, Inc.	7218	0.84
Mecklenburg	0322	Associated Asphalt Charlotte, LLC	5032	1.28
Mecklenburg	E004	AT&T North Carolina - 22506	4812	
Mecklenburg	0067	Barnhardt Manufacturing Company	2269	5.96
Mecklenburg	0909	Barrday Corporation	2221	1.32
Mecklenburg	0738	Blythe Brothers Asphalt Company, LLC Old Nations	2951	1.02
Mecklenburg	0578	Blythe Construction, Inc.	2951	0.07
Mecklenburg	0772	Blythe Construction, Inc. - East Plant	2951	1.75
Mecklenburg	0113	Blythe Construction, Inc. - North Plant	2951	2.13
Mecklenburg	0024	C & C Boiler - Portable Boiler System	7359	0.07
Mecklenburg	0710	C & M Recycling, Inc.	3272	4.63
Mecklenburg	0069	Cargill, Inc.	2079	34.35

Table 6.0-1 Metrolina 2009 NOx Annual Emissions by Facility

County	Facility ID	PLANT	SIC#	2009 (ton/yr)
Mecklenburg	0289	Carolinas Medical Center	8062	8.61
Mecklenburg	0230	Carolinas Medical Center - Mercy	8062	4.19
Mecklenburg	0109	Carolinas Medical Center - Pineville	8062	2.24
Mecklenburg	0311	Carrier Corporation (Charlotte Chiller Ops)	3585	0.97
Mecklenburg	0910	CEMEX Construction Materials Atlantic, LLC	3273	0.00
Mecklenburg	0100	CEMEX Construction Materials Cottonwood Ready Mix	3273	0.02
Mecklenburg	0182	CEMEX Construction Materials Reames Road Operation	3273	0.42
Mecklenburg	0987	Ceramco-Printech, Inc.	3555	0.01
Mecklenburg	0872	Charlotte Douglas International Airport	4581	2.65
Mecklenburg	0789	Charlotte Mecklenburg Schools Building Services	5541	
Mecklenburg	0626	Charlotte Pipe & Foundry Company, Inc.	3321	23.12
Mecklenburg	0009	CHT R. Beitlich Corporation	2843	
Mecklenburg	6000687	Clariant Corporation	2865	11.07
Mecklenburg	0020	C-MUD: Franklin Water Treatment Plant	4941	5.70
Mecklenburg	0937	C-MUD: Lee S. Dukes, Jr. Water Plant	4941	0.40
Mecklenburg	0678	C-MUD: Mallard Creek Water Reclamation Facility	4952	3.38
Mecklenburg	0764	C-MUD: McAlpine Creek Wastewater Treatment Plant	4953	16.70
Mecklenburg	0740	C-MUD: McDowell Creek Wastewater Treatment Plant	4952	1.85
Mecklenburg	0036	Coatings 2000	2851	0.01
Mecklenburg	0096	Coca-Cola Bottling Co. Consolidated (Snyder Fac)	2086	2.30
Mecklenburg	0150	Concrete Supply Co. - Arrowood	3273	0.03
Mecklenburg	0281	Concrete Supply Co. - Croft	3273	0.03
Mecklenburg	0654	Concrete Supply Co. - North	3273	0.04
Mecklenburg	0656	Concrete Supply Co. - South	3273	0.00
Mecklenburg	0655	Concrete Supply Co. - West	3273	0.00
Mecklenburg	0704	Cumulus Fibres	2299	0.72
Mecklenburg	0222	D.H. Griffin Grading & Crushing, LLC	3295	1.32
Mecklenburg	0004	Davidson College	8221	5.94
Mecklenburg	0114	Detrex Corporation	2869	
Mecklenburg	0269	Duke Energy - McGuire Nuclear Station	4911	16.21
Mecklenburg	0595	Emerald Carolina Chemical, LLC	2821	3.90
Mecklenburg	0001	Exopack Advanced Coatings	3083	6.10
Mecklenburg	0963	Ferebee Asphalt Corp - Charlotte South Plant	2951	4.09
Mecklenburg	0736	Ferebee Asphalt Corporation- Statesville Rd. Plant	2951	6.66
Mecklenburg	0793	Flextronics	3679	6.87
Mecklenburg	0570	Foamex Innovations, Inc.	2821	
Mecklenburg	0773	Forbo Movement Systems	3052	
Mecklenburg	0280	Forbo Siegling, LLC	2295	3.70

Table 6.0-1 Metrolina 2009 NOx Annual Emissions by Facility

County	Facility ID	PLANT	SIC#	2009 (ton/yr)
Mecklenburg	0022	Frito-Lay, Incorporated	2096	58.82
Mecklenburg	0323	G & K Services	7218	
Mecklenburg	0749	General Electric International, Inc.	7699	0.01
Mecklenburg	0054	General Steel Drum Corporation	3412	1.61
Mecklenburg	0123	Genpak LLC	3086	0.90
Mecklenburg	0567	Gerdau Ameristeel US Inc. Charlotte Steel Mill Div	3312	58.51
Mecklenburg	0709	Herff Jones Incorporated	2752	
Mecklenburg	0058	Huntersville Hardwoods	2426	24.93
Mecklenburg	0663	Huntsman Textile Effects	2899	0.46
Mecklenburg	0590	IGM Resins Charlotte, Inc	2869	3.23
Mecklenburg	0588	Industrial Container Services - NC, LLC (Matthews)	7699	0.83
Mecklenburg	0225	Industrial Container Services -NC, LLC (Charlotte)	7699	1.51
Mecklenburg	0008	International Paper Company	2653	0.00
Mecklenburg	0381	International Paper Company	2653	2.68
Mecklenburg	0733	Interstate Custom Crushing, LLC	3295	2.25
Mecklenburg	0796	INX International Ink Company	2893	0.18
Mecklenburg	0015	IPEX USA LLC	3084	
Mecklenburg	0999	J.T. Russell & Sons, Inc.	2951	1.05
Mecklenburg	0741	Jenkins Electric Company	7694	
Mecklenburg	0045	Keebler Company	2052	2.19
Mecklenburg	0682	Lance, Incorporated	2052	19.93
Mecklenburg	0087	Lincoln Harris, LLC	6099	3.92
Mecklenburg	0039	Livingstone Coating Corporation	3479	0.00
Mecklenburg	0148	Mallard Creek Polymers, Inc.	2821	4.12
Mecklenburg	0176	Masonite-Stanley Door Systems	3442	0.02
Mecklenburg	0975	Masonry Reinforcing Corp. of America	3479	
Mecklenburg	0185	Mast Brothers Tank Cleaning, Inc.	7389	
Mecklenburg	0132	Metrolina Greenhouses, Inc.	0181	16.22
Mecklenburg	0284	Metromont Corporation	3272	0.59
Mecklenburg	0099	MNC Holdings, LLC	4953	3.33
Mecklenburg	0753	Norfolk Southern Railway Company	4011	
Mecklenburg	0038	North Carolina Air National Guard	9711	0.05
Mecklenburg	0201	Novant Healthcare's Presbyterian Hospital	8062	6.20
Mecklenburg	0117	Pan-Glo Charlotte	7699	0.31
Mecklenburg	0799	Pavestone Company	3271	0.00
Mecklenburg	0832	Piedmont Natural Gas Co., Inc.	5541	3.91
Mecklenburg	0971	Prairie Packaging, Inc.	3086	0.29
Mecklenburg	0936	Presbyterian Hospital - Matthews	8069	0.26

Table 6.0-1 Metrolina 2009 NOx Annual Emissions by Facility

County	Facility ID	PLANT	SIC#	2009 (ton/yr)
Mecklenburg	0785	Presbyterian Hospital Huntersville	8062	3.56
Mecklenburg	0213	Process Innovation LLC	2841	0.00
Mecklenburg	R523	Quala Services, LLC	7699	4.01
Mecklenburg	0257	Rea Contracting - Mallard Creek	2951	2.11
Mecklenburg	0506	Rea Contracting - Portable Concrete	3273	
Mecklenburg	0134	Rea Contracting (069 Arrowood)	2951	4.24
Mecklenburg	0900	Rea Contracting, LLC. (068 Matthews)	2951	2.47
Mecklenburg	0398	Ready Mixed Concrete Company	3273	
Mecklenburg	0206	Ready Mixed Concrete Company-Reames Plant	3241	
Mecklenburg	0668	Red Clay Industries	1499	6.22
Mecklenburg	0804	Reman Technologies	3519	0.76
Mecklenburg	0690	Rohm and Haas Chemicals, LLC	2821	0.85
Mecklenburg	0108	RR Donnelley	2752	3.10
Mecklenburg	0915	Sanders Brothers Construction Company	1795	
Mecklenburg	0568	Siemens Power Generation, Inc.	3511	9.46
Mecklenburg	0563	Southern Concrete - Old Concord Road	3273	
Mecklenburg	0562	Southern Concrete - State St.	3273	
Mecklenburg	0887	Southern Concrete Materials - South Plant	3273	
Mecklenburg	0003	SteelFab, Inc.	3441	0.13
Mecklenburg	0959	Sterigenics U.S. LLC	7389	1.94
Mecklenburg	0968	Stork Prints America, Inc.	3471	1.33
Mecklenburg	0667	Superior Fire Hose Corporation	3061	
Mecklenburg	0133	Thalle Construction Company, Inc.	1429	0.14
Mecklenburg	0939	The Charlotte Observer Publishing Company	2711	0.01
Mecklenburg	0034	Toddville Operations Center	4911	0.03
Mecklenburg	0057	Trane U.S., Inc.	3585	3.47
Mecklenburg	0011	Transflo Terminal Services, Inc.	4214	2.12
Mecklenburg	0105	Trident	3559	
Mecklenburg	0215	University of North Carolina at Charlotte	8221	20.56
Mecklenburg	0104	UPS Freight	7532	
Mecklenburg	0216	US Airways, Four (4) Site Locations	4581	0.00
Mecklenburg	0778	Vertis, Inc.	2752	3.35
Mecklenburg		**Total**		**482.26**
Rowan	8000182	Akzo Nobel Surface Chemistry LLC.	2869	6.45
Rowan	8000054	APAC-Atlantic, Inc., Salisbury Plant # 69	2951	2.24
Rowan	8000148	Associated Asphalt Salisbury, Inc.	2952	0.26
Rowan	8000039	Boral Bricks Inc - Salisbury Plant	3251	13.29

Table 6.0-1 Metrolina 2009 NOx Annual Emissions by Facility

County	Facility ID	PLANT	SIC#	2009 (ton/yr)
Rowan	8000113	C & H Frameworks, Inc	2511	0.08
Rowan	8000035	Cansorb Industries, Inc.	2493	0.77
Rowan	8000018	Carolina Perlite Company, Inc.	3295	1.00
Rowan	8000164	Carolina Perlite, Inc.	3295	1.26
Rowan	8000003	Carolina Stalite Company	3281	588.33
Rowan	8000091	Centurion Medical Products Corporation	3842	0.23
Rowan	8000166	City of Salisbury	4941	0.62
Rowan	8000014	Concrete Supply Company - Salisbury Plant	3273	0.02
Rowan	8000173	Cronland Lumber Co., Inc.	2421	7.33
Rowan	8000045	Daimler Trucks North America - Cleveland Plant	3711	6.46
Rowan	8000004	Duke Power Company, LLC - Buck Steam Station	4911	1144.30
Rowan	8000145	GDX Automotive ** INACTIVE **	3053	0.68
Rowan	8000002	Goodman Millwork, Inc.	2431	0.11
Rowan	8000019	HBD Industries Inc.	3069	2.07
Rowan	8000117	Hitachi Metals North Carolina, Ltd.	3264	2.02
Rowan	8000055	Indopco, Inc. dba Henkel,	2869	10.10
Rowan	8000159	Innospec Performance Chemicals U.S. Company	2843	2.13
Rowan	8000079	Johnson Concrete Company, Inc., Central Division	3273	0.19
Rowan	8000171	Kannapolis Water Treatment Plant	4941	0.27
Rowan	8000176	Magna Composites LLC - Salisbury Operations	3089	3.24
Rowan	8000057	Norandal USA Inc	3353	14.14
Rowan	8000046	Old Carolina Brick Company	3251	2.91
Rowan	8000118	Old Carolina Brick Gold Hill	3251	0.20
Rowan	8000047	Packaging Corporation Of America	2653	2.25
Rowan	8000041	Parker Hannifin Corporation	3052	0.48
Rowan	8000034	Performance Fibers Operations, Inc. - Salisbury Plant	2824	26.10
Rowan	8000040	Perma-flex Roller Technology - Salisbury, LLC	3069	0.25
Rowan	8000170	Pinnacle Corrugated LLC	2653	2.28
Rowan	8000163	Plant Rowan County	4911	71.87
Rowan	8000012	Rea Contracting (Kannapolis)	2951	6.30
Rowan	8000060	Rowan Regional Medical Center	8062	3.81
Rowan	8000066	Southern States Cooperative, Inc. - Barber Feed Mill	2048	0.52
Rowan	8000084	Taylor Clay Products, Inc.	3251	12.96
Rowan	8000167	W A Brown and Son Inc - Plant 2	3585	0.27
Rowan	8000020	Wingfoot Commercial Tire Systems, LLC	7534	1.02
Rowan		**Total**		**1938.81**

Table 6.0-1 Metrolina 2009 NOx Annual Emissions by Facility

County	Facility ID	PLANT	SIC#	2009 (ton/yr)
Union	9000165	Archer Daniels Midland Company, Golden Grain & Feeds, Inc.	5153	1.93
Union	9000169	Bakery Feeds	2048	34.58
Union	9000052	Bloomsburg Mills, Inc. ** INACTIVE **	2269	7.14
Union	9000174	Boggs Paving, Inc. ** INACTIVE **	2951	6.96
Union	9000129	Brooks Food Group - Monroe Plant ** INACTIVE **	2015	9.58
Union	9000189	Caledonian Alloys, Inc.	3356	0.33
Union	9000168	Carolina Wood Products of Marshville, Inc.	2448	1.71
Union	9000120	Cedar Valley Finishing Company, Inc.	2262	0.18
Union	9000009	Charlotte Pipe and Foundry Company - Plastics Division	3084	0.26
Union	9000173	Concrete Supply Company - Monroe Plant	3273	0.02
Union	9000146	Concrete Supply Company Matthews Plant	3273	0.03
Union	9000124	Conn-Selmer Ludwig Facility, Plant 3	3931	0.02
Union	9000036	Consolidated Metco, Inc.	3365	17.25
Union	9000019	Cooper Tools, LLC - Monroe Operation	3423	22.96
Union	9000170	Decore-ative Specialties, Inc.	2431	0.85
Union	9000115	DUCO-SCI, Inc.	3299	0.15
Union	9000158	Edwards Wood Products, Inc.	2421	7.35
Union	9000185	Frontier Communications Monroe Central Office	4813	0.15
Union	9000020	Genwove US Ltd ** INACTIVE **	2435	9.04
Union	9000028	Hanson Brick East, LLC, dba Hanson Brick-Monroe	3255	3.20
Union	9000131	Hudson Bros. Trailer Mfg., Inc.	3715	0.17
Union	9000194	NC Municipal Power Agency No. 1 - Monroe Middle School Unit	4911	0.71
Union	9000117	OMNOVA Solutions, Inc.	2754	3.29
Union	9000074	Pilgrim's Pride Corporation of Virginia, Inc.	2048	8.00
Union	9000005	Ready Mixed Concrete Company - Plant 102 - Indian Trail	3273	0.26
Union	9000197	Thomas Concrete of Carolinas, Inc., Monroe Plant	3273	0.06
Union	9000023	Tyson Foods, Inc., Monroe Processing Plant and Feed Mill	2015	12.69
Union	9000012	Yale Security Inc., Norton Door Controls	3442	4.39
Union		**Total**		**153.26**

* Iredell County Emissions for Nonattainment area only

Table 6.0-2 Metrolina 2009 VOC Annual Emission by Facility

County	Facility ID	PLANT	SIC#	2009 (ton/yr)
Cabarrus	1300078	Americhem, Inc.	3087	0.15
Cabarrus	1300027	Berenfield Containers SE Ltd	3412	75.19
Cabarrus	1300110	BFI Waste Systems of North America, CMS Landfill V	4953	24.46
Cabarrus	1300101	Blythe Brothers Asphalt Co., LLC - Concord Plant	2951	6.20
Cabarrus	1300074	Blythe Construction, Inc., Plant No. 2	2951	1.95
Cabarrus	1300139	Builders FirstSource-Atlantic Group, Inc.	5031	0.15
Cabarrus	1300140	Carolina Counters Corporation	3088	5.13
Cabarrus	1300040	Chemical Specialties, Inc.	2819	6.86
Cabarrus	1300005	CMC - Northeast, Inc.	8062	0.61
Cabarrus	1300144	Coddle Creek WTP	4931	0.13
Cabarrus	1300103	Concord City Generating Plant #1	4911	1.13
Cabarrus	1300104	Concord City Generating Plant #2	4911	0.82
Cabarrus	1300117	Corning Incorporated	3229	21.28
Cabarrus	1300109	DNP IMS America Corporation ** INACTIVE **	3955	1.73
Cabarrus	1300105	Eaton Corporation, Clutch Division	3714	0.26
Cabarrus	1300135	Ferebee Asphalt Corporation	2951	4.51
Cabarrus	1300006	Fieldcrest Cannon Plant #1 ** INACTIVE **	2211	46.84
Cabarrus	1300029	Galvan Industries, Inc.	3479	0.18
Cabarrus	1300146	Gelder Thompson Asphalt Plant - Midland ** INACTIVE **	2951	0.27
Cabarrus	1300083	Greif Packaging, LLC - Southeastern Packaging	2653	0.19
Cabarrus	1300047	Johnson Concrete Company, Piedmont Block Division	3273	0.03
Cabarrus	1300136	Martin Marietta Materials, Inc. - Bonds Quarry	1423	1.14
Cabarrus	1300046	Morton Custom Plastics, Inc., A Wilbert Company	3089	0.66
Cabarrus	1300102	Pass & Seymour/legrand ** INACTIVE **	3644	14.74
Cabarrus	1300107	Perdue Farms Incorporated, Concord	2015	0.41
Cabarrus	1300048	Philip Morris USA Inc., Cabarrus Manufacturing Facility	2111	104.04
Cabarrus	1300086	Rinker Materials Concrete Pipe Division	3272	0.02
Cabarrus	1300051	S & D Coffee, Inc.	2095	62.10
Cabarrus	1300075	Technicon Acoustics	3089	0.26
Cabarrus	1300131	Thomas Concrete Company, Inc., Concord Plant	3273	0.01
Cabarrus	1300151	Thomas Concrete of Carolina, Inc. - Harrisburg Plant	3273	0.03
Cabarrus	1300067	Vulcan Construction Materials LP - Gold Hill	1411	0.06
Cabarrus	1300079	Whitley Handle, Inc.	2499	35.45
Cabarrus	1300002	WSACC - Rocky River Regional WWTP	4952	4.43
Cabarrus	1300115	Young Cleaners ** INACTIVE **	7219	1.73
Cabarrus		**Total**		**423.15**

Table 6.0-2 Metrolina 2009 VOC Annual Emission by Facility

County	Facility ID	PLANT	SIC#	2009 (ton/yr)
Gaston	3600137	Affinia Group, Inc., Wix Filtration Corp. - Allen Plant	3714	80.23
Gaston	3600138	Affinia Group, Inc., Wix Filtration Corp. - D ** INACTIVE **	3714	11.23
Gaston	3600144	Apex Tool Group (Gastonia Operations)	3423	0.21
Gaston	3600150	Bradington-Young LLC, Cherryville Plant	3433	11.37
Gaston	3600233	Buckeye Mt. Holly, LLC	2676	9.43
Gaston	3600049	Caromont Health, Gaston Memorial Hospital	8062	0.46
Gaston	3600315	Catawba Creek Pump Station	4941	0.06
Gaston	3600124	Chemtura Corporation	2821	0.39
Gaston	3600327	City of Gastonia - Freightliner Generator Pla	4911	0.04
Gaston	3600183	Conitex-Sonoco, USA Inc.	2655	0.35
Gaston	3600316	Crowders Creek WWTP	4952	0.06
Gaston	3600040	Duke Energy Carolinas, LLC - Riverbend Steam Station	4911	15.66
Gaston	3600039	Duke Power Company, LLC - Allen Steam Station	4911	62.80
Gaston	3600044	Firestone Fibers & Textiles Company, LLC	2296	4.22
Gaston	3600251	Firestone Fibers and Textiles Company, Kings Mountain Plant	2296	5.88
Gaston	3600172	Fleischmanns Yeast Inc **Inactive**	2099	25.96
Gaston	3600078	FMC Corporation - Lithium Division	2819	6.86
Gaston	3600153	Freightliner LLC--Mount Holly Truck Manufacturing Plant	3711	27.05
Gaston	3600285	Gaston Community College	8221	0.05
Gaston	3600152	Gastonia Components & Logistics, LLC	3714	12.96
Gaston	3600318	Gatza Marble Products	3088	6.15
Gaston	3600219	J. Charles Saunders Company	2284	11.44
Gaston	3600194	LNS Turbo, Inc. - Kings Mountain	3499	8.25
Gaston	3600314	Long Creek WWTP	4952	0.38
Gaston	3600128	Lubrizol Advanced Materials, Inc.	2821	6.50
Gaston	3600173	Metso Minerals, Inc. ** INACTIVE **	3429	10.00
Gaston	3600246	Modern Polymers, Inc.	3089	52.69
Gaston	3600330	NC Municipal Power Agency No. 1 - Cherryville City Hall Unit	4911	0.03
Gaston	3600325	NC Municipal Power Agency No. 1 - Gastonia Freightliner	4911	0.08
Gaston	3600338	NC Municipal Power Agency No. 1 - Gastonia Prime Power Park	4911	0.13
Gaston	3600312	NC Municipal Power Agency No. 1-Gastonia Plant 1	4911	0.02
Gaston	3600313	NC Municipal Power Agency No. 1-Gastonia Plant 2	4911	0.07
Gaston	3600281	Orograin - Gastonia	2051	3.76
Gaston	3600157	Parker Hannifan Corporation	3594	6.02
Gaston	3600094	Pharr Yarns I-85 Complex	2281	0.03

Table 6.0-2 Metrolina 2009 VOC Annual Emission by Facility

County	Facility ID	PLANT	SIC#	2009 (ton/yr)
Gaston	3600091	Pharr Yarns Complex 46	2281	20.76
Gaston	3600310	Pharr Yarns, Inc., Space Dye Plant	2269	10.40
Gaston	3600053	RADICISPANDEX Corporation ** INACTIVE **	2824	206.31
Gaston	3600252	Rea Contracting, LLC 075 Bessemer City Plant ** INACTIVE **	2951	2.88
Gaston	3600093	Spartan Dyers, Inc., Sterling Division	2281	0.15
Gaston	3600167	Stabilus, Inc.	3499	68.48
Gaston	3600288	United Memorial Bible Services Inc ** INACTIVE **	2499	12.86
Gaston	3600026	Valley Proteins, Inc. dba Carolina By-Products - Gastonia	2077	9.15
Gaston		**Total**		**711.81**
Iredell	4900180	Custom Products, Inc.	3728	6.74
Iredell	4900275	D&F Consolidated, Inc. dba Car-Mel Products, Inc.	2299	4.56
Iredell	4900173	EGA Products, Inc.	3479	1.47
Iredell	4900294	General Microcircuits, Inc.	3672	1.64
Iredell	4900201	Matsushita Compressor Corp **Inactive**	3639	3.27
Iredell	4900172	NGK Ceramics USA, Inc.	3999	1.77
Iredell	4900225	Transcontinental Gas Pipeline Company, LLC	4922	296.02
Iredell*		**Total**		**315.50**
Lincoln	5500093	Blythe Construction, Inc., Plant No. 8	2951	3.05
Lincoln	5500104	B R Lee Industries, Inc. ** INACTIVE **	3537	14.24
Lincoln	5500106	Cataler North America Corporation	3714	0.14
Lincoln	5500009	Cochrane Furniture Divisions 10 20 35 and 55 ** INACTIVE **	2653	70.18
Lincoln	5500089	CPI Packaging, Inc.	3086	217.50
Lincoln	5500082	Duke Energy Corporation LCTS	4911	1.35
Lincoln	5500091	HOF Textiles, Inc.	2297	22.50
Lincoln	5500005	La-Z-Boy Chair - Burris Division ** INACTIVE **	4911	3.82
Lincoln	5500110	Lincolnton Wastewater Treatment Plant	4952	0.14
Lincoln	5500090	McMurray Fabrics, Inc.	3552	0.14
Lincoln	5500043	McMurray Fabrics, Inc. - Lincolnton	2262	22.77
Lincoln	5500029	Mohican Mills, Inc.	2258	7.52
Lincoln	5500027	National Fruit Product Company, Inc.	2033	1.38
Lincoln	5500115	NC Municipal Power Agency No. 1 -Lincolnton High School Unit	4911	0.02
Lincoln	5500111	Rea Contracting (Denver)	2951	2.70

Table 6.0-2 Metrolina 2009 VOC Annual Emission by Facility

County	Facility ID	PLANT	SIC#	2009 (ton/yr)
Lincoln	5500044	Robert Bosch Tool Corporation ** INACTIVE **	3425	10.11
Lincoln	5500112	RSI Home Products	2434	0.90
Lincoln	5500080	South Fork Industries, Inc.	2257	2.94
Lincoln	5500013	Textile Piece Dyeing Co., Inc.	2951	7.25
Lincoln	5500046	The Timken Company, Lincolnton Bearing Plant	3562	1.66
Lincoln	5500114	VT LeeBoy, Inc.	3531	12.08
Lincoln	5500075	Wireway/Husky Systems	3499	25.65
Lincoln		**Total**		**428.04**
Mecklenburg	R508	Aloft Charlotte Ballantyne	6799	
Mecklenburg	0029	Alphagary Corporation	3087	2.59
Mecklenburg	0756	ALSCO, Inc.	7213	0.06
Mecklenburg	0056	Altec Industries, Inc.	3713	4.62
Mecklenburg	0192	Americh Corporation	3082	11.83
Mecklenburg	0928	Anilox Roll Co., Inc. (ARC Intl.)	3479	3.99
Mecklenburg	0063	Aplix, Incorporated	2295	10.43
Mecklenburg	0177	ARAMark Uniform Services, Inc.	7218	0.09
Mecklenburg	0283	Arjobex America	3081	2.41
Mecklenburg	0322	Associated Asphalt Charlotte, LLC	5032	0.14
Mecklenburg	E004	AT&T North Carolina - 22506	4812	
Mecklenburg	0575	Ballabox Company, Inc.	2657	1.30
Mecklenburg	0067	Barnhardt Manufacturing Company	2269	0.40
Mecklenburg	0909	Barrday Corporation	2221	1.38
Mecklenburg	0242	Baucom Press, Inc.	2752	0.00
Mecklenburg	0996	Belk Printing Technologies	2759	3.68
Mecklenburg	0125	Bendel Corporation	3443	1.94
Mecklenburg	0738	Blythe Brothers Asphalt Company, LLC Old Nations	2951	3.50
Mecklenburg	0578	Blythe Construction, Inc.	2951	2.58
Mecklenburg	0772	Blythe Construction, Inc. - East Plant	2951	2.50
Mecklenburg	0113	Blythe Construction, Inc. - North Plant	2951	3.78
Mecklenburg	0734	Boston Gear	3566	1.56
Mecklenburg	0180	Brenntag Southeast, Inc.	5169	1.21
Mecklenburg	0024	C & C Boiler - Portable Boiler System	7359	0.00
Mecklenburg	0710	C & M Recycling, Inc.	3272	0.38
Mecklenburg	0154	Cadmus	2752	27.28
Mecklenburg	0068	Caraustar Carolina Carton	2759	10.44
Mecklenburg	0069	Cargill, Inc.	2079	3.78
Mecklenburg	0289	Carolinas Medical Center	8062	0.28

Table 6.0-2 Metrolina 2009 VOC Annual Emission by Facility

County	Facility ID	PLANT	SIC#	2009 (ton/yr)
Mecklenburg	0230	Carolinas Medical Center - Mercy	8062	0.21
Mecklenburg	0109	Carolinas Medical Center - Pineville	8062	0.12
Mecklenburg	0311	Carrier Corporation (Charlotte Chiller Ops)	3585	9.02
Mecklenburg	0263	CCL Label, Inc.	2759	14.53
Mecklenburg	0910	CEMEX Construction Materials Atlantic, LLC	3273	0.00
Mecklenburg	0100	CEMEX Construction Materials Cottonwood Ready Mix	3273	0.00
Mecklenburg	0182	CEMEX Construction Materials Reames Road Operation	3273	0.02
Mecklenburg	0987	Ceramco-Printech, Inc.	3555	0.01
Mecklenburg	0629	Charlotte BP Terminal	5171	20.52
Mecklenburg	0872	Charlotte Douglas International Airport	4581	9.09
Mecklenburg	0789	Charlotte Mecklenburg Schools Building Services	5541	2.10
Mecklenburg	0626	Charlotte Pipe & Foundry Company, Inc.	3321	32.48
Mecklenburg	0499	Charlotte-Mecklenburg School Facilities	5541	2.82
Mecklenburg	0016	Chematron	2843	0.07
Mecklenburg	0009	CHT R. Beitlich Corporation	2843	0.00
Mecklenburg	0585	Citgo Petroleum Corporation	5171	11.36
Mecklenburg	6000687	Clariant Corporation	2865	11.88
Mecklenburg	0882	Classic Graphics, Inc.	2752	10.02
Mecklenburg	0020	C-MUD: Franklin Water Treatment Plant	4941	0.21
Mecklenburg	0937	C-MUD: Lee S. Dukes, Jr. Water Plant	4941	0.01
Mecklenburg	0678	C-MUD: Mallard Creek Water Reclamation Facility	4952	0.80
Mecklenburg	0764	C-MUD: McAlpine Creek Wastewater Treatment Plant	4953	0.88
Mecklenburg	0740	C-MUD: McDowell Creek Wastewater Treatment Plant	4952	0.07
Mecklenburg	0036	Coatings 2000	2851	0.15
Mecklenburg	0096	Coca-Cola Bottling Co. Consolidated (Snyder Fac)	2086	1.34
Mecklenburg	0627	Colonial Pipeline Company	4613	13.93
Mecklenburg	0019	Concentric MicroTubing, Inc.	3083	0.06
Mecklenburg	0150	Concrete Supply Co. - Arrowood	3273	0.00
Mecklenburg	0281	Concrete Supply Co. - Croft	3273	0.00
Mecklenburg	0654	Concrete Supply Co. - North	3273	0.00
Mecklenburg	0656	Concrete Supply Co. - South	3273	0.00
Mecklenburg	0655	Concrete Supply Co. - West	3273	0.00
Mecklenburg	0021	Container Graphics Corporation	2796	0.55
Mecklenburg	0704	Cumulus Fibres	2299	1.33
Mecklenburg	0486	D.C. Paint Works, Inc.	1721	5.55
Mecklenburg	0222	D.H. Griffin Grading & Crushing, LLC	3295	0.54
Mecklenburg	0004	Davidson College	8221	2.50
Mecklenburg	0114	Detrex Corporation	2869	1.55

Table 6.0-2 Metrolina 2009 VOC Annual Emission by Facility

County	Facility ID	PLANT	SIC#	2009 (ton/yr)
Mecklenburg	0596	Duff Norton	3599	6.25
Mecklenburg	0269	Duke Energy - McGuire Nuclear Station	4911	1.38
Mecklenburg	0093	ECO-Energy Distribution--Charlotte, LLC	5171	0.00
Mecklenburg	0595	Emerald Carolina Chemical, LLC	2821	15.75
Mecklenburg	0001	Exopack Advanced Coatings	3083	16.69
Mecklenburg	0963	Ferebee Asphalt Corp - Charlotte South Plant	2951	3.09
Mecklenburg	0736	Ferebee Asphalt Corporation- Statesville Rd. Plant	2951	3.79
Mecklenburg	0793	Flextronics	3679	6.58
Mecklenburg	0570	Foamex Innovations, Inc.	2821	7.40
Mecklenburg	0773	Forbo Movement Systems	3052	25.90
Mecklenburg	0280	Forbo Siegling, LLC	2295	12.85
Mecklenburg	0022	Frito-Lay, Incorporated	2096	8.95
Mecklenburg	0323	G & K Services	7218	5.86
Mecklenburg	0749	General Electric International, Inc.	7699	0.50
Mecklenburg	0054	General Steel Drum Corporation	3412	71.22
Mecklenburg	0123	Genpak LLC	3086	61.59
Mecklenburg	0567	Gerdau Ameristeel US Inc. Charlotte Steel Mill Div	3312	26.07
Mecklenburg	0131	Graphic Packaging International, Inc.	2657	21.70
Mecklenburg	0853	Greif Fibre Drum, Inc.	2655	0.93
Mecklenburg	0145	Harper Corporation of America	3449	2.61
Mecklenburg	0709	Herff Jones Incorporated	2752	3.80
Mecklenburg	0058	Huntersville Hardwoods	2426	0.66
Mecklenburg	0663	Huntsman Textile Effects	2899	0.05
Mecklenburg	0590	IGM Resins Charlotte, Inc	2869	23.79
Mecklenburg	0588	Industrial Container Services - NC, LLC (Matthews)	7699	38.56
Mecklenburg	0225	Industrial Container Services -NC, LLC (Charlotte)	7699	55.46
Mecklenburg	0008	International Paper Company	2653	1.74
Mecklenburg	0381	International Paper Company	2653	5.66
Mecklenburg	0733	Interstate Custom Crushing, LLC	3295	0.38
Mecklenburg	0796	INX International Ink Company	2893	11.88
Mecklenburg	0015	IPEX USA LLC	3084	
Mecklenburg	0999	J.T. Russell & Sons, Inc.	2951	0.98
Mecklenburg	0741	Jenkins Electric Company	7694	0.93
Mecklenburg	0076	Journalbooks/Timeplanner	2782	1.41
Mecklenburg	0045	Keebler Company	2052	10.23
Mecklenburg	0142	Keller Crescent Company	2652	5.55
Mecklenburg	0556	Kinder Morgan SE Terminals - (CT#1 & CT#2)	5171	16.15
Mecklenburg	0765	Kurz Transfer Products, L.P.	2754	3.58

Table 6.0-2 Metrolina 2009 VOC Annual Emission by Facility

County	Facility ID	PLANT	SIC#	2009 (ton/yr)
Mecklenburg	0224	Labeltec, Inc./Pharmaprint, Inc.	2759	4.95
Mecklenburg	0682	Lance, Incorporated	2052	85.95
Mecklenburg	0087	Lincoln Harris, LLC	6099	0.10
Mecklenburg	0226	Livingstone & Haven, LLC	3561	0.26
Mecklenburg	0039	Livingstone Coating Corporation	3479	0.00
Mecklenburg	0965	Loftin & Company, Inc.	2752	4.76
Mecklenburg	0633	Magellan Terminals Holdings, L.P. - Charlotte I	5171	13.98
Mecklenburg	0636	Magellan Terminals Holdings, L.P. - Charlotte II	5171	6.37
Mecklenburg	0148	Mallard Creek Polymers, Inc.	2821	2.66
Mecklenburg	0586	Marathon Petroleum Company LP	5171	10.58
Mecklenburg	0176	Masonite-Stanley Door Systems	3442	3.75
Mecklenburg	0975	Masonry Reinforcing Corp. of America	3479	
Mecklenburg	0185	Mast Brothers Tank Cleaning, Inc.	7389	0.04
Mecklenburg	0132	Metrolina Greenhouses, Inc.	0181	0.90
Mecklenburg	0284	Metromont Corporation	3272	3.12
Mecklenburg	0099	MNC Holdings, LLC	4953	0.12
Mecklenburg	0689	Motiva Enterprises LLC - Motiva Charlotte Complex	5171	28.67
Mecklenburg	0982	Mount Hope Machinery Company	3552	7.95
Mecklenburg	0158	New South Fabricators LLC	3441	3.67
Mecklenburg	0119	Nexeo Solutions, LLC	5169	6.22
Mecklenburg	0753	Norfolk Southern Railway Company	4011	4.46
Mecklenburg	0038	North Carolina Air National Guard	9711	0.55
Mecklenburg	0201	Novant Healthcare's Presbyterian Hospital	8062	0.23
Mecklenburg	0895	Office Environments	3479	0.69
Mecklenburg	0052	Okuma America Corporation	3541	0.79
Mecklenburg	0117	Pan-Glo Charlotte	7699	16.39
Mecklenburg	0737	Parts Cleaning Technologies, LLC	8999	1.16
Mecklenburg	0799	Pavestone Company	3271	0.00
Mecklenburg	0832	Piedmont Natural Gas Co., Inc.	5541	0.77
Mecklenburg	0507	Pneumafil Metals Corporation	3444	1.14
Mecklenburg	0782	Pool Builders Supply of the Carolinas	3082	1.24
Mecklenburg	0971	Prairie Packaging, Inc.	3086	6.26
Mecklenburg	0936	Presbyterian Hospital - Matthews	8069	0.01
Mecklenburg	0785	Presbyterian Hospital Huntersville	8062	0.17
Mecklenburg	0213	Process Innovation LLC	2841	0.00
Mecklenburg	R523	Quala Services, LLC	7699	0.24
Mecklenburg	0257	Rea Contracting - Mallard Creek	2951	2.95
Mecklenburg	0506	Rea Contracting - Portable Concrete	3273	

Table 6.0-2 Metrolina 2009 VOC Annual Emission by Facility

County	Facility ID	PLANT	SIC#	2009 (ton/yr)
Mecklenburg	0134	Rea Contracting (069 Arrowood)	2951	3.14
Mecklenburg	0900	Rea Contracting, LLC. (068 Matthews)	2951	2.33
Mecklenburg	0398	Ready Mixed Concrete Company	3273	
Mecklenburg	0206	Ready Mixed Concrete Company-Reames Plant	3241	
Mecklenburg	0668	Red Clay Industries	1499	0.51
Mecklenburg	0804	Reman Technologies	3519	2.52
Mecklenburg	0690	Rohm and Haas Chemicals, LLC	2821	1.73
Mecklenburg	0108	RR Donnelley	2752	23.78
Mecklenburg	0875	Rutland Plastic Technologies, Inc.	3089	0.67
Mecklenburg	0854	Safety-Kleen Corporation	7389	0.23
Mecklenburg	0876	Shutter Shop, Inc.	2431	1.17
Mecklenburg	0568	Siemens Power Generation, Inc.	3511	34.11
Mecklenburg	0474	Sign Art	3499	2.78
Mecklenburg	0563	Southern Concrete - Old Concord Road	3273	
Mecklenburg	0562	Southern Concrete - State St.	3273	
Mecklenburg	0887	Southern Concrete Materials - South Plant	3273	
Mecklenburg	0061	Southern Converters Inc.	2675	18.22
Mecklenburg	0571	Southern Graphic Systems	2796	1.12
Mecklenburg	0932	Southwood Corporation	2499	2.27
Mecklenburg	0665	Spectrum Graphics, Inc.	2752	5.12
Mecklenburg	0003	SteelFab, Inc.	3441	14.09
Mecklenburg	0959	Sterigenics U.S. LLC	7389	0.32
Mecklenburg	0968	Stork Prints America, Inc.	3471	0.39
Mecklenburg	0147	Sun Chemical Corporation - Printing & Ink	2893	12.54
Mecklenburg	0667	Superior Fire Hose Corporation	3061	0.55
Mecklenburg	0939	The Charlotte Observer Publishing Company	2711	7.93
Mecklenburg	0034	Toddville Operations Center	4911	0.98
Mecklenburg	0057	Trane U.S., Inc.	3585	4.41
Mecklenburg	0044	Transflo Charlotte West Terminal	4212	2.35
Mecklenburg	0011	Transflo Terminal Services, Inc.	4214	0.73
Mecklenburg	0632	TransMontaigne - Charlotte Piedmont Terminal	5171	15.55
Mecklenburg	0105	Trident	3559	
Mecklenburg	0215	University of North Carolina at Charlotte	8221	1.37
Mecklenburg	0104	UPS Freight	7532	1.02
Mecklenburg	0216	US Airways, Four (4) Site Locations	4581	13.49
Mecklenburg	0025	US Polymers, Inc.	2899	7.89
Mecklenburg	0778	Vertis, Inc.	2752	36.14
Mecklenburg	0240	Volvo & GMC Truck Leasing of the Carolinas	7513	0.94

Table 6.0-2 Metrolina 2009 VOC Annual Emission by Facility

County	Facility ID	PLANT	SIC#	2009 (ton/yr)
Mecklenburg	0171	WorkflowOne	2761	7.84
Mecklenburg	0904	Zepsa Industries, Incorporated	2499	11.55
Mecklenburg		**Total**		**1196.74**
Rowan	8000182	Akzo Nobel Surface Chemistry LLC.	2869	82.04
Rowan	8000054	APAC-Atlantic, Inc., Salisbury Plant # 69	2951	1.40
Rowan	8000148	Associated Asphalt Salisbury, Inc.	2952	0.64
Rowan	8000126	Athena Marble Inc.	3088	7.67
Rowan	8000115	B & E Custom Cabinets, Inc.	2434	2.67
Rowan	8000125	Baja Products Ltd.	3089	1.94
Rowan	8000039	Boral Bricks Inc - Salisbury Plant	3251	0.86
Rowan	8000035	Cansorb Industries, Inc.	2493	0.02
Rowan	8000018	Carolina Perlite Company, Inc.	3295	0.10
Rowan	8000164	Carolina Perlite, Inc.	3295	0.04
Rowan	8000003	Carolina Stalite Company	3281	1.53
Rowan	8000091	Centurion Medical Products Corporation	3842	0.05
Rowan	8000166	City of Salisbury	4941	0.02
Rowan	8000173	Cronland Lumber Co., Inc.	2421	1.87
Rowan	8000045	Daimler Trucks North America - Cleveland Plant	3711	190.30
Rowan	8000004	Duke Power Company, LLC - Buck Steam Station	4911	13.56
Rowan	8000002	Goodman Millwork, Inc.	2431	6.28
Rowan	8000145	GDX Automotive ** INACTIVE **	3053	11.55
Rowan	8000019	HBD Industries Inc.	3069	6.24
Rowan	8000117	Hitachi Metals North Carolina, Ltd.	3264	0.13
Rowan	8000055	Indopco, Inc. dba Henkel,	2869	124.34
Rowan	8000159	Innospec Performance Chemicals U.S. Company	2843	0.23
Rowan	8000079	Johnson Concrete Company, Inc., Central Division	3273	3.41
Rowan	8000171	Kannapolis Water Treatment Plant	4941	0.01
Rowan	8000176	Magna Composites LLC - Salisbury Operations	3089	10.98
Rowan	8000104	McKenzie Sports Products, Inc.	3999	4.50
Rowan	8000057	Norandal USA Inc	3353	833.57
Rowan	8000046	Old Carolina Brick Company	3251	0.17
Rowan	8000118	Old Carolina Brick Gold Hill	3251	0.01
Rowan	8000047	Packaging Corporation Of America	2653	2.04
Rowan	8000041	Parker Hannifin Corporation	3052	1.09
Rowan	8000034	Performance Fibers Operations, Inc. - Salisbury Plant	2824	28.59
Rowan	8000040	Perma-flex Roller Technology - Salisbury, LLC	3069	2.65
Rowan	8000170	Pinnacle Corrugated LLC	2653	0.12

Table 6.0-2 Metrolina 2009 VOC Annual Emission by Facility

County	Facility ID	PLANT	SIC#	2009 (ton/yr)
Rowan	8000163	Plant Rowan County	4911	6.16
Rowan	8000012	Rea Contracting (Kannapolis)	2951	2.20
Rowan	8000060	Rowan Regional Medical Center	8062	0.19
Rowan	8000062	Salisbury Millwork, Inc.	2421	0.65
Rowan	8000066	Southern States Cooperative, Inc. - Barber Feed Mill	2048	0.03
Rowan	8000084	Taylor Clay Products, Inc.	3251	0.88
Rowan	8000167	W A Brown and Son Inc - Plant 2	3585	2.51
Rowan	8000020	Wingfoot Commercial Tire Systems, LLC	7534	2.38
Rowan	8000044	Woodard, LLC ** INACTIVE **	2514	1.54
Rowan		**Total**		**1357.16**
Union	9000136	AEP Industries, Inc.	3081	12.00
Union	9000165	Archer Daniels Midland Co, Golden Grain & Feeds, Inc.	5153	0.16
Union	9000169	Bakery Feeds	2048	123.94
Union	9000189	Caledonian Alloys, Inc.	3356	23.80
Union	9000168	Carolina Wood Products of Marshville, Inc.	2448	0.14
Union	9000120	Cedar Valley Finishing Company, Inc.	2262	0.01
Union	9000009	Charlotte Pipe and Foundry Company - Plastics Division	3084	8.72
Union	9000130	Colfax Pump Group, IMO Pump Division	3561	4.96
Union	9000041	Conn-Selmer Ludwig Facility Plant 2	3365	2.77
Union	9000124	Conn-Selmer Ludwig Facility, Plant 3	3931	2.92
Union	9000036	Consolidated Metco, Inc.	3365	0.86
Union	9000019	Cooper Tools, LLC - Monroe Operation	3423	5.23
Union	9000199	Darnel, Inc.	3086	75.56
Union	9000170	Decore-ative Specialties, Inc.	2431	4.00
Union	9000115	DUCO-SCI, Inc.	3299	0.10
Union	9000158	Edwards Wood Products, Inc.	2421	6.75
Union	9000020	Genwove US Ltd ** INACTIVE **	2453	3.15
Union	9000028	Hanson Brick East, LLC, dba Hanson Brick-Monroe	3255	0.43
Union	9000131	Hudson Bros. Trailer Mfg., Inc.	3715	4.44
Union	9000143	McGee Corporation	3444	2.58
Union	9000142	Mint Hill Cabinet Shop, Inc.	5021	12.48
Union	9000194	NC Municipal Power Agency No. 1 - Monroe Middle School Unit	4911	0.03
Union	9000159	Nina Plastics	2759	134.20
Union	9000117	OMNOVA Solutions, Inc.	2754	56.23
Union	9000045	Oro Manufacturing Company	3499	0.60
Union	9000074	Pilgrim's Pride Corporation of Virginia, Inc.	2048	0.04

Table 6.0-2 Metrolina 2009 VOC Annual Emission by Facility

County	Facility ID	PLANT	SIC#	2009 (ton/yr)
Union	9000005	Ready Mixed Concrete Company - Plant 102 - Indian Trail	3273	0.01
Union	9000153	Rock - Tenn Company ** INACTIVE **	2657	2.18
Union	9000023	Tyson Foods, Inc., Monroe Processing Plant and Feed Mill	2015	0.71
Union	9000049	Vanguard Pai Lung	3552	0.89
Union	9000132	Windsor Window Company - Heritage Plant ** INACTIVE **	2431	0.71
Union	9000012	Yale Security Inc., Norton Door Controls	3442	9.43
Union		**Total**		**496.88**

* Iredell County Emissions for Nonattainment area only

Appendix B.2

Area Source Emissions

Inventory Documentation

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LIST OF TABLES

List of Acronyms

Acronym	Definition
CARB	California Air Resource Board
EIIP	Emissions Inventory Improvement Program
E-GAS 5.0	Economic Growth Analysis System version 5.0
ERTAC	Eastern Regional Technical Advisory Group
LPG	Liquid Petroleum Gas
MSW	Municipal Solid Waste
NAICS	North American Industry Classification System
NCDAQ	North Carolina Division of Air Quality
NCDFR	North Carolina Division of Forest Resources
NCDOT	North Carolina Department of Transportation
NCOSBM	North Carolina Office of State and Budget Management
NCSU	North Carolina State University
NG	Natural Gas
NOx	Nitrogen Oxides
QAPP	Quality Assurance Project Plan
SAF	Seasonal Adjustment Factor
SIC	Standard Industrial Classification
USCBP	U.S Census Bureau, County Business Patterns
USEPA	U.S. Environmental Protection Agency
USFA	U.S. Fire Administration
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds

1.0 INTRODUCTION AND SCOPE

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

The area source emissions inventory has been developed in order to meet the requirement of the 8-hour ozone standard, as part of the process of redesignation from nonattainment to attainment/maintenance for the 1997 8-hour ozone standard.

The North Carolina portion of the Charlotte-Gastonia-Rock Hill, NC-SC nonattainment area, referred to as the Metrolina nonattainment area, is comprised of Cabarrus, Gaston, Lincoln, Mecklenburg, Rowan, and Union Counties and the Davidson and Coddle Creek Townships in Iredell County. The emissions for Iredell County are for the nonattainment portion only; therefore, the emissions are adjusted by 32.5% to reflect the Davidson and Coddle Creek Townships of the county. The base year for the emissions inventory is 2010 and the future years are 2013, 2016, 2019, 2022 and 2025. All emissions are calculated on a ton per summer day basis. Since the activity data for 2010 is not available, the 2007 emissions inventory that has been developed for modeling purposes was grown to the 2010 base year.

The Rock Hill, SC redesignation plan will be addressed and submitted to the US Environmental Protection Agency (USEPA) by the SC Department of Health and Environmental Control (SCDHEC); therefore, the emissions for Rock Hill, SC will not be included in this document. A copy of the SCDHEC draft redesignation demonstration and maintenance plan is included in Appendix C.

2.0 OVERALL METHODOLOGY

2.1 SOURCE CATEGORY IDENTIFICATION

The area source categories were identified from two USEPA guidance documents: EPA-450/4-91-016, Procedures for the Preparation of Emission Inventories of Carbon Monoxide and Precursors of Ozone, Vol. 1, from this point on this document will be referred to as the Procedures document, and the Emissions Inventory Improvement Program (EIIP) Technical Reports, Vol. 3, Area Sources, from this point on this document will be referred to as EIIP Tech. Report.

2.2 EMISSION ESTIMATION APPROACH

Area source emissions are estimated by multiplying an emission factor by some known indicator of collective activity for each source category within the inventory area. An indicator is any parameter associated with the activity level of a source that can be correlated with the air pollutant emissions from that source, such as production, number of employees, or population.

In general, one of the following emissions estimation approaches is used to calculate the area source emissions: per capita emission factors, employment-related emission factors, commodity consumption-related emission factors, and level of activity based emission factors. The emission factors used were obtained from the EIIP Tech. Report, the USEPA's AP-42 Compilation of Air Pollutant Emission Factors, 5th Edition, referred to as AP-42 or the emissions methods developed by E.H. Pechan & Associates, Inc. (Pechan) for the USEPA for the 2008 National Emissions Inventory. The methods Pechan developed were based upon the emission factor development work conducted by the Eastern Regional Technical Advisory Group (ERTAC) in conjunction with the USEPA.

As previously stated, the area source emissions were calculated based on the emissions methods developed by Pechan or the USEPA's EIIP Tech. Report and AP-42. The majority of the area source categories were calculated with the methods outlined by Pechan because they incorporate the most recent emission factors and activity data available. The remaining area source categories were calculated using the USEPA's EIIP Tech. Report and AP-42 because these categories were not included as part of the area source categories Pechan updated. The following outlines the area source categories calculated using the emissions methods developed by Pechan:

- Residential Combustion
- Commercial Combustion
- Industrial Combustion

- Underground Storage Tanks – Stage I Balanced Submerged Filling
- Paved and Unpaved Roads
- Charbroiling
- Architectural Surface Coating
- Autobody Refinishing
- Traffic Markings
- Industrial Surface Coating
- Dry Cleaning
- Graphic Arts Printing
- Consumer and Commercial Solvents
- Asphalt Paving (emulsified)
- Aircraft Refueling
- Open Burning – Yard Trimmings.

The remaining area source categories were calculated using the EIIP Tech. Report and AP-42 are:

- Asphalt Roofing
- Truck Transit
- Underground Storage Tank Breathing Loss
- Open Burning – Municipal Solid Waste (MSW)
- Agricultural Burning
- Agricultural Pesticide
- Structure Fires
- Vehicle Fires
- Solvent Cleaning and Degreasing

There are several methods for estimating the activity level for a specific area source category. Some of these methods include treating area sources as point sources, surveying local activity levels, apportioning national or statewide activity totals to local inventory areas, or using population and employment data. All of these methods were employed to determine the activity data needed for the various area source categories.

For certain categories, there can be overlap between the point sources and the area sources, which can lead to double counting of emissions. To avoid double counting of emissions, point source emissions were identified so they could be subtracted from the applicable area source emissions.

There are a number of categories where emissions were calculated with emission factors based on employment. These emission factors were developed by the USEPA when employment reports were organized by Standard Industrial Classification (SIC) code. Since 1997 employment statistics are organized by the North American Industry Classification System (NAICS). For the solvent cleaning industries, the SIC codes do not directly correspond to single

NAICS code. Sometimes several partial NAICS employment values will relate to a SIC code. A crosswalk was used to determine what percentage of a NAICS employment value would correspond to the SIC codes. It should be noted that the crosswalk is based on national totals and is not specific to any particular state.

The employment numbers were obtained from the on-line 2007 US Census Bureau, County Business Patterns (USCBP) for the various NAICS codes at the county level for North Carolina. In addition to having employment values (or employment ranges due to confidentiality rules) by NAICS, the USCBP breaks down the number of facilities by employment categories. The employment categories are 1 – 4, 5 – 9, 10 – 19, 20 – 49, 50 – 99, 100 – 249, 250 – 499, 500 – 999, >1000 employees. To account for point sources, it was assumed that facilities with 100 employees or greater were point sources and were not considered in the calculations.

When a NAICS category gave a number of employees and there were no establishments with 100 employees or greater, then the value was used, however, in most cases the USCBP gave a range of total employees in the county instead of the actual number. When this occurred, facility sizes were considered and the mid-range of employees was assumed, in accordance with the EIIP Tech. Report. For example, a NAICS category for a county had a range of employment of 100-249 with two establishments with 1-4 employees, one with 20-49 employees, and one with 100-249 employees. Assuming 3 to be the mid-range of 1-4 and 35 to be the mid-range of 20-49, the employment used for the area source calculation was estimated as:

(2 x 3) + (1 x 35) = 41 employees

The larger establishment was assumed to be a point source and not taken into consideration for the area source calculation.

If a total number of employees was provided and there were establishments with 100 employees or greater, then the mid-range of the smaller facilities were used as described above. The estimated employment was compared to the value given to ensure that remainder would account for the large establishment. In cases where the remainder would not be enough employment to account for the larger establishment, the area source employment was adjusted down. For example, a NAICS category had 250 employees with one establishment with 20–49 employees (mid-range 35), two establishments with 50–99 employees (mid-range 75), and one establishment with 100–249 employees. The employment estimated for the area source and the remainder employment was estimated as:

(1 x 35) + (2 x 75) = 185 employees
250 – 185 = 65 employees

The remainder of 65 employees is not enough to account for an establishment of 100–249 employees. Therefore, the area source employment was adjusted down by 35 so that there were 100 employees remaining to account for the large establishment.

Additionally, many of the categories for the area source emissions use total county population or the rural portion of the county for the activity data. In order to calculate the emissions for these categories, the 2007 population was obtained from the North Carolina Office of State and Budget Management (NCOSBM). Table 2.2-1 contains the population for the Metrolina nonattainment area and statewide for 2007. The population for Iredell County is adjusted by 32.5% to reflect the nonattainment only portion of the county. The rural portion of the county population was determined by applying a rural percentage to the total county population. The rural percentage was determined from the latest data available, the 2000 census. Table 2.2-2 shows the rural percentage of each county and the rural population of each county.

Table 2.2-1 County Population

County	2007
Cabarrus	163,910
Gaston	200,481
*Iredell	48,894
Lincoln	72,497
Mecklenburg	859,853
Rowan	136,089
Union	181,652

*Iredell County population for nonattainment area only

Table 2.2-2 County Rural Population

County	Percentage of Rural Population	2007 Rural Population
Cabarrus	27.9	45,731
Gaston	22.2	44,507
*Iredell	49.7	24,300
Lincoln	61.7	44,731
Mecklenburg	3.9	33,534
Rowan	41.1	55,933
Union	49.8	90,463

*Iredell County rural population for nonattainment area only

For creating projected emissions for 2010, 2013, 2016, 2019, and 2025 growth factors were developed for each area source category. The growth factors for all of the categories are generated by using equation 2.2-1.

$$\text{Growth Factors} = \frac{FY}{BY} \qquad 2.2\text{-}1$$

where:

BY = base year
FY = future year

Many of the area source categories emission estimations are based upon population. The growth factors for the population are developed using equation 2.2-1. The population for the future years was determined by using the FORECAST function in Microsoft EXCEL. The FORECAST tool uses linear interpolation to project future values based on historic data. The statewide population from 2003 – 2008 is the historical data used to calculate the future years' population. The growth factors for the population were calculated using equation 2.2-2.

$$\text{Population Growth Factors} = \frac{FY_{pop}}{BY_{pop}} \qquad 2.2\text{-}2$$

where:

BY_{pop} = 2007 population per county
FY_{pop} = future years' population per county

The population growth factors are listed in Tables 2.2-3.

Table 2.2-3 Statewide Population Growth Factors

2010	2013	2016	2019	2022	2025
1.0540	1.1095	1.1651	1.2206	1.2761	1.3317

Certain emission categories were adjusted for factors such as seasonal adjustment, rule effectiveness and rule penetration. These are discussed in the description of the area source categories where they are applicable.

3.0 QUALITY ASSURANCE MEASURES

The first step in the quality assurance process is to develop a list of area sources in the nonattainment area. The Procedures document and the EIIP Tech. Report were the primary references used in preparing this list for the emissions inventory. To ensure the accuracy of the emissions estimates, the area source emissions inventory team followed the quality assurance measures as outlined in the NCDAQ Emissions Inventory Quality Assurance Project Plan (QAPP).

Under the direction of the quality assurance coordinator, emission sources whose contribution was either at the high or low end of the range of estimates were scrutinized more closely for reasonableness. The accuracy was addressed by performing independent checks of the emissions calculations, verifying the activity data and emission factors as well as plotting all of the area source categories vs. pollutants.

4.0 DISCUSSION OF AREA SOURCE CATEGORIES

There are three major area source categories comprised of a number of individual types of area source categories. Sections 4.1 through 4.3 addresses each of these categories and include subsections that correspond to the category. The objective of each subsection is to describe each category and the emission estimation and/or projection procedures.

4.1 GASOLINE DISTRIBUTION

The area source emissions attributed to this category are associated with various operations related to gasoline and aircraft fuel handling and distribution. Since tank farms and bulk plants are specifically addressed in the point source inventory, the area source category is limited to fuel handling, storage, and distribution operations associated with the service stations and in the refueling of aircrafts.

4.1.1 Gasoline Dispensing Facilities

Since service stations are so numerous, they are collectively considered as an area source. The area source emissions that are derived for this subsection involve determining the estimated emissions that occur at each of the following operations: 1) losses during storage tank filling, 2) storage tank breathing and working losses and 3) truck transit losses. The emissions from vehicle refueling are captured in the on-road mobile source emissions inventory and therefore are not estimated as part of the area sources inventory.

As part of the air toxics program, Stage I controls for gasoline dispensing facilities was adopted by the State, effective May 1990 with final compliance by January 1, 1994. Stage I is the vapor recovery technology on the underground storage tanks and reduces the emissions during the tank filling operations at service stations.

The North Carolina Department of Agriculture, Standards Division is responsible for going to all gasoline dispensing facilities and testing the fuels to ensure that it meets the quality standards of the State. The NCDAQ has worked out an agreement with the Standards Division to also check for Stage I controls. A notice is sent to the NCDAQ for every facility checked by the Standards Division verifying if a facility has properly maintained control equipment. If a facility is not found to be properly maintaining the control equipment, then the NCDAQ sends a notice of violation informing the facility that the controls are required and gives the facility time to correct the violation before fines are accessed. From this information the rule effectiveness and rule penetration can be estimated. The rule effectiveness is the percentage of facilities complying with the rule, whereas the rule penetration is the percentage of facilities requiring Stage I controls. Control efficiency is the expected percent reduction from this control technology. The compliance and rule effectiveness rates for Stage I controls for the Metrolina nonattainment area were obtained from the Mooresville Region Stage I vapor recovery reports supplied by the Mobile Sources Compliance Branch, North Carolina Division of Air Quality. The control efficiency rate, 0.95, is a conservative estimate used for the entire State. The Stage I compliance factors are listed in Table 4.1.1-1.

Table 4.1.1-1 Compliance Factors for Stage I Controls

Rule Effectiveness	Rule Penetration	Control Efficiency
1.00	0.99	0.95

<u>Delivery to Outlets-Underground Storage Tanks-Stage I Balanced Submerged Filling</u>

Stage I controls capture the displacement of gasoline vapors from the storage tanks during the transfer of gasoline from tank trucks to storage tanks at the service station. The emissions calculation was obtained from <u>AP-42</u>, Chapter 5.2-Transportation and Marketing of Petroleum Liquids, equation 1. The daily allocation for the delivery to outlets is 6 days/week.

EM = annual county consumption * proportion of gas sold in July * (12.46 * S * P * M) *
(1/T * 2,000 lbs/ton) *(1-CE/100) * (1 yr/52 wks) * (1 wk/6 days) 4.1.1-1

where:

EM = total daily emissions in tons/day
S = saturation factor = 1.0
P = true vapor pressure of gasoline in July
M = vapor molecular weight
T = temperature of gasoline in July = 80^{o} F
CE = control efficiency

County	True Vapor Pressure (psia)
Cabarrus	6.74
Gaston	5.79
Iredell	6.74
Lincoln	6.74
Mecklenburg	5.79
Rowan	6.74
Union	6.74

County	Vapor Molecular Weight (lbs/lb/mole)
Cabarrus	67.18
Gaston	68.00
Iredell	67.18
Lincoln	67.18
Mecklenburg	68.00
Rowan	67.18
Union	67.18

Truck Transit

Truck transit emissions are the emissions that emanate from gasoline trucks in transit. The emissions equation is from the EIIP Tech. Report, Chapter 11-Gasoline Marketing, Equation 11.3-3. The daily allocation for truck transit is also 6 days/week.

$$EM = \frac{(TGD * L_{EF} * GTA) + (TGD * U_{EF} * GTA)}{2{,}000 \text{ lbs/ton}} * (1 \text{ yr}/52 \text{ wks}) * (1 \text{ wk}/6 \text{ dys}) \qquad 4.1.1\text{-}2$$

where:

EM = total daily emissions in tons/day
TGD = total gasoline dispensed per county per 1,000 gallons
GTA = default value (1.25) obtained from EIIP Tech. Report, Chapter 11, page 11.3-7
L_{EF} = loaded tank truck EF = 0.005 lbs/1,000 gallons
U_{EF} = unloaded tank truck EF = 0.055 lbs/1,000 gallons

The L_{EF} and the U_{EF} factors were obtained from the EIIP Tech. Report, Table 11.3-1.

Underground Tank Breathing and Emptying

The emissions equation is from the EIIP Tech. Report, Chapter 11-Gasoline Marketing, Section 3. The emission factor was obtained from EIIP Tech. Report, Table 11.3-1. The base year emissions were calculated using equation 4.1.1-3.

$$EM = TGD * EF * (1 \text{ year}/365 \text{ days}) \qquad 4.1.1\text{-}3$$

where:

EM = total daily emissions in tons/day
EF = emission factor, 1.0 lb/1,000 gallons/year
TGD = total gasoline dispensed per county per 1,000 gallons

The FORECAST function in Microsoft EXCEL was used to determine the future year gasoline consumption based on the past motor fuel consumption for 2003 - 2008. The FORECAST tool uses linear interpolation to project future values based on historic data. By applying this methodology, growth factors for 2010, 2013, 2016, 2019, 2022 and 2025 were determined. The 2003-2008 statewide gasoline consumption was obtained from the US Federal Highway Administration. The growth factors are shown in Table 4.1.1-2.

Table 4.1.1-2 Growth Factors for Gasoline Dispensing

2010	2013	2016	2019	2022	2025
1.0588	1.0966	1.1343	1.1720	1.2097	1.2474

The projected emissions for the gasoline dispensing facilities are obtained from equation 4.1.1-4.

$$PJEM = EM * GF_a \qquad 4.1.1\text{-}4$$

where:

EM = total daily emissions in tons/day
PJEM = projected future emissions in tons/day
GF_a = growth factor (a) for projected future years

The VOC emissions for underground storage tanks, trucks in transit and underground tank breathing and emptying are in Tables 4.1.1-3 through 4.1.1-5. The total VOC emissions from the gasoline dispensing facilities are summarized in Table 4.4.5-6.

Table 4.1.1-3 VOC Emissions (tpd) from Underground Storage Tanks

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.079	0.084	0.087	0.090	0.093	0.096	0.099
Gaston	0.094	0.099	0.103	0.107	0.110	0.110	0.117
Iredell	0.013	0.044	0.045	0.047	0.048	0.050	0.051
Lincoln	0.018	0.019	0.020	0.020	0.021	0.022	0.022
Mecklenburg	0.335	0.355	0.367	0.380	0.393	0.405	0.418
Rowan	0.027	0.029	0.030	0.031	0.032	0.033	0.034
Union	0.048	0.051	0.053	0.055	0.057	0.059	0.060
Total	**0.614**	**0.681**	**0.705**	**0.730**	**0.754**	**0.779**	**0.801**

*Iredell County emissions for nonattainment area only

Table 4.1.1-4 VOC Emissions (tpd) from Tank Trucks in Transit

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.011	0.012	0.012	0.013	0.013	0.013	0.014
Gaston	0.014	0.015	0.016	0.016	0.017	0.017	0.018
*Iredell	0.004	0.013	0.013	0.014	0.014	0.014	0.015
Lincoln	0.006	0.006	0.007	0.007	0.007	0.007	0.007
Mecklenburg	0.051	0.054	0.056	0.057	0.059	0.061	0.063
Rowan	0.010	0.011	0.011	0.012	0.012	0.012	0.013
Union	0.012	0.013	0.013	0.014	0.014	0.014	0.015
Total	**0.108**	**0.124**	**0.128**	**0.133**	**0.136**	**0.138**	**0.145**

*Iredell County emissions for nonattainment area only

Table 4.1.1-5 VOC Emissions (tpd) from Storage Tank Breathing Loss

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.148	0.157	0.162	0.168	0.173	0.179	0.184
Gaston	0.191	0.202	0.209	0.217	0.224	0.231	0.238
*Iredell	0.052	0.168	0.174	0.180	0.186	0.192	0.198
Lincoln	0.079	0.084	0.087	0.090	0.093	0.096	0.099
Mecklenburg	0.675	0.715	0.740	0.766	0.791	0.817	0.842
Rowan	0.137	0.146	0.151	0.156	0.161	0.166	0.171
Union	0.159	0.168	0.174	0.180	0.186	0.192	0.198
Total	**1.441**	**1.640**	**1.697**	**1.757**	**1.814**	**1.873**	**1.930**

*Iredell County emissions for nonattainment area only

Table 4.1.1-6 Total VOC Emissions for Gasoline Dispensing Facilities

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.238	0.253	0.261	0.271	0.279	0.288	0.297
Gaston	0.299	0.316	0.328	0.340	0.351	0.362	0.373
*Iredell	0.069	0.255	0.232	0.241	0.248	0.256	0.264
Lincoln	0.103	0.109	0.114	0.117	0.121	0.125	0.128
Mecklenburg	1.061	1.124	1.163	1.203	1.243	1.283	1.323
Rowan	0.174	0.186	0.192	0.199	0.205	0.211	0.218
Union	0.219	0.232	0.240	0.249	0.257	0.265	0.273
Total	**2.163**	**2.445**	**2.530**	**2.620**	**2.704**	**2.790**	**2.876**

*Iredell County emissions for nonattainment area only

4.1.2 Aircraft Refueling

Like vehicle refueling, aircraft refueling results in VOC emissions. There are two processes that generate VOC emissions. Stage I is the displacement of vapors during the transfer of gasoline from tank trucks to storage tanks and vice versa. The other process is Stage II that involves the transfer of fuel from the tanker trucks into general aviation aircraft.

For Stage I and Stage II, the national-level emissions were calculated by multiplying the nationwide aviation gasoline (AvGas) consumption by the VOC emission factors and summing the emissions.

Once the national-level emissions were calculated, they were allocated to the Petroleum Administration for Defense (PAD) Districts based on the amount of gasoline reported for each PAD. The PAD for North Carolina is PAD 1, which comprises 17 states along the Atlantic Coast. The emissions were then allocated to the county-level based on the number of landing-offs (LTOs) for general aviation flights per county. The amount of aviation gasoline consumed nationally and for PAD 1 was obtained from the US Department of Energy, Energy Information Administration. The number of LTOs was obtained from the US Federal Aviation Administration. The 2008 LTOs were used for PAD 1 District and the counties because that is the only data that was available, therefore, it is assumed the LTOs remain constant between 2007 and 2008. The VOC emission factors are shown in Table 4.1.2-1.

Table 4.1.2-1 Aircraft Refueling Emission Factors

Emission Source	VOC Emission Factors (lb VOC/gallon AvGas/year)
Stage I Emission Factors	
Aviation gas unloading/tank filling-tank fill	0.009021383
Aviation gas unloading/tank filling-storage tank working	0.003605215
Aviation gas tank truck filling-composite	0.010306575
Aviation gas storage tank-breathing loss	0.001694117
Stage II Emission Factors	
Fuel transfer from tanker trucks to aircraft	0.0136

The following equation shows the emission estimate for the nationwide aviation gasoline consumption.

US AvGas Consumption = amt of nationwide AvGas consumed * 42 gal/barrel * VOC EF

For Stage I, the US aviation gasoline consumed is generated for each VOC emission factor and the total consumption is calculated by summing the emissions. The emission estimate for the county-level is shown in equation 4.1.2-1.

EM = US VOC Emissions * (PAD 1 consumption/ US AvGas Consumption) *
(County LTOs/PAD 1 LTOs) * (1 ton/2,000 lbs/year) * (1 year/365 days) 4.1.2-1

where:

EM = total daily emissions in tons/day
US VOC Emissions = nationwide annual AvGas VOC emissions, lbs/year
PAD 1consumption = PAD 1 District I total AvGas consumption = 1,323,000 barrels/year
PAD 1 LTOs = PAD 1 District I landing-take offs for general aircraft = 17,588,837
County LTOs = county-level landing-take offs for general aircraft

The 2008 county-level landing-take offs for general aircraft are shown in Table 4.1.2-2.

Table 4.1.2-2 County-Level Landing-Takeoffs

County	2008 County-Level Landing-Takeoffs
Cabarrus	41,064
Gaston	18,102
Iredell	23,003
Lincoln	13,271
Mecklenburg	73,724
Rowan	35,923
Union	37,106

The growth factors were developed using Microsoft EXCEL FORECAST to linear interpolate the future year's PAD 1 aviation gasoline consumption based on the 2003 – 2008 aviation gasoline consumption. The growth factors for the Metrolina area are listed in Table 4.1.2-3.

Table 4.1.2-3 Growth Factors for Aircraft Refueling

2010	2013	2016	2019	2022	2025
0.9496	0.9627	0.9759	0.9890	1.0022	1.0153

The projected emissions for the aircraft refueling are calculated by using equation 4.1.2-2.

$$PJEM = EM * GF_a \qquad 4.1.2\text{-}2$$

where:

PJEM = projected future emissions in tons/day
GF_a = growth factor (a) for projected future years

The following tables show the emissions from Stage I and Stage II.

Table 4.1.2-4 VOC Emissions (tpd) from Stage I

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.047	0.044	0.045	0.045	0.046	0.047	0.047
Gaston	0.021	0.019	0.020	0.020	0.020	0.021	0.021
*Iredell	0.009	0.008	0.008	0.008	0.008	0.009	0.009
Lincoln	0.015	0.014	0.014	0.015	0.015	0.015	0.015
Mecklenburg	0.084	0.079	0.081	0.082	0.083	0.084	0.085
Rowan	0.041	0.039	0.039	0.040	0.040	0.041	0.041
Union	0.042	0.040	0.041	0.041	0.042	0.042	0.043
Total	**0.259**	**0.243**	**0.248**	**0.251**	**0.254**	**0.259**	**0.261**

*Iredell County emissions for nonattainment area only

Table 4.1.2-5 VOC Emissions (tpd) from Stage II

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.0024	0.0023	0.0023	0.0024	0.0024	0.0024	0.0025
Gaston	0.0011	0.0010	0.0010	0.0010	0.0011	0.0011	0.0011
*Iredell	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004
Lincoln	0.0008	0.0007	0.0008	0.0008	0.0008	0.0008	0.0008
Mecklenburg	0.0043	0.0041	0.0042	0.0042	0.0043	0.0043	0.0044
Rowan	0.0021	0.0020	0.0020	0.0021	0.0021	0.0021	0.0021
Union	0.0022	0.0021	0.0021	0.0021	0.0022	0.0022	0.0022
Total	**0.0133**	**0.0126**	**0.0128**	**0.0130**	**0.0133**	**0.0133**	**0.0135**

*Iredell County emissions for nonattainment area only

The total emissions for aircraft refueling, in tons/day, are shown in Table 4.1.2-6.

Table 4.1.2-6 Total VOC Emissions (tpd) from Aircraft Refueling

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.049	0.046	0.047	0.047	0.048	0.049	0.050
Gaston	0.022	0.020	0.021	0.021	0.021	0.022	0.022
*Iredell	0.009	0.008	0.008	0.008	0.008	0.009	0.009
Lincoln	0.016	0.015	0.016	0.016	0.016	0.016	0.016
Mecklenburg	0.088	0.083	0.085	0.086	0.087	0.088	0.089
Rowan	0.043	0.041	0.041	0.042	0.042	0.043	0.043
Union	0.044	0.042	0.043	0.043	0.044	0.044	0.045
Total	**0.271**	**0.255**	**0.260**	**0.263**	**0.266**	**0.271**	**0.274**

*Iredell County emissions for nonattainment area only

4.1.3 Portable Fuel Containers

Portable fuel containers (PFCs, or gas cans) are consumer products used to refuel a wide variety of gasoline-powered equipment.

The USEPA has generated emissions for portable fuel containers for 2002, 2010, 2015, 2020 and 2030. The activity data used in the development of these emission inventories were obtained from the USEPA's Nonroad Model, which uses a variety of variables like equipment size, equipment population, equipment age, Reid Vapor Pressure and air temperature to estimate activity.

The base year emissions are calculated using equation 4.1.3-1

$$EM = m * (2007\text{-}2002) + Emissions_{2002} * (1\ year/365\ days) \qquad 4.1.3\text{-}1$$

where:

EM = total daily emissions in tons/day

$m = (Emissions_{2010} – Emissions_{2002}) / (2010 – 2002)$

The future year emissions were determined by linear interpolation using the Microsoft EXCEL FORECAST tool. The emissions for 2010, 2013, 2016 and 2019 were linearly interpolated from the PFC emissions for 2010 and 2015. The 2022 and 2025 emissions were linearly interpolated from the 2020 and 2030 emissions.

Table 4.1.3-1 is the VOC emissions for the Metrolina nonattainment area for portable fuel containers.

Table 4.1.3-1 VOC Emissions (tpd) from Portable Fuel Containers

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.446	0.412	0.232	0.113	0.118	0.129	0.129
Gaston	0.413	0.382	0.215	0.105	0.110	0.114	0.119
*Iredell	0.084	0.077	0.044	0.021	0.022	0.023	0.024
Lincoln	0.150	0.138	0.078	0.038	0.040	0.041	0.043
Mecklenburg	3.882	3.589	2.018	0.985	1.030	1.075	1.121
Rowan	0.236	0.218	0.123	0.060	0.063	0.065	0.068
Union	0.745	0.689	0.387	0.189	0.198	0.206	0.215
Total	**5.956**	**5.505**	**3.097**	**1.511**	**1.581**	**1.653**	**1.719**

*Iredell County emissions for nonattainment area only

4.2 STATIONARY SOURCE SOLVENT EVAPORATION

There are eleven subcategories that involve stationary source solvent evaporative emissions. They include: dry cleaning, graphic arts, solvent cleaning, automotive refinishing, architectural coatings, traffic markings, industrial surface coating, asphalt paving, roofing operations, pesticide application and consumer/commercial solvent use. The methodology used to calculate the emissions from these sources are described in detail in each subsection.

4.2.1 Dry Cleaning

The VOC emissions from dry cleaning vary with the type of process and the solvent used. For the most part, dry cleaning facilities (coin-operated and conventional) are small business entities. As a result of their size, dry cleaning emissions are not captured as point sources. However, dry cleaning operations can be a significant emission source for VOC emissions, when taken collectively.

The emissions from dry cleaning are estimated by multiplying the number of employees at dry cleaning by a national per-employee emission factor, 467 lbs of VOC/employee/year. The number of dry cleaning employees was obtained from the US Census Bureau, County Business Patterns. Any facilities with 100 or more employees were deemed to be point sources and not included in the area source emissions inventory. Table 4.2.1-1 below shows the dry cleaning employment used in the emissions estimation.

Table 4.2.1-1 Employment for Dry Cleaning

County	2007 Employment for Dry Cleaning
Cabarrus	101
Gaston	112
Iredell	87
Lincoln	46
Mecklenburg	1,030
Rowan	67
Union	116

According to the EIIP Tech. Report, the activity is 6 days per week. The FORECAST tool in Microsoft EXCEL was used to determine the future year dry cleaning employment data for 2010, 2013, 2016, 2019, 2022, and 2025 based on the past statewide dry cleaning employment data for 2003 - 2008. The dry cleaning growth factors are shown in Table 4.2.1-2.

Table 4.2.1-2 Growth Factors for Dry Cleaning

2010	2013	2016	2019	2022	2025
0.3238	0.2326	0.1414	0.0501	0.0501	0.0501

The emissions for 2007 were calculated using equation 4.2.1-1 and the emissions for the future year emissions were calculated using equation 4.2.1-2.

$$EM = \frac{\text{no. of employees} * EF}{2{,}000 \text{ lbs/ton}} * (1 \text{ year}/52 \text{ weeks}) * (1 \text{ week}/6 \text{ days}) \qquad 4.2.1\text{-}1$$

$$PJEM = EM * GF_a \qquad 4.2.1\text{-}2$$

where:

EM = total daily emissions in tons/day
EF = emission factor, 467 lbs VOC/employee/year
PJEM = projected emissions in tons/day
GF_a = growth factor (a) for projected future years

The VOC emission estimates, in tons/day, from dry cleaning for the Metrolina nonattainment area are listed in Table 4.2.1-3.

Table 4.2.1-3 VOC Emissions (tpd) from Dry Cleaning

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.076	0.025	0.018	0.011	0.004	0.004	0.004
Gaston	0.084	0.027	0.020	0.012	0.004	0.004	0.004
*Iredell	0.021	0.007	0.005	0.003	0.001	0.001	0.001
Lincoln	0.034	0.011	0.008	0.005	0.002	0.002	0.002
Mecklenburg	0.771	0.250	0.179	0.109	0.039	0.039	0.039
Rowan	0.149	0.016	0.011	0.007	0.002	0.002	0.002
Union	0.087	0.028	0.020	0.012	0.004	0.004	0.004
Total	**1.122**	**0.364**	**0.261**	**0.159**	**0.056**	**0.056**	**0.056**

*Iredell County emissions for nonattainment area only

4.2.2 Graphic Arts/Printing

Graphic arts include operations that are involved in printing of newspapers, magazines, books, and other printed materials, which can be divided into several subsets based upon printing technology. Over the last decade ink-jet and offset lithography have emerged as the dominant technologies. The use of oils as ink solvents and the reduction of alcohols in the fountain solution and in the cleanup solutions have resulted in notable reductions in emissions for offset lithography. Ink-jet printing results in essentially no VOC emissions.

A number of establishments that generate emissions in this source category are in-house graphic arts operations at plants that are in non-printing industries. The per-capita emission factor of 1,482 lbs VOC/employee/year was used to calculate the VOC emissions. The emissions are from facilities that emit less than 100 tons VOC/year. It assumes that facilities greater than 100 tons VOC/year will be included in the point source emissions inventory. The employment was obtained from the US Census Bureau, County Business Patterns. The graphic arts employment per county for 2007 is in Table 4.2.2-1.

Table 4.2.2-1 Employment for Graphic Arts

County	2007 Employment for Graphic Arts
Cabarrus	151
Gaston	328
Iredell	182
Lincoln	126
Mecklenburg	1,862
Rowan	289
Union	353

According to the Procedures document, Table 5.8-1, the activity days per week is 5 and there is no seasonal adjustment needed. There were no graphic arts point sources in the Metrolina nonattainment area.

The future year emissions were calculated using the FORECAST function in Microsoft EXCEL to linear interpolate the graphic arts printing operations employment. The growth factors were determined by using statewide historical employment data from 2003-2008. The growth factors are shown in Table 4.2.2-2.

Table 4.2.2-2 Growth Factors for Graphic Arts

2010	2013	2016	2019	2022	2025
0.9589	0.9368	0.9147	0.8927	0.8706	0.8486

The emissions for the base year and future years were calculated using equations 4.2.2-1 and 4.2.2-2, respectively.

$$EM = \frac{\text{county employment} * EF}{2{,}000 \text{ lbs/ton}} * (1 \text{ year}/52 \text{ weeks}) * (1 \text{ week}/5 \text{ days}) \qquad 4.2.2\text{-}1$$

$$PJEM = EM * GF_a \qquad 4.2.2\text{-}2$$

where:

EM = total daily emissions in tons/day
EF = emission factor, 1,482 lbs VOC/employee/year
PJEM = projected future year emissions in ton/day
GF_a = growth factor (a) for projected future years

The VOC emission estimates from graphic arts operations for the Metrolina nonattainment area are listed in Table 4.2.2-3.

Table 4.2.2-3 VOC Emissions (tpd) from Graphic Arts

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.430	0.412	0.403	0.393	0.384	0.374	0.365
Gaston	0.935	0.897	0.876	0.855	0.835	0.814	0.793
*Iredell	0.169	0.162	0.158	0.155	0.151	0.147	0.143
Lincoln	0.359	0.344	0.336	0.328	0.320	0.313	0.305
Mecklenburg	5.392	5.170	5.051	4.932	4.813	4.694	4.576
Rowan	0.824	0.790	0.772	0.754	0.736	0.717	0.699
Union	1.006	0.965	0.942	0.920	0.898	0.876	0.854
Total	**9.115**	**8.740**	**8.538**	**8.337**	**8.137**	**7.935**	**7.735**

*Iredell County emissions for nonattainment area only

4.2.3 Solvent Cleaning and Degreasing

Solvent cleaning operations are integral to many businesses and industries, and are conducted for the purpose of removing grease, oils, waxes, carbon deposits, etc. from metals, plastic, or glass surfaces. Solvent cleaning is usually performed prior to painting, plating, inspection, repair, assembly, etc. The solvents used in the cleaning operations can be either in a liquid or vapor phase. Generally, these solvents have high vapor pressures which emit VOC emissions.

There are two basic types of solvent cleaning techniques, cold cleaning and vapor cleaning. Cold cleaning machines use solvents in the liquid phase to clean and remove foreign material such as oils and grease from the surface of materials. Cleaning operations include spraying/flushing solvent or parts agitation, wipe cleaning, brushing, and immersion.

The vapor cleaning technique can be further divided into open top degreasing and in-line cleaning. The open top degreasing machines are tanks designed to generate and contain solvent vapor. The tank is equipped with a heating system that boils the liquid solvent. As the solvent boils, dense solvent vapors rise and displace the air in the tank. Coolant is circulated in condensing coils on the top of the tank to create a controlled vapor zone within the tank. Condensing solvent vapors dissolve the contaminants on the surface of the workload and flush both the dissolved and undissolved contaminants from the workload.

In-line cleaning machines employ automated loading on a continuous basis. These machines are often custom made for large-scale operations. A continuous or multiple-batch loading system greatly reduces or even eliminates the manual parts handling associated with batch cleaning. In-line cleaning machines are enclosed to prevent solvent losses; however, entry and exit openings cannot be sealed.

The VOC emissions for this category are estimated by using per employee factors. The emission factors for these subcategories are listed in Table 4.2.3-1.

Table 4.2.3-1 Solvent Cleaning and Degreasing Emission Factors

Subcategory	VOC Emission Factors (lbs VOC/employee/year)
Electronic & Other Electrical: Open Top Degreasing	29
Miscellaneous Manufacturing: Open Top Degreasing	9.8
Miscellaneous Manufacturing: Cold Cleaning	24
Auto Repair Services: Cold Cleaning	270

Employment data was derived from the US Census Bureau, County Business Patterns. The following table shows the total employment for each subcategory per county.

Table 4.2.3-2 Solvent Cleaning and Degreasing Employment

	Open Top Degreasing		Cold Cleaning	
County	Electronic & Other Electrical	Miscellaneous Manufacturing: Open Top Degreasing	Miscellaneous Manufacturing: Cold Cleaning	Auto Repair Services: Cold Cleaning
Cabarrus	84	2,695	1,222	1,466
Gaston	122	4,387	2,655	1,732
Iredell	89	3,515	1,939	1,502
Lincoln	0	881	342	538
Mecklenburg	547	12,558	6,622	5,911
Rowan	132	2,453	1,411	1,039
Union	206	2,747	1,673	1,044

Federal rules are expected to reduce the VOC emission from solvent cleaning in the future years. The USEPA estimates (EPA420-R-00-020) that the federal rules will reduce the emissions from this source category by approximately 31% for open top processes and about 43% from cold cleaning processes. This reduction was applied to the base year and future years' emissions.

The work week is 6 days for this category. The growth factors were developed using linear interpolation of 2003-2008 statewide employment data. The manufacturing employment was used for the electronic & other electrical: open top degreasing and miscellaneous manufacturing: cold cleaning subcategories. Employment for retail trade, transportation and warehousing and other services (except public administration) was used for the auto repair services: cold cleaning subcategory. Lastly, all of the employment categories were used for the miscellaneous manufacturing: open top degreasing subcategory. The employment categories used for the growth factors were determined based on the statewide employment NAICS codes used for each subcategory emissions calculation. The growth factors are shown in Tables 4.2.3-3 through 4.2.3-6.

Table 4.2.3-3 Growth Factors for Electronic & Other Electrical: Open Top Degreasing

2010	2013	2016	2019	2022	2025
0.9559	0.9195	0.8831	0.8468	0.8104	0.7740

Table 4.2.3-4 Growth Factors for Miscellaneous Manufacturing: Open Top Degreasing

2010	2013	2016	2019	2022	2025
0.9860	0.9816	0.9773	0.9730	0.9686	0.9643

Table 4.2.3-5 Growth Factors for Miscellaneous Manufacturing: Cold Cleaning

2010	2013	2016	2019	2022	2025
0.9559	0.9195	0.8831	0.8468	0.8104	0.7740

Table 4.2.3-6 Growth Factors for Auto Repair Services: Cold Cleaning

2010	2013	2016	2019	2022	2025
0.9939	0.9980	1.0020	1.0061	1.0102	1.0143

The emissions for the base year and future years were calculated using equations 4.2.3-1 and 4.2.3-2, respectively.

$$EM = \frac{\text{no. of employees} * EF}{2{,}000 \text{ lbs/tons}} * (1 \text{ year}/52 \text{ weeks}) * (1 \text{ week}/6 \text{ days}) * [1 - RF] \qquad 4.2.3\text{-}1$$

$$PJEM = EM * GF_a \qquad 4.2.3\text{-}2$$

where:

EM = total daily emissions in tons/day
EF = emission factor per subcategory
RF = reduction factors, 31% for degreasing processes and 43% for cold cleaning processes
PJEM = projected future year emissions in tons/day
GF_a = growth factor (a) for projected future years

The VOC emission estimates, in tons/day, are summarized in Tables 4.2.3-7 through 4.2.3-11.

Table 4.2.3-7 VOC Emissions (tpd) from Electronic & Other Electrical: Open Top Degreasing

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.0027	0.0026	0.0025	0.0024	0.0023	0.0022	0.0021
Gaston	0.0039	0.0037	0.0036	0.0034	0.0033	0.0032	0.0030
*Iredell	0.0009	0.0009	0.0008	0.0008	0.0008	0.0007	0.0007
Lincoln	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mecklenburg	0.0176	0.0168	0.0162	0.0155	0.0149	0.0143	0.0136
Rowan	0.0042	0.0040	0.0039	0.0037	0.0036	0.0034	0.0033
Union	0.0066	0.0063	0.0061	0.0058	0.0056	0.0053	0.0051
Total	**0.0359**	**0.0343**	**0.0331**	**0.0316**	**0.0305**	**0.0291**	**0.0278**

*Iredell County emissions for nonattainment area only

Table 4.2.3-8 VOC Emissions (tpd) from Miscellaneous Manufacturing: Open Top Degreasing

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.0292	0.0288	0.0287	0.0285	0.0284	0.0283	0.0282
Gaston	0.0475	0.0468	0.0466	0.0464	0.0462	0.0460	0.0458
*Iredell	0.0124	0.0122	0.0122	0.0121	0.0121	0.0120	0.0120
Lincoln	0.0095	0.0094	0.0093	0.0093	0.0092	0.0092	0.0092
Mecklenburg	0.1361	0.1342	0.1336	0.1330	0.1324	0.1318	0.1312
Rowan	0.0266	0.0262	0.0261	0.0260	0.0259	0.0258	0.0257
Union	0.0298	0.0294	0.0293	0.0291	0.0290	0.0289	0.0287
Total	**0.2911**	**0.2870**	**0.2858**	**0.2844**	**0.2832**	**0.2820**	**0.2828**

*Iredell County emissions for nonattainment area only

Table 4.2.3-9 VOC Emissions (tpd) from Miscellaneous Manufacturing: Cold Cleaning

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.027	0.026	0.025	0.024	0.023	0.022	0.021
Gaston	0.058	0.055	0.053	0.051	0.049	0.047	0.045
*Iredell	0.064	0.061	0.059	0.057	0.054	0.052	0.050
Lincoln	0.008	0.008	0.007	0.007	0.007	0.006	0.006
Mecklenburg	0.145	0.139	0.133	0.128	0.123	0.118	0.112
Rowan	0.031	0.030	0.029	0.027	0.026	0.025	0.024
Union	0.037	0.035	0.034	0.033	0.031	0.030	0.029
Total	**0.370**	**0.354**	**0.340**	**0.327**	**0.313**	**0.300**	**0.287**

*Iredell County emissions for nonattainment area only

Table 4.2.3-10 VOC Emissions (tpd) from Auto Repair Services: Cold Cleaning

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.362	0.360	0.361	0.363	0.364	0.366	0.367
Gaston	0.427	0.424	0.426	0.428	0.430	0.431	0.433
*Iredell	0.121	0.120	0.121	0.121	0.122	0.122	0.123
Lincoln	0.133	0.132	0.133	0.133	0.134	0.134	0.135
Mecklenburg	1.458	1.449	1.455	1.461	1.467	1.473	1.479
Rowan	0.256	0.254	0.255	0.257	0.258	0.259	0.260
Union	0.258	0.256	0.257	0.259	0.260	0.261	0.262
Total	**3.015**	**2.995**	**3.008**	**3.022**	**3.035**	**3.046**	**3.059**

*Iredell County emissions for nonattainment area only

Table 4.2.3-11 Total VOC Emissions (tpd) from Surface Cleaning and Degreasing

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.421	0.417	0.417	0.418	0.418	0.419	0.418
Gaston	0.536	0.530	0.529	0.529	0.529	0.527	0.527
*Iredell	0.198	0.194	0.193	0.191	0.189	0.187	0.186
Lincoln	0.151	0.149	0.149	0.149	0.150	0.149	0.150
Mecklenburg	1.757	1.739	1.738	1.738	1.737	1.737	1.736
Rowan	0.318	0.314	0.314	0.314	0.314	0.313	0.313
Union	0.331	0.327	0.326	0.327	0.326	0.325	0.325
Total	**3.712**	**3.670**	**3.666**	**3.666**	**3.663**	**3.657**	**3.655**

*Iredell County emissions for nonattainment area only

4.2.4 Auto Body Refinishing

Auto body refinishing operations consist of vehicle preparation, primer application, topcoat application and spray equipment cleaning. These operations result in significant VOC emissions. The solvents are typically 100% volatile and can constitute up to 6.5 lbs of VOC per gallon of cleaner or paint.

The emissions estimation is based on a per employee emission factor, 89 lbs/VOC/employee. The number of employees for 2007 was obtained from the US Census Bureau, County Business Patterns, which are listed in Table 4.2.4-1.

Table 4.2.4-1 Employment for Auto Body Refinishing

County	2007 Auto Body Refinishing Employment
Cabarrus	132
Gaston	113
Iredell	162
Lincoln	58
Mecklenburg	623
Rowan	63
Union	139

According to the EIIP Tech. Report the activity days per week is 5 days. The growth factors are determined by using the FORECAST function in Microsoft EXCEL by linear interpolation of historic statewide employment data from 2003-2008. The auto body refinishing growth factors are shown in Table 4.2.4-2.

Table 4.2.4-2 Growth Factors for Auto Body Refinishing

2010	2013	2016	2019	2022	2025
0.7629	0.7291	0.6953	0.6615	0.6277	0.5939

Federal rules are expected to reduce the VOC emission from auto body refinishing in the future years. The USEPA estimates that the federal rules will reduce the emissions from this source category by approximately 37%. This reduction was applied to the base year and future year emissions. The base year emissions were calculated using equation 4.2.4-1 and the emissions for the future years were calculated using equation 4.2.4-2.

$$EM = \frac{\underline{\text{no. of employees} * EF} * (1\ \text{year}/52\ \text{weeks}) * (1\ \text{week}/5\ \text{days}) * [1-RF]}{2{,}000\ \text{lbs/ton}} \quad 4.2.4\text{-}1$$

$$PJEM = EM * GF_a \quad 4.2.4\text{-}2$$

where:

EM =total daily emissions in tons/day
EF = emission factor, 89 lbs. VOC/employee/year
RF = reduction factor, 37%
PJEM = projected future emissions in tons/day
GF_a = growth factor (a) for projected future years

The VOC emission estimates, in tons/day, from auto body refinishing for the Metrolina nonattainment area are listed in Table 4.2.4-3.

Table 4.2.4-3 VOC Emissions (tpd) from Auto Body Refinishing

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.014	0.011	0.010	0.010	0.009	0.009	0.008
Gaston	0.012	0.009	0.009	0.008	0.008	0.008	0.007
*Iredell	0.006	0.005	0.004	0.004	0.004	0.004	0.004
Lincoln	0.006	0.005	0.004	0.004	0.004	0.004	0.004
Mecklenburg	0.067	0.051	0.049	0.047	0.044	0.042	0.040
Rowan	0.007	0.005	0.005	0.005	0.005	0.004	0.004
Union	0.015	0.011	0.011	0.010	0.010	0.009	0.009
Total	**0.127**	**0.097**	**0.092**	**0.088**	**0.084**	**0.080**	**0.076**

*Iredell County emissions for nonattainment area only

4.2.5 Architectural Coatings

This category includes the application of paint, primer, varnish or lacquer to architectural surfaces, and the use of solvents as thinners and for cleanup.

The VOC emissions for this source category were estimated by multiplying county population in Table 2.2-1 by a per capita emission factor as shown in equation 4.2.5-1. The future emissions were determined using equation 4.2.5-2. The population growth factors in Table 2.2-3 were used to calculate the future years' emissions.

Federal rules are expected to reduce the VOC emission from architectural coatings in the future years. The USEPA estimates that the federal rules will reduce the emissions from this source category by approximately 25%. This reduction was applied to the base year and future year emissions.

$$EM = \frac{\underline{\text{county population} * EF}}{2{,}000 \text{ lbs/ton}} * (1 \text{ year}/52 \text{ weeks}) * (1 \text{ week}/7 \text{ days}) * [1-RF] \qquad 4.2.5\text{-}1$$

$$PJEM = EM * GF_a \qquad 4.2.5\text{-}2$$

where:

EM = total daily emissions in tons/day
EF = emission factor, 3.02 lbs. VOC/person/year
RF = reduction factor, 25%
PJEM = projected future emissions in tons/day
GF_a = growth factor (a) for projected future years

The VOC emission estimates, in tons/day, from architectural coatings for the Metrolina nonattainment area are listed in Table 4.2.5-1.

Table 4.2.5-1 VOC Emissions (tpd) from Architectural Coatings

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.510	0.538	0.566	0.594	0.623	0.651	0.679
Gaston	0.624	0.658	0.692	0.727	0.762	0.796	0.831
*Iredell	0.152	0.160	0.169	0.177	0.186	0.194	0.202
Lincoln	0.226	0.238	0.251	0.263	0.276	0.288	0.301
Mecklenburg	2.675	2.819	2.968	3.117	3.265	3.414	3.562
Rowan	0.423	0.446	0.469	0.493	0.516	0.540	0.563
Union	0.565	0.595	0.627	0.658	0.690	0.721	0.752
Total	**5.175**	**5.454**	**5.742**	**6.029**	**6.318**	**6.604**	**6.890**

*Iredell County emissions for nonattainment area only

4.2.6 Traffic Markings

The paint used in traffic markings operations (the painting of center lines, shoulders, etc.) emits VOC emissions during the drying process.

The emission estimation used to calculate the traffic marking emissions is based upon the number of lane miles for each county. The number of lane miles was obtained from the North Carolina Department of Transportation (NCDOT) for 2007 as shown in Table 4.2.6-1.

Table 4.2.6-1 Number of Lane Miles

County	Number of Lane Miles in 2007
Cabarrus	1,735
Gaston	2,145
Iredell	3,216
Lincoln	1,572
Mecklenburg	2,900
Rowan	2,467
Union	3,171

For the future years' emissions, the growth factors were determined using linear interpolation with Microsoft EXCEL FORECAST function. The statewide lane miles for 2003-2008 were used to determine the number of lane miles for the future years. Statewide lane miles were used in lieu of county lane miles because the statewide information was readily available from the US Federal Highway Administration.

Table 4.2.6-2 Growth Factors for Traffic Markings

2010	2013	2016	2019	2022	2025
1.0184	1.0373	1.0563	1.0753	1.0942	1.1132

Additionally, federal rules are expected to reduce the VOC emission from traffic markings in the future years. The USEPA estimates that the federal rules will reduce the emissions from this source category by approximately 25%. This reduction was applied to the emissions for the base year and the interim and future years. According to the EIIP Tech. Report, the activity is 5 days per week and the SAF is 1.3.

The emissions for the base year and future years were calculated using equations 4.2.6-1 and 4.2.6-2, respectively.

$$EM = \frac{\text{no. of lane miles} * EF * SAF}{2{,}000 \text{ lbs/ton}} * (1 \text{ year}/52 \text{ weeks}) * (1 \text{ week}/5 \text{ days}) * [1-RF] \qquad 4.2.6\text{-}1$$

$$PJEM = EM * GF_a \qquad 4.2.6\text{-}2$$

where:

EM = total daily emissions in tons/year
EF = emission factor, 22.1 lbs. VOC/mile/year
SAF = seasonal adjustment factor, 1.3
RF = reduction factor, 25%
PJEM = projected future emissions in tons/day
GF_a = growth factor (a) for projected future years

The VOC emission estimates, in tons/day, from traffic markings for the Metrolina nonattainment area are listed in Table 4.2.6-3.

Table 4.2.6-3 VOC Emissions (tpd) from Traffic Markings

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.072	0.073	0.075	0.076	0.077	0.079	0.080
Gaston	0.089	0.091	0.092	0.094	0.096	0.097	0.099
*Iredell	0.043	0.044	0.045	0.045	0.046	0.047	0.048
Lincoln	0.065	0.066	0.067	0.069	0.070	0.071	0.072
Mecklenburg	0.120	0.122	0.124	0.127	0.129	0.131	0.134
Rowan	0.102	0.104	0.106	0.108	0.110	0.112	0.114
Union	0.131	0.133	0.136	0.138	0.141	0.143	0.146
Total	**0.622**	**0.633**	**0.645**	**0.657**	**0.669**	**0.680**	**0.693**

*Iredell County emissions for nonattainment area only

4.2.7 Industrial Surface Coating

Surface coating operations involve applying a thin layer of coating (e.g. paint, lacquer, enamel, varnish, etc.) to the surface of an object for decorative or protective purposes. The coating products, which are solvent based, emit VOC emissions as the result of solvent evaporation during the drying or curing process.

Ideally, the VOC emissions from industrial surface coating activities should be captured as point sources. From a practical standpoint, this is not always accomplished. For example, two of the industrial surface coating subcategories, industrial maintenance coatings and other special purpose coatings, utilize per capita emission factors instead of per employment emission factors.

For industrial maintenance coatings and other special purpose coating emissions calculation, the population used is shown in Table 2.2-1. The employment used for the remaining subcategories is shown in Table 4.2.7-1. For these subcategories, a per capita emission factor, shown in Table 4.2.7-1, is used to estimate the emissions. The emissions for the remaining industrial surface coating subcategories were estimated using per employee emission factors, shown in

Table 4.2.7-1. For these subcategories, the 2007 employment per county were used to estimate the emissions. The 2007 county employment are in Table 4.2.7-2.

Table 4.2.7-1 Industrial Surface Coating Emission Factors

	VOC Emission Factors	
Subcategory	Per Capita Emission Factors (lbs VOC /person/year)	Per Employee Emission Factors (lbs VOC/employee/year)
Industrial Maintenance Coatings	0.960	
Other Special Purpose Coatings	0.007	
Furniture & Fixtures		244
Metal Containers		2,326
Automobile (new)		164
Machinery & Equipment		109
Appliances		249
Other Transportation Equipment		222
Sheet, Strip & Coil		2,877
Factory Finished Wood		43
Electrical Insulation		24.7
Marine Coatings		198
Other Misc. Manufacturing		136

Table 4.2.7-2 2007 Employment for Surface Coating Subcategories

Subcategory	Cabarrus	Gaston	Iredell	Lincoln	Mecklenburg	Rowan	Union
Factory Finished Wood	142	160	309	41	580	218	311
Furniture & Fixtures	86	52	198	20	251	100	129
Metal Containers	32	0	0	0	38	0	0
Sheet, Strip & Coil	7	91	7	35	99	0	36
Machinery & Equipment	389	1,608	815	127	2,106	540	620
Appliances	6	35	110	0	102	35	15
Electrical Insulation	0	0	0	0	20	2	38
Automobile (new)	6	0	0	0	1	22	0
Marine Coatings	3	2	3	2	24	2	3
Other Transportation Equipment	303	3	116	10	531	142	201
Other Misc. Manufacturing	342	105	288	35	1,043	294	130

According to the EIIP Tech. Report the activity days per week is 5 days. To estimate the future years' emissions from the subcategories that used a per capita emission factor, the population growth factors were used from Table 2.2-3. The remaining subcategories use a per employee emission factor. The growth factors for these categories are derived from the total statewide manufacturing employment for each subcategory as shown in Tables 4.2.7-3 through 4.2.7-10.

Table 4.2.7-3 Employment Growth Factors for Furniture & Fixtures, Machinery Equipment, Other Transportation Equipment and Other Misc. Manufacturing

2010	2013	2016	2019	2022	2025
0.9948	0.9918	0.9889	0.9859	0.9830	0.9801

Table 4.2.7-4 Employment Growth Factors for Factory Finished Wood

2010	2013	2016	2019	2022	2025
0.9115	0.8553	0.7991	0.7430	0.6868	0.6306

Table 4.2.7-5 Employment Growth Factors for Metal Containers

2010	2013	2016	2019	2022	2025
1.0072	1.0808	1.1544	1.2281	1.3017	1.3753

Table 4.2.7-6 Employment Growth Factors for Sheet, Strip and Coil

2010	2013	2016	2019	2022	2025
1.0168	1.1034	1.1901	1.2767	1.3634	1.4500

Table 4.2.7-7 Employment Growth Factors for Appliances

2010	2013	2016	2019	2022	2025
1.0649	1.0329	1.0009	0.9689	0.9370	0.9050

The electrical insulation growth factors for 2019, 2022, and 2025 are negative, indicating a decrease in growth; therefore, the growth factor for 2016 will be used for 2019, 2022, and 2025 as a conservative estimate.

Table 4.2.7-8 Employment Growth Factors for Electrical Insulation

2010	2013	2016	2019	2022	2025
0.7012	0.4114	0.1215	0.1215	0.1215	0.1215

Table 4.2.7-9 Employment Growth Factors for Automobiles (new)

2010	2013	2016	2019	2022	2025
1.0288	1.0314	1.0340	1.0366	1.0392	1.0418

Table 4.2.7-10 Employment Growth Factors for Marine Coating

2010	2013	2016	2019	2022	2025
1.0516	1.1397	1.2278	1.3159	1.4040	1.4921

Federal rules are expected to reduce VOC emission from industrial surface coating operations. The USEPA estimates of percent reduction of emissions for the federal rules are listed in Table 4.2.7-11 below. These reductions were applied starting with the 2007 base year emissions.

Table 4.2.7-11 Industrial Surface Coating Percent Reductions from Federal Rules

Subcategory	Expected Reduction
Furniture & Fixtures	30%
Metal Containers	36%
Automobiles (New)	36%
Machinery & Equipment	36%
Appliances	36%
Other Transportation Equipment	36%
Sheet, Strip, & Coil	36%
Factory Finished Wood	36%
Electrical Insulation	36%
Marine Coatings	24%
Other Misc. Manufacturing	25%
Industrial Maintenance Coatings	36%
Other Special Purpose Coatings	25%

The emissions estimation for the industrial maintenance coatings and other special purpose coatings for the base year emissions are shown in equation 4.2.7-1 and the interim and future years emissions are shown in equation 4.2.7-2.

$$EM = \frac{\text{county population} * EF}{2{,}000 \text{ lbs/ton}} * (1 \text{ year}/52 \text{ weeks}) * (1 \text{ week}/5 \text{ days}) * [1-RF] \qquad 4.2.7\text{-}1$$

$$PJEM = EM * GF_a \qquad 4.2.7\text{-}2$$

where:

EM = total daily emissions in tons/day
EF = emission factor per subcategory
RF = reduction factor per subcategory
PJEM =p rojected future emissions in tons/day
GF_a = growth factor (a) for projected future years

The emissions estimation for the subcategories that are based upon a per employee emission factor for the base year emissions are shown in equation 4.2.7-3 and the future years emissions are shown in equation 4.2.7-4.

$$EM = \frac{\text{no. of employees} * EF}{2{,}000 \text{ lbs/ton}} * (1 \text{ year/52 weeks}) * (1 \text{ week/5 days}) * [1\text{-}RF] \qquad 4.2.7\text{-}3$$

$$PJEM = EM * GF_a \qquad 4.2.7\text{-}4$$

where:

EM = total daily emissions in tons/day
EF = emission factor per subcategory
RF = reduction factor per subcategory
PJEM = projected future emissions in tons/day
GF_a = growth factor (a) for projected future years

The VOC emission estimates, in tons/day, from all industrial surface coating operations are listed in Tables 4.2.7-12 through 4.2.7-24. The total emissions from the industrial surface coatings are summarized in Table 4.2.7-25.

Table 4.2.7-12 VOC Emissions (tpd) from Furniture and Fixtures

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.0282	0.0281	0.0280	0.0279	0.0278	0.0277	0.0276
Gaston	0.0172	0.0171	0.0171	0.0170	0.0170	0.0169	0.0169
*Iredell	0.0212	0.0211	0.0210	0.0210	0.0209	0.0208	0.0208
Lincoln	0.0067	0.0067	0.0066	0.0066	0.0066	0.0066	0.0066
Mecklenburg	0.0825	0.0821	0.0818	0.0816	0.0813	0.0811	0.0809
Rowan	0.0328	0.0326	0.0325	0.0324	0.0323	0.0322	0.0321
Union	0.0424	0.0422	0.0421	0.0419	0.0418	0.0417	0.0416
Total	**0.2310**	**0.2299**	**0.2291**	**0.2284**	**0.2277**	**0.2270**	**0.2265**

*Iredell County emissions for nonattainment area only

Table 4.2.7-13 VOC Emissions (tpd) from Metal Containers

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.091	0.092	0.098	0.105	0.112	0.118	0.125
Gaston	0.000	0.000	0.000	0.000	0.000	0.000	0.000
*Iredell	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lincoln	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mecklenburg	0.109	0.110	0.118	0.126	0.134	0.142	0.150
Rowan	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Union	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	**0.200**	**0.202**	**0.216**	**0.231**	**0.246**	**0.260**	**0.275**

*Iredell County emissions for nonattainment area only

Table 4.2.7-14 VOC Emissions (tpd) from Automobiles (new)

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.0013	0.0013	0.0013	0.0013	0.0013	0.0014	0.0014
Gaston	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
*Iredell	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Lincoln	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mecklenburg	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Rowan	0.0044	0.0045	0.0045	0.0045	0.0046	0.0046	0.0046
Union	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0059**	**0.0060**	**0.0060**	**0.0060**	**0.0061**	**0.0062**	**0.0062**

*Iredell County emissions for nonattainment area only

Table 4.2.7-15 VOC Emissions (tpd) from Machinery and Equipment

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.052	0.052	0.052	0.051	0.051	0.051	0.051
Gaston	0.216	0.215	0.214	0.214	0.213	0.212	0.212
*Iredell	0.036	0.036	0.036	0.036	0.035	0.035	0.035
Lincoln	0.017	0.017	0.017	0.017	0.017	0.017	0.017
Mecklenburg	0.283	0.282	0.281	0.280	0.279	0.278	0.277
Rowan	0.073	0.073	0.072	0.072	0.072	0.072	0.072
Union	0.083	0.083	0.082	0.082	0.082	0.082	0.081
Total	**0.760**	**0.758**	**0.754**	**0.752**	**0.749**	**0.747**	**0.745**

*Iredell County emissions for nonattainment area only

Table 4.2.7-16 VOC Emissions (tpd) from Appliances

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Gaston	0.011	0.012	0.011	0.011	0.011	0.010	0.010
*Iredell	0.011	0.012	0.011	0.011	0.011	0.010	0.010
Lincoln	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mecklenburg	0.031	0.033	0.032	0.031	0.030	0.029	0.028
Rowan	0.011	0.012	0.011	0.011	0.011	0.010	0.010
Union	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Total	**0.071**	**0.076**	**0.072**	**0.071**	**0.070**	**0.066**	**0.065**

*Iredell County emissions for nonattainment area only

Table 4.2.7-17 VOC Emissions (tpd) from Other Transportation Equipment

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.083	0.083	0.082	0.082	0.082	0.082	0.081
Gaston	0.001	0.001	0.001	0.001	0.001	0.001	0.001
*Iredell	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Lincoln	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Mecklenburg	0.145	0.144	0.144	0.143	0.143	0.143	0.142
Rowan	0.039	0.039	0.039	0.039	0.038	0.038	0.038
Union	0.055	0.055	0.055	0.054	0.054	0.054	0.054
Total	**0.336**	**0.335**	**0.334**	**0.332**	**0.331**	**0.331**	**0.329**

*Iredell County emissions for nonattainment area only

Table 4.2.7-18 VOC Emissions (tpd) from Sheet, Strip & Coil

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.025	0.025	0.028	0.030	0.032	0.034	0.036
Gaston	0.322	0.327	0.355	0.383	0.411	0.439	0.467
*Iredell	0.008	0.008	0.009	0.010	0.010	0.011	0.012
Lincoln	0.124	0.126	0.137	0.148	0.158	0.169	0.180
Mecklenburg	0.351	0.357	0.387	0.418	0.448	0.479	0.509
Rowan	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Union	0.127	0.129	0.140	0.151	0.162	0.173	0.184
Total	**0.957**	**0.972**	**1.056**	**1.140**	**1.221**	**1.305**	**1.388**

*Iredell County emissions for nonattainment area only

Table 4.2.7-19 VOC Emissions (tpd) from Factory Finished Wood

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.008	0.007	0.007	0.006	0.006	0.005	0.005
Gaston	0.008	0.007	0.007	0.006	0.006	0.005	0.005
*Iredell	0.005	0.005	0.004	0.004	0.004	0.003	0.003
Lincoln	0.002	0.002	0.002	0.002	0.001	0.001	0.001
Mecklenburg	0.031	0.028	0.027	0.025	0.023	0.021	0.020
Rowan	0.012	0.011	0.010	0.010	0.009	0.008	0.008
Union	0.016	0.015	0.014	0.013	0.012	0.011	0.010
Total	**0.082**	**0.075**	**0.071**	**0.066**	**0.061**	**0.054**	**0.052**

*Iredell County emissions for nonattainment area only

Table 4.2.7-20 VOC Emissions (tpd) from Electrical Insulation

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Gaston	0.000	0.000	0.000	0.000	0.000	0.000	0.000
*Iredell	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lincoln	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mecklenburg	0.001	0.001	0.000	0.000	0.000	0.000	0.000
Rowan	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Union	0.001	0.001	0.000	0.000	0.000	0.000	0.000
Total	**0.002**	**0.002**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**

*Iredell County emissions for nonattainment area only

Table 4.2.7-21 VOC Emissions (tpd) from Marine Coatings

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.0008	0.0008	0.0009	0.0010	0.0011	0.0011	0.0012
Gaston	0.0005	0.0005	0.0006	0.0006	0.0007	0.0007	0.0007
*Iredell	0.0003	0.0003	0.0003	0.0004	0.0004	0.0004	0.0004
Lincoln	0.0005	0.0005	0.0006	0.0006	0.0007	0.0007	0.0007
Mecklenburg	0.0069	0.0073	0.0079	0.0085	0.0091	0.0097	0.0103
Rowan	0.0007	0.0007	0.0008	0.0009	0.0009	0.0010	0.0010
Union	0.0008	0.0008	0.0009	0.0010	0.0011	0.0011	0.0012
Total	**0.0105**	**0.0109**	**0.0120**	**0.0130**	**0.0140**	**0.0147**	**0.0155**

*Iredell County emissions for nonattainment area only

Table 4.2.7-22 VOC Emissions (tpd) from Other Misc. Manufacturing

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.067	0.067	0.066	0.066	0.066	0.066	0.066
Gaston	0.021	0.021	0.021	0.021	0.021	0.021	0.021
*Iredell	0.018	0.018	0.018	0.018	0.018	0.018	0.018
Lincoln	0.007	0.007	0.007	0.007	0.007	0.007	0.007
Mecklenburg	0.205	0.204	0.203	0.203	0.202	0.202	0.201
Rowan	0.058	0.058	0.058	0.057	0.057	0.057	0.057
Union	0.026	0.026	0.026	0.026	0.026	0.026	0.025
Total	**0.402**	**0.401**	**0.399**	**0.398**	**0.397**	**0.397**	**0.395**

*Iredell County emissions for nonattainment area only

Table 4.2.7-23 VOC Emissions (tpd) from Industrial Maintenance Coatings

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.194	0.204	0.215	0.266	0.237	0.248	0.258
Gaston	0.237	0.250	0.263	0.276	0.289	0.302	0.316
*Iredell	0.058	0.061	0.064	0.068	0.071	0.074	0.077
Lincoln	0.086	0.091	0.095	0.100	0.105	0.110	0.115
Mecklenburg	1.016	1.071	1.127	1.184	1.240	1.297	1.353
Rowan	0.161	0.170	0.179	0.188	0.197	0.205	0.214
Union	0.215	0.227	0.239	0.250	0.262	0.274	0.286
Total	**1.967**	**2.074**	**2.182**	**2.292**	**2.401**	**2.510**	**2.619**

*Iredell County emissions for nonattainment area only

Table 4.2.7-24 VOC Emissions (tpd) from Other Special Purpose Coatings

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.189	0.199	0.210	0.220	0.231	0.241	0.252
Gaston	0.231	0.243	0.256	0.269	0.282	0.295	0.308
*Iredell	0.056	0.059	0.062	0.065	0.068	0.071	0.075
Lincoln	0.084	0.089	0.093	0.098	0.103	0.107	0.112
Mecklenburg	0.992	1.046	1.101	1.156	1.211	1.266	1.321
Rowan	0.157	0.165	0.174	0.183	0.192	0.200	0.209
Union	0.210	0.221	0.233	0.245	0.256	0.268	0.280
Total	**1.919**	**2.022**	**2.129**	**2.236**	**2.343**	**2.448**	**2.557**

*Iredell County emissions for nonattainment area only

Table 4.2.7-25 Total VOC Emissions (tpd) from Industrial Surface Coatings

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.741	0.761	0.790	0.818	0.849	0.877	0.906
Gaston	1.065	1.094	1.146	1.199	1.252	1.303	1.358
*Iredell	0.224	0.230	0.235	0.243	0.248	0.253	0.261
Lincoln	0.330	0.342	0.361	0.382	0.401	0.421	0.442
Mecklenburg	3.254	3.366	3.510	3.656	3.801	3.948	4.092
Rowan	0.549	0.566	0.581	0.598	0.614	0.628	0.646
Union	0.781	0.805	0.837	0.869	0.902	0.936	0.968
Total	**6.944**	**7.164**	**7.460**	**7.765**	**8.067**	**8.366**	**8.673**

*Iredell County emissions for nonattainment area only

4.2.8 Asphalt Paving

Two types of asphalt paving are used for road paving and repair; emulsified asphalt and cutback asphalt. Emulsified asphalt is a type of liquefied road surfacing material made from a blend of water with an emulsifier. Cutback asphalt is a type of liquefied road surface that is prepared by blending or "cutting back" asphalt cement with various kinds of petroleum distillates. VOC emissions occur as the asphalt cures.

The NCDOT specification for asphalt in 2002 was hot mix and emulsified asphalt with hot mix but not cutback asphalt. Surrounding states have precluded the use of cut back by statutory provisions; which has driven asphalt manufactures to discontinue cutback production throughout the region. The absence of the use of cutback has resulted in substantial reductions in emissions from asphalt paving operations in North Carolina.

Hot-mix is composed of high molecular weight organics with minimal vapor pressures; consequently, VOC emissions are negligible. The use of emulsified asphalt does result in VOC emissions; but the emissions are significantly less than cutback. New formulations of emulsified asphalt, such as cationic, continue to result in reduced emissions. The use of emulsified asphalt is primarily used for tack coating, which is a surface preparation for the hot-mix layer. The tonnage of hot-mix asphalt is accounted for by the NCDOT based on districts and not on a county level basis. A usage factor was developed because the amount of hot-mix asphalt used per lane mile for paving could not be obtained for 2007. The amount of hot-mix asphalt in 2005 was used to generate the usage factor for 2007. The data from 2005 is from the 2005 Consolidated Emissions Reporting Rule emissions inventory. The 2005 statewide paved roads miles was obtained from the 2005 Highway and Road Mileage Report from NCDOT. The usage factor is shown in equation 4.2.8-1.

Usage Factor = (2005 tons hot-mix asphalt) * (2,000 lbs/ton) * (0.08 gallons/sq yds) * 220 lbs/sq yds
2005 statewide paved miles

= (62,500,000 tons hot-mix asphalt) * (2,000 lbs/ton) * (0.08 gallons/sq yds)
73,598 statewide paved miles

= 617.6 gallons hot-mix asphalt/paved miles 4.2.8-1

The 2007 county paved miles is from the 2007 Highway and Road Mileage Report from NCDOT. The number of paved miles per county for 2007 is listed in Table 4.2.8-1.

Table 4.2.8-1 Miles of Paved Roads

County	2007 Miles of Paved Road
Cabarrus	790
Gaston	956
Iredell	1,427
Lincoln	756
Mecklenburg	1,010
Rowan	1,127
Union	1,521

The VOC emissions were calculated using the emissions factor for emulsified asphalt is 9.2 lbs VOC/barrel and the number of gallons of emulsified asphalt per barrel 42 gallon/barrel from Table 17.5-2 of the EIIP Tech. Report. A SAF of 1.33 was applied to correct for the majority of paving operations occurring between March and November, as reported by the NCDOT.

The growth factors were developed using linear interpolation of historic data for 2003-2008 for the number of paved miles per county. The growth factors are shown in Table 4.2.8-2.

Table 4.2.8-2 Growth Factors for Asphalt Paving

2010	2013	2016	2019	2022	2025
1.0156	1.0311	1.0466	1.0621	1.0777	1.0932

The emissions for the base year and the future year inventories were calculated using equations 4.2.8-2 and 4.2.8-3, respectively.

$$EM = \frac{\text{gallons hot-mix apshalt} * EF * SAF}{42\ \text{gal/barrel} * 2{,}000\ \text{lbs/tons}} * (1\ \text{year}/365\ \text{days}) \qquad 4.2.8\text{-}2$$

$$PJEM_a = EM * GF_a \qquad 4.2.8\text{-}3$$

where:

EM = total daily emissions in tons/day
EF = emission factor, 9.2 lbs. VOC/barrel/year
SAF = seasonal adjustment factor, 1.33
PJEM = projected future emissions in tons/day
GF_a = growth factor (a) for projected future years

The VOC emission estimates, in tons/day, from asphalt paving for the Metrolina nonattainment area are listed in Table 4.2.8-3.

Table 4.2.8-3 VOC Emissions (tpd) from Asphalt Paving

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.195	0.198	0.201	0.204	0.207	0.210	0.213
Gaston	0.237	0.241	0.244	0.248	0.252	0.255	0.259
*Iredell	0.115	0.117	0.119	0.120	0.122	0.124	0.126
Lincoln	0.187	0.190	0.193	0.196	0.199	0.202	0.204
Mecklenburg	0.250	0.254	0.258	0.262	0.266	0.269	0.273
Rowan	0.279	0.283	0.288	0.292	0.296	0.301	0.305
Union	0.376	0.382	0.388	0.394	0.399	0.405	0.411
Total	**1.639**	**1.665**	**1.691**	**1.716**	**1.741**	**1.766**	**1.791**

*Iredell County emissions for nonattainment area only

4.2.9 Roofing Operations

This category covers the installation and repair of asphalt roofs on commercial and industrial buildings. This category includes only hot-applied asphalt roofing, for which the only significant emissions source is the kettle used to heat the asphalt. The 2007 emissions were projected from the 2005 emissions submitted to the USEPA to meet the requirement of the Consolidated Emissions Requirement Rule using E-GAS 5.0 because the number of felt, cap, and flashing squares used in North Carolina for 2007 was unavailable. The future years were estimated by growth factors developed from statewide roofing contractors' employment. The growth factors for the Metrolina nonattainment area are listed in Table 4.2.9-1.

Table 4.2.9-1 Growth Factors for Asphalt Roofing

2010	2013	2016	2019	2022	2025
0.9678	0.9606	0.9534	0.9462	0.9390	0.9318

The VOC emission estimates, in tons/day, from asphalt roofing for the Metrolina nonattainment area are listed in Table 4.2.9-2.

Table 4.2.9-2 VOC Emissions (tpd) from Roofing Operations

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.0016	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015
Gaston	0.0012	0.0012	0.0012	0.0011	0.0011	0.0011	0.0011
*Iredell	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004
Lincoln	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
Mecklenburg	0.0069	0.0067	0.0066	0.0066	0.0065	0.0065	0.0064
Rowan	0.0011	0.0011	0.0011	0.0010	0.0010	0.0010	0.0010
Union	0.0021	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
Total	**0.0140**	**0.0134**	**0.0133**	**0.0131**	**0.0130**	**0.0130**	**0.0129**

*Iredell County emissions for nonattainment area only

4.2.10 Agricultural Pesticide Applications

Pesticides broadly include any substance used to kill or retard the growth of insects, rodents, fungi, weeds or microorganisms. Formulations of organic pesticides are commonly made by combining synthetic materials with various petroleum products. The petroleum products, or inert ingredients, act as a carrier of the active component and usually evaporate into the atmosphere.

Agricultural Pesticides

Agricultural pesticides are applied in various manners, which directly affect the possible emissions associated with the application, regardless of the amount of solvent contained in the pesticide. There are basically three types of pesticide/herbicide application methods. One is the "incorporated" type, in which the product is applied and immediately incorporated into the soil. It is expected that little, if any, evaporation of solvent occurs in this type of application. The next type, "pre-emergence", is where the product is put on the ground immediately after the crop is planted. This provides a protective layer. Some evaporation of solvent would be expected with this type of application. The largest emissions would occur from "over the top" application of pesticides. These pesticides are sprayed directly on the foliage to kill weeds or insects. This application would provide an opportunity for a great deal of solvent to evaporate.

The overall pesticide usage associated with agricultural crop production continues to slowly decrease in North Carolina driven by conservative pest management practices and the cost of pesticides as reported by the North Carolina State University (NCSU) Extension Center. The large majority of pesticide usage is confined to the production of tobacco and cotton crops. Because of the small crop size and high cash value, significant tobacco acreage is found in North Carolina.

The planted crop acreage from the North Carolina Agricultural Statistic Division and crop profile reports prepared by the NCSU Extension Center, and other university extension services, for the US Department of Agriculture Pest Management Center were used to estimate agricultural pesticide usage. Crop acreage from the North Carolina Agricultural Statistic Division was obtained from http://www.ncagr.com/stats/. Crop profile reports conducted by NCSU are based on surveys; where participation is reported to be as high as 90% for the more important cash crops. Crop profile reports for grains and soybeans do not exist for North Carolina, therefore, data for these crops were obtained from other state profiles and from discussions with representatives of the NCSU Extension Center.

The individual crop profiles outline the current agricultural pesticide practices, i.e., the pesticide agents (insecticides, herbicides, fungicides), the percentage of acres treated and the pounds of active ingredient pesticide applied per acre. The crop profiles often report the application of the active ingredient (pounds of active ingredient per acre) as a range of values. For the worst case scenario, the highest reported value was used. The number of applications of a single pesticide was usually one for all pesticides. The few exceptions to one application are more than accounted for by the conservative practice of using the highest value of application rate.

The pounds of active ingredients for each crop were calculated by using Equation 4.2.10-1 and an example calculation for soybeans follows. Table 4.2.10-1 presents the pesticides associated with a particular crop, the % of treated acres, and the lbs. of active pesticide ingredient per year.

$$(\text{lbs. AI/acre})_{CROP} = \sum (\text{\% acres treated}) \times (\text{lb AI/acre})_{pesticide} \qquad 4.2.10\text{-}1$$

where AI = active ingredient.

For soybeans, the pounds of active ingredients for the crop is:

Pesticide	% Acres Treated	lbs AI/acre
Paraquat	20	0.47
Glyphosate	10	4
Sulfusate	5	4
Carbaryl	10	1.5

$(\text{lbs AI/acre})_{soybean} = (0.20 \times 0.47) + (0.10 \times 4) + (0.05 \times 4) + (0.10 \times 1.5)$
$= 0.844$ lbs. AI/acre for soybeans

Table 4.2.10-1 Agriculture Pesticides Application Rates

Crop/Agent	% Acres Treated	lbs. active ingredient/Acre
Soybeans		
Paraquat	20	0.47
Glyphosate	10	4
Sulfusate	5	4
Carbaryl	10	1.5
Cotton		
Tribufos	100	0.75
Aldicarb	91	0.75
Prourgite	0.45	0.73
Dicofol	0.55	1.6
Dicrotophos	0.45	0.2
Acephate	2.1	0.5
M-Parathion	1	0.5
L-cyhalothrin	99	0.145
Thiocarb	40	0.75
Aldicarb	50	0.725
Tobacco		
Acephate	70	1.5
Spinosad	13	0.05
Methomyl	11	0.45
Endosulfan	7	1
Imidacolopríd	62	0.03
Chloropicrin	41	79.8
Dichloropropene	35	89.5
Clomazone	75	1
Metalaxyl	49	0.76
Barley		
M Parathion	0.8	0.5
Irish Potatoes		
Phorate 3	40	1.20
Glyphosate	6	5
Metolachor	8	2
Metribuzin	55	0.5

Crop/Agent	% Acres Treated	lbs. active ingredient/Acre
Corn Silage		
Terbufos	35	1
Chloropyrifus	10	1
Phorate	10	1
Ethoprop	5	1
Carbofuran	5	1
M Parathion	50	0.75
Thiocarb	90	0.6
Methomyl	50	0.45
Corn Grain		
Terbufos	35	1
Chloropyrifus	10	1
Phorate	10	1
Ethoprop	5	1
Carbofuran	5	1
M Parathion	50	0.75
Thiocarb	90	0.6
Methomyl	50	0.45
Oats		
M Parathion	5	0.5
Wheat		
M Parathion	5	0.5
Sweet Potatoes		
Napropamide	50	1.5
Clomazone	25	0.87
Fluazifop	20	0.17
Carbaryl	25	0.67
Peanuts		
Chlorpyrifus	60	1
Disulfoton	90	0.75
Esfenvalerate	25	0.03
Folicur 1	51	0.51
Vernolate	45	2.5

Sorghum			Dichloropropene	0.16	80
MethyParathion	1	0.75			
Chlorpyrifus	1	1			
Carbaryl	1	2			

The emission factors for each crop were calculated utilizing information from the EIIP Tech. Report, which relates active ingredients to VOC emissions. According to the EIIP Tech. Report, for every pound of active ingredient there are 2.45 lbs of VOC emitted and 90% of the emissions are evaporated. The emission factors for each crop were calculated using equation 4.2.10-2, with an example calculation for soybean following.

$$EF_{crop} = (\text{lb } AI_{crop}/\text{acre}) * (2.45 \text{ lb. VOC/lbs of AI}) * (0.90) \qquad 4.2.10\text{-}2$$

where:

EF_{crop} = emission factor in lbs VOC/active ingredient for each crop
AI_{crop} = active ingredient for each crop.

The emission factor for soybeans is

lbs AI/acre for soybean = 0.844 lbs. AI/acre

$$EF_{soybean} = (0.844 \text{ lbs active ingredient/acre}) * (2.45 \text{ lbs VOC/active ingredient}) * (0.90)$$
$$= 1.861 \text{ lbs VOC/acre.}$$

An exception to the above calculation was for the usage of the following pesticides: chloropicrin and 1,3 dichloropropene. These fumigants are widely used for treating tobacco beds for nematodes and constitute a major portion of the pesticide inventory. They have a moderate vapor pressure of 18.3 and 34 millimeters of mercury (at 77° F), respectively, and their formulation is approximately 96% to 98% of the active ingredient. In light of these properties, the VOC emissions are assumed to be equal to the application per acre, which are 79 lbs/acre for chloropicrin and 89.5 lbs/acre for 1,3 dichloropropene. Table 4.2.10-2 list the pounds of active ingredients per acre and the calculated emission factor for each crop. The number of crops planted for 2007 in each county was obtained from the National Agricultural Statistics Service website. The number of acres of each crop planted in each county is listed in Table 4.2.10-3.

Table 4.2.10-2 Agricultural Pesticide Applications Emission Factors by Crop Type

Crop	lbs active ingredients/acre	VOC Emission Factors (lbs VOC/acre/year)
Soybeans	0.844	1.861
Cotton	2.267	4.999
Barley	0.004	0.009
Corn – Silage	1.79	3.947
Corn – Grain	1.79	3.947
Wheat	0.025	0.055
Oats	0.025	0.055
Sweet Potato	1.169	2.578
Tobacco		
- *Non-fumigant*	2.317	5.109
- *Fumigant*	64.043	64.043
Total Tobacco		69.152
Peanuts		
- *Non-fumigant*	2.9175	6.433
- *Fumigant*	0.128	0.282
Total Peanuts		6.715
Irish Potatoes	1.9350	4.267
Sorghum	0.0375	0.083

Table 4.2.10-3 2007 Acres of Crops Planted

County	Cabarrus	Gaston	Iredell	Lincoln	Mecklenburg	Rowan	Union
Cotton	0	0	0	0	0	0	0
Tobacco	0	0	0	0	0	0	0
Soybean	600	0	25,500	29,200	15,900	5,000	34,000
Wheat	3,300	0	8,700	3,300	1,400	8,400	40,000
Sweet Potato	0	0	0	0	0	0	0
Oats	2,100	0	0	700	0	500	1,800
Barley	600	0	0	900	0	1,800	0
Corn-Grain	3,700	0	16,500	2,800	0	8,700	29,800
Corn-Silage	1,400	0	10,750	1,500	0	1,650	0
Peanuts	0	0	0	0	0	0	0
Irish Potatoes	0	0	0	0	0	0	0
Sorghum	0	0	0	0	0	0	0

An SAF of 2.4 is applied to correct for the almost exclusive use of agricultural pesticides from April to August. For future years' emissions, the growth factors were developed using Microsoft EXCEL FORECAST to linear interpolate the crops acreage for 2010, 2013, 2016, 2019, 2022, and 2025 from 2003-2008 historic data. Statewide acreage was used because the 2003-2008 acreage data was readily available via the NC Department of Agriculture. The acreage used in the calculation does not include oaks, barley and sorghum because the acreage for 2003-2008 was not available. The growth factors are listed in Table 4.2.10-4.

Table 4.2.10-4 Growth Factors for Agricultural Pesticide Applications

2010	2013	2016	2019	2022	2025
1.0497	1.0812	1.1272	1.2053	1.2835	1.3617

The emissions for 2007 were calculated using equation 4.2.10-3 and the future years' emissions were calculated using equation 4.2.10-4.

$$EM = \frac{(\sum (CROP) * EF_{crop}) * SAF}{2{,}000 \text{ lbs/tons}} * (1 \text{ year}/365 \text{ days}) \qquad 4.2.10\text{-}3$$

$$PJEM = EM * GF_a \qquad 4.2.10\text{-}4$$

where:

EM = total daily emissions in tons/day
CROP = acres of each crop per county
EF_{crop} = emission factor per crop
SAF = seasonal adjustment factor, 2.4
PJEM = projected future emissions in tons/day
GF_a = growth factor (a) for projected future years

The VOC emission estimates, in tons/day, from agricultural pesticides for the Metrolina nonattainment area are listed in Table 4.2.10-5.

Table 4.2.10-5 VOC Emissions (tpd) from Agricultural Pesticide Applications

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.071	0.075	0.077	0.080	0.086	0.091	0.097
Gaston	0.000	0.000	0.000	0.000	0.000	0.000	0.000
*Iredell	0.167	0.175	0.181	0.188	0.201	0.214	0.227
Lincoln	0.236	0.248	0.255	0.266	0.284	0.303	0.321
Mecklenburg	0.098	0.103	0.106	0.110	0.118	0.126	0.133
Rowan	0.167	0.175	0.181	0.188	0.201	0.214	0.227
Union	0.604	0.634	0.653	0.681	0.728	0.775	0.822
Total	**1.343**	**1.410**	**1.453**	**1.513**	**1.618**	**1.723**	**1.827**

*Iredell County emissions for nonattainment area only

4.2.11 Commercial/Consumer Solvent Use

This category includes only non-industrial solvents that are used in commercial or consumer applications. The solvent containing products consist of a diverse grouping, e.g. personal care products, household products, automotive aftermarket products, adhesives and sealants, pesticides, some coatings and other commercial and consumer products that may emit VOC emissions.

The VOC emissions are estimated based on per capita emissions factors. The county population values are listed in Table 2.2-1. The population growth factors listed in Table 2.2-3 were used to estimate the projected future year emissions. There are seven subcategories within the commercial/consumer solvent use category. They are listed in Table 4.2.11-1 with their respective emission factor.

Table 4.2.11-1 Misc. Non-Industrial Consumer/Commercial Emission Factors

Subcategory	VOC Emission Factors (lbs VOC/person/year)
All Coatings and Related Products	0.95
All FIFRA Related Products	1.78
Miscellaneous Products	0.07
Personal Care Products	1.9
Household Products	1.8
Automotive Aftermarket Products	1.36
Adhesives and Sealants	0.57

According to the EIIP Tech. Report, emissions from this source category occur 365 days per year and there is no seasonal adjustment required. Federal rules are expected to reduce the VOC emissions from consumer solvents in the future years. The USEPA estimates that the federal rules will reduce the emissions from this source category by approximately 25%. This reduction was applied starting with 2007 estimated emissions. The emissions for the base year and future year inventories were calculated using equations 4.2.11-1 and 4.2.11-2, respectively.

$$EM = \frac{\text{county population} * EF}{2{,}000 \text{ lbs/tons}} * (1 \text{ year}/365 \text{ days}) * [1 - RF] \qquad 4.2.11\text{-}1$$

$$PJEM = EM * GF_a \qquad 4.2.11\text{-}2$$

where:

EM = total daily emissions in tons/day
EF = emission factor per subcategory
RF = reduction factor, 25%
PJEM = projected future emissions in tons/day
GF_a = growth factor (a) for projected future years

The VOC emission estimates, in tons/day, from the commercial/consumer solvents subcategories for the Metrolina nonattainment area are listed in Tables 4.2.11-2 through 4.2.11-8. The total emissions for this source category are summarized in Table 4.2.11-9.

Table 4.2.11-2 VOC Emissions (tpd) from All Coatings and Related Products

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.160	0.169	0.178	0.186	0.195	0.204	0.213
Gaston	0.196	0.207	0.217	0.228	0.239	0.250	0.261
*Iredell	0.048	0.051	0.053	0.056	0.059	0.061	0.064
Lincoln	0.071	0.075	0.079	0.083	0.087	0.091	0.095
Mecklenburg	0.842	0.887	0.934	0.981	1.028	1.074	1.121
Rowan	0.133	0.140	0.148	0.155	0.162	0.170	0.177
Union	0.178	0.188	0.197	0.207	0.217	0.227	0.237
Total	**1.628**	**1.717**	**1.806**	**1.896**	**1.987**	**2.077**	**2.168**

*Iredell County emissions for nonattainment area only

Table 4.2.11-3 VOC Emissions (tpd) from All FIFRA Related Products

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.301	0.317	0.334	0.351	0.367	0.384	0.401
Gaston	0.368	0.388	0.408	0.429	0.449	0.470	0.490
*Iredell	0.090	0.095	0.100	0.105	0.110	0.115	0.120
Lincoln	0.133	0.140	0.148	0.155	0.162	0.170	0.177
Mecklenburg	1.577	1.662	1.750	1.837	1.925	2.012	2.100
Rowan	0.250	0.263	0.277	0.291	0.305	0.319	0.333
Union	0.333	0.351	0.369	0.388	0.406	0.425	0.443
Total	**3.052**	**3.216**	**3.386**	**3.556**	**3.724**	**3.895**	**4.064**

*Iredell County emissions for nonattainment area only

Table 4.2.11-4 VOC Emissions (tpd) from Miscellaneous Products

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.012	0.013	0.013	0.014	0.015	0.015	0.016
Gaston	0.014	0.015	0.016	0.016	0.017	0.018	0.019
*Iredell	0.004	0.004	0.004	0.005	0.005	0.005	0.005
Lincoln	0.005	0.005	0.006	0.006	0.006	0.006	0.007
Mecklenburg	0.062	0.065	0.069	0.072	0.076	0.079	0.083
Rowan	0.010	0.011	0.011	0.012	0.012	0.013	0.013
Union	0.013	0.014	0.014	0.015	0.016	0.017	0.017
Total	**0.120**	**0.127**	**0.133**	**0.140**	**0.147**	**0.153**	**0.160**

*Iredell County emissions for nonattainment area only

Table 4.2.11-5 VOC Emissions (tpd) from Personal Care Products

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.321	0.338	0.356	0.374	0.392	0.410	0.427
Gaston	0.392	0.413	0.435	0.457	0.478	0.500	0.522
*Iredell	0.096	0.101	0.107	0.112	0.117	0.123	0.128
Lincoln	0.142	0.150	0.158	0.165	0.173	0.181	0.189
Mecklenburg	1.683	1.774	1.867	1.961	2.054	2.148	2.241
Rowan	0.266	0.280	0.295	0.310	0.325	0.339	0.354
Union	0.356	0.375	0.395	0.415	0.435	0.454	0.454
Total	**3.256**	**3.431**	**3.613**	**3.794**	**3.974**	**4.155**	**4.335**

*Iredell County emissions for nonattainment area only

Table 4.2.11-6 VOC Emissions (tpd) from Household Products

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.304	0.320	0.337	0.354	0.371	0.388	0.405
Gaston	0.372	0.392	0.413	0.433	0.454	0.475	0.495
*Iredell	0.091	0.096	0.101	0.106	0.111	0.116	0.121
Lincoln	0.134	0.141	0.149	0.156	0.164	0.171	0.178
Mecklenburg	1.595	1.681	1.770	1.858	1.947	2.035	2.214
Rowan	0.252	0.266	0.280	0.294	0.308	0.322	0.336
Union	0.337	0.355	0.374	0.393	0.411	0.430	0.449
Total	**3.085**	**3.251**	**3.424**	**3.594**	**3.766**	**3.937**	**4.108**

*Iredell County emissions for nonattainment area only

Table 4.2.11-7 VOC Emissions (tpd) from Automotive Aftermarket Products

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.230	0.242	0.255	0.268	0.281	0.294	0.306
Gaston	0.281	0.298	0.312	0.327	0.343	0.359	0.374
*Iredell	0.069	0.073	0.077	0.080	0.084	0.088	0.092
Lincoln	0.102	0.108	0.113	0.119	0.125	0.130	0.136
Mecklenburg	1.205	1.270	1.337	1.404	1.471	1.538	1.605
Rowan	0.191	0.201	0.212	0.223	0.233	0.244	0.254
Union	0.255	0.269	0.283	0.297	0.311	0.325	0.340
Total	**2.333**	**2.459**	**2.589**	**2.718**	**2.848**	**2.978**	**3.107**

*Iredell County emissions for nonattainment area only

Table 4.2.11-8 VOC Emissions (tpd) from Adhesives and Sealants

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.096	0.101	0.107	0.112	0.117	0.123	0.128
Gaston	0.118	0.124	0.131	0.137	0.144	0.151	0.157
*Iredell	0.029	0.031	0.032	0.034	0.035	0.037	0.039
Lincoln	0.043	0.045	0.048	0.050	0.052	0.055	0.057
Mecklenburg	0.505	0.532	0.560	0.588	0.616	0.644	0.673
Rowan	0.080	0.084	0.089	0.093	0.098	0.102	0.107
Union	0.107	0.113	0.119	0.125	0.131	0.137	0.142
Total	**0.978**	**1.030**	**1.086**	**1.139**	**1.193**	**1.249**	**1.303**

*Iredell County emissions for nonattainment area only

Table 4.2.11-9 Total VOC Emissions (tpd) from Commercial/Consumer Solvent

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	1.424	1.500	1.580	1.659	1.738	1.818	1.896
Gaston	1.741	1.835	1.932	2.027	2.124	2.223	2.318
*Iredell	0.427	0.451	0.474	0.498	0.521	0.545	0.569
Lincoln	0.630	0.664	0.701	0.734	0.769	0.804	0.839
Mecklenburg	7.469	7.871	8.287	8.701	9.117	9.531	9.947
Rowan	1.182	1.245	1.312	1.378	1.443	1.509	1.574
Union	1.579	1.665	1.751	1.840	1.927	2.015	2.102
Total	**14.452**	**15.231**	**16.037**	**16.837**	**17.639**	**18.445**	**19.245**

*Iredell County emissions for nonattainment area only

4.3 OTHER MAN MADE AREA SOURCES

Other man made area sources include forest fires, slash burning and prescribed burning, agricultural burning, structure fires and vehicle fires. Some of these sources, such as orchard heaters and certain kinds of agricultural burning, are not active during the ozone season. The methodology used to calculate the emissions from these sources are described in detail in each subsection.

4.3.1 Forest Fires

There are two types of forest fires; wild fires, which are accidental or felonious fires and prescribed burns, which are intentionally set for the purpose of forest and/or grassland management practice. The number of acres burned in 2007 for each of these categories was obtained from the North Carolina Division of Forest Resources (NCDFR) and are listed in Table 4.3.1-1.

Table 4.3.1-1 2007 Acres of Land Burned by Fires

County	Wildfires	Prescribed	Total
Cabarrus	25	190	215
Gaston	30	249	279
Iredell	24	11	35
Lincoln	11	0	11
Mecklenburg	34	24	78
Rowan	42	0	42
Union	40	80	120

The makeup of the plant life burned in each fire can vary from woodland to brush to grassland. The emission factors for the southern region of the United States from AP-42, Table 13.1-2, were used to estimate the emissions from forest burns. The emission factors are 0.108 tons VOC per acre burned and 0.018 tons of NOx per acre burned.

The NCDFR was not able to provide seasonal numbers, so the daily emissions are estimated by dividing by 365 days per year. For the base year and future year emission inventories, it is assumed that the number of acres burned remains relatively constant; therefore, the emissions between the base year and future years remain constant. The emissions were calculated using equation 4.3.1-1.

$$EM = \text{no. acres burned} * EF * (1\ \text{year}/365\ \text{days}) \qquad 4.3.1\text{-}1$$

where:
EM = total daily emissions in tons/day
EF = emission factors, VOC = 0.108 tons/acre and NOx = 0.018 tons/acre

The VOC and NOx emission estimates, in tons/day, from forest fires for the Metrolina nonattainment area are listed in Table 4.3.1-2.

Table 4.3.1-2 Emissions (tpd) from Forest Fires

County	VOC Emissions	NOx Emissions
Cabarrus	0.064	0.011
Gaston	0.083	0.014
*Iredell	0.010	0.002
Lincoln	0.003	0.001
Mecklenburg	0.017	0.003
Rowan	0.012	0.002
Union	0.036	0.006
Total	**0.225**	**0.039**

*Iredell County emissions for nonattainment area only

4.3.2 Structure Fires

The U.S. Fire Administration (USFA) maintains statistics on the number of fires per county. The number of fires per county for 2007 was derived from the USFA fire statistics were obtained from the USFA website. The structure fires category is based on both residential and non-residential structures. A fires per person factor was calculated for the residential structures based on the national number of residential fires divided by the national population for 2007. The fires per person factor for residential structures 0.0014 fires/person. A fires per person factor was also calculated for the non-residential structures based on the national number of non-residential fires divided by the national employment for 2007. The fires per employee factor for non-residential structures 0.00086 fires/employee. The 2007 county population was obtained from the North Carolina State Demographics and the 2007 county employment was obtained from the US Census Bureau, County Business Patterns. A fires per person factor was applied to the 2007 county population to determine the number of residential structure fires per county. Additionally, a fires per employee factor was applied to the 2007 total county employment to determine the non-residential structure fires per county. To determine the total emissions from structure fires, the sum of the residential and non-residential structure fires were totaled for each county. The county population, shown in Table 2.2-1, was used to estimate the emissions for the residential portion and the county employment, shown in Table 4.3.2-1, was used to estimate the emissions for the non-residential portion. The estimates of the residential and nonresidential portions were summed to obtain the total emissions for the structure fires.

Table 4.3.2-1 County Employment

	2007 County Employment
Cabarrus	61,476
Gaston	67,656
Iredell	20,751
Lincoln	19,793
Mecklenburg	559,023
Rowan	46,504
Union	51,369

The emission factors and fuel loading factor were obtained from the EIIP Tech. Report, Table 18.4-1 and Table 18.4-2, respectively. The emission factors are 11 lbs of VOC per ton burned and 1.4 lbs of NOx per ton burned. The loading factor is 1.15 tons of material burned per structural fire was also obtained from the EIIP Tech. Report.

The structure fires growth factors were calculated using the FORECAST function in Microsoft EXCEL to linearly interpolate historic nationwide data from 2003-2008 for residential and non-residential fires. The growth factors are based upon the sum of the residential and non-residential fires. The residential and non-residential fires data was obtained from the US Fire Administration Statistics. The growth factors are shown in Table 4.3.2-2.

Table 4.3.2-2 Growth Factors for Structure Fires

2010	2013	2016	2019	2022	2025
0.9169	0.8675	0.8180	0.7686	0.7191	0.6697

According to the EIIP Tech. Report, emissions from this source category occur 365 days per year and there is no seasonal adjustment required.

The structure fires emissions for the 2007 base year were calculated using equation 4.3.2-1. The projected future year emissions inventories were calculated using equation 4.3.2-2.

$$EM = \frac{[(\text{cnty pop} * FPP) + (\text{cnty empl} * FPE)]}{2{,}000 \text{ lbs/tons}} * CF * EF * (1 \text{ year}/365 \text{ days}) \qquad 4.3.2\text{-}1$$

$$PJEM = EM * GF_a \qquad 4.3.2\text{-}2$$

where:

EM = total daily emissions in tons/day
FPP = fires per person, 0.0014 fires/person
FPE = fires per employee, 0.00086 fires/employee
CF = conversion factor, 1.15 tons burned/structure fire
EF = emission factors, VOC = 11 lbs/ton burned/year and NOx = 1.4 lbs/ton burned/year
PJEM = projected future emissions in tons/day
GF_a = growth factor (a) for projected future years

The VOC and NOx emission estimates, in tons/day, from structure fires for the Metrolina nonattainment area are listed in Tables 4.3.2-3 and 4.3.2-4.

Table 4.3.2-3 VOC Emissions (tpd) from Structure Fires

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.005	0.005	0.004	0.004	0.004	0.004	0.003
Gaston	0.006	0.006	0.005	0.005	0.005	0.004	0.004
*Iredell	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Lincoln	0.002	0.002	0.002	0.002	0.002	0.001	0.001
Mecklenburg	0.029	0.027	0.025	0.024	0.022	0.021	0.019
Rowan	0.004	0.004	0.003	0.003	0.003	0.003	0.003
Union	0.005	0.005	0.004	0.004	0.004	0.004	0.004
Total	**0.052**	**0.050**	**0.044**	**0.043**	**0.041**	**0.038**	**0.034**

*Iredell County emissions for nonattainment area only

Table 4.3.2-4 NOx Emissions (tpd) from Structure Fires

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Gaston	0.001	0.001	0.001	0.001	0.001	0.001	0.001
*Iredell	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lincoln	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mecklenburg	0.004	0.004	0.003	0.003	0.003	0.003	0.003
Rowan	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Union	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Total	**0.008**	**0.008**	**0.007**	**0.007**	**0.007**	**0.007**	**0.007**

*Iredell County emissions for nonattainment area only

4.3.3 Vehicle Fires

Vehicle fire emissions within the nonattainment area are estimated by considering the estimated number vehicles burned in the Metrolina nonattainment area counties, the amount of material burned (the fuel loading) in a vehicle fire, and the emission factors for the open burning of automobile components.

The estimated number of vehicle fires was determined by apportioning a national fire statistic to a county level. The USFA maintains national-level fire statistics. The number of vehicle fires nationwide in 2007 was 258,000. The number of national vehicle fires was apportioned to a state-level using ratio of North Carolina vehicle miles traveled (VMT) to U.S. VMT (249,698,650 miles/3,029,822 x 10^6 miles). The number of statewide vehicle fires was then apportioned to a county level based on VMT in each county. The nationwide VMT statistics were obtained from the U.S. Department of Transportation, Federal Highway Administration website. The statewide and county VMT is Highway Performance Monitoring System data that was received from the NCDOT.

The above methodology was employed to calculate the vehicle fire emissions per county. For 2007, the VMT for the Metrolina nonattainment area counties is listed in Table 4.3.3-1.

Table 4.3.3-1 Vehicle Miles Traveled

County	2007 Vehicle Miles Traveled
Cabarrus	4,381,180
Gaston	5,614,080
Iredell	5,208,390
Lincoln	1,823,890
Mecklenburg	21,759,840
Rowan	3,712,530
Union	3,601,620

The amount of vehicle material burned (the fuel loading) in a vehicle fire was estimated by assuming that an average vehicle has 500 lbs. of components (0.25 tons) that can burn in a fire, based on a 3,700 lbs. average vehicle weight (CARB, 1995).

The projected future year emissions were developed by linear interpolation of the nationwide number of vehicle fires. The nationwide vehicle fires were obtained from the US Fire Administration, National Fire Data Center. As with previous categories, the historic data used if for the linear interpolation is for 2003-2008. These growth factors are listed in Table 4.3.3-2 below.

Table 4.3.3-2 Growth Factors for Vehicle Fires

2010	2013	2016	2019	2022	2025
0.8398	0.6637	0.4877	0.3116	0.1356	0.1356

The emissions for the base year and future year inventories were calculated using equations 4.3.3-1 and 4.3.3-2, respectively.

$$EM = \frac{\text{US veh fires} * CF * EF}{2{,}000\ \text{lbs/tons}} * (\text{NC VMT/US VMT}) * (\text{cnty VMT/NC VMT}) * (1\ \text{yr}/365\ \text{dys}) \qquad 4.3.3\text{-}1$$

$$PJEM = EM * GF_a \qquad 4.3.3\text{-}2$$

where:

EM = total daily emissions in tons/day
CF = conversion factor, 0.25 tons burned/vehicle fire
EF = emission factors, VOC = 32 lbs/ton burned year and NOx = 4 lbs/ton burned/year
PJEM = projected future emissions in tons/day
GF_a = growth factor (a) for projected future years

The VOC and NOx emission estimates, in tons/day, from vehicle fires for the Metrolina nonattainment area are listed in Tables 4.3.3-3 and 4.3.3-4. The emissions from vehicle fires are significantly small; therefore, they are effectually zero when rounded to the hundredth decimal place.

Table 4.3.3-3 VOC Emissions (tpd) from Vehicle Fires

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gaston	0.00	0.00	0.00	0.00	0.00	0.00	0.00
*Iredell	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lincoln	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mecklenburg	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rowan	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Union	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

*Iredell County emissions for nonattainment area only

Table 4.3.3-4 NOx Emissions (tpd) from Vehicle Fires

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gaston	0.00	0.00	0.00	0.00	0.00	0.00	0.00
*Iredell	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lincoln	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mecklenburg	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rowan	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Union	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

*Iredell County emissions for nonattainment area only

4.3.4 Charbroiling

Charbroiling is one of the categories the USEPA revised for the 2008 National Emissions Inventory (NEI). The emission factors were developed and reviewed by an ERTAC advisory panel composed of state and USEPA personnel. The emission factors were generated by taking the 2002 NEI emissions and dividing by the 2002 population to develop per capita emission factors. The charbroiling emission factors are shown in Table 4.3.4-1

Table 4.3.4-1 Charbroiling Emission Factors

Subcategory	VOC Emission Factors (lb VOC/person/year)
Conveyorized Charbroiling	0.0121
Under-fired Charbroiling	0.0415
Deep Fat Frying	0.0126
Flat Griddle Frying	0.0059
Clamshell Griddle Frying	0.0002

For projected future year emissions, growth factors were calculated using linear interpolation of restaurant employment from 2003-2008. Microsoft EXCEL FORECAST was used to calculate the growth factors that are listed in Table 4.3.4-2.

Table 4.3.4-2 Growth Factors for Charbroiling

2010	2013	2016	2019	2022	2025
1.1005	1.2141	1.3278	1.4415	1.5551	1.6688

The emissions for the base year and projected future year emissions were calculated using equations 4.3.4-1 and 4.3.4-2, respectively.

$$EM = \frac{\text{county population} * EF}{2{,}000\ \text{lbs/tons}} * (1\ \text{year}/365\ \text{days}) \qquad 4.3.4\text{-}1$$

$$PJEM = EM * GF_a \qquad 4.3.4\text{-}2$$

where:

EM = total daily emissions in tons/day
EF = emission factor per subcategory
PJEM = projected future emissions in tons/day
GF_a = growth factor (a) for projected future years

The VOC emission estimates, in tons/day, from charbroiling for the Metrolina nonattainment area are listed in Tables 4.3.4-3 through 4.3.4-7. The total emissions from charbroiling are summarized in Table 4.3.4-8.

Table 4.3.4-3 VOC Emissions (tpd) from Conveyorized Charbroiling

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.003	0.003	0.004	0.004	0.004	0.005	0.005
Gaston	0.003	0.003	0.004	0.004	0.004	0.005	0.005
*Iredell	0.001	0.001	0.001	0.001	0.001	0.002	0.002
Lincoln	0.001	0.001	0.001	0.001	0.001	0.002	0.002
Mecklenburg	0.014	0.015	0.017	0.019	0.020	0.022	0.023
Rowan	0.002	0.002	0.002	0.003	0.003	0.003	0.003
Union	0.003	0.003	0.004	0.004	0.004	0.005	0.005
Total	**0.027**	**0.028**	**0.033**	**0.036**	**0.037**	**0.044**	**0.045**

*Iredell County emissions for nonattainment area only

Table 4.3.4-4 VOC Emissions (tpd) from Under-fired Charbroiling

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.009	0.010	0.011	0.012	0.013	0.014	0.015
Gaston	0.011	0.012	0.013	0.015	0.016	0.017	0.018
*Iredell	0.003	0.003	0.004	0.004	0.004	0.005	0.005
Lincoln	0.004	0.004	0.005	0.005	0.006	0.006	0.007
Mecklenburg	0.049	0.054	0.059	0.065	0.071	0.076	0.082
Rowan	0.008	0.009	0.010	0.011	0.012	0.012	0.013
Union	0.010	0.011	0.012	0.013	0.014	0.016	0.017
Total	**0.094**	**0.103**	**0.114**	**0.125**	**0.136**	**0.146**	**0.157**

*Iredell County emissions for nonattainment area only

Table 4.3.4-5 VOC Emissions (tpd) from Deep Fat Frying

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.003	0.003	0.004	0.004	0.004	0.005	0.005
Gaston	0.003	0.003	0.004	0.004	0.004	0.005	0.005
*Iredell	0.001	0.001	0.001	0.001	0.001	0.002	0.002
Lincoln	0.001	0.001	0.001	0.001	0.001	0.002	0.002
Mecklenburg	0.015	0.017	0.018	0.020	0.022	0.023	0.025
Rowan	0.002	0.002	0.002	0.003	0.003	0.003	0.003
Union	0.003	0.003	0.004	0.004	0.004	0.005	0.005
Total	**0.028**	**0.030**	**0.034**	**0.037**	**0.039**	**0.045**	**0.047**

*Iredell County emissions for nonattainment area only

Table 4.3.4-6 VOC Emissions (tpd) from Flat Griddle Frying

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.001	0.001	0.001	0.001	0.000	0.002	0.002
Gaston	0.002	0.002	0.002	0.003	0.003	0.003	0.003
*Iredell	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lincoln	0.001	0.001	0.001	0.001	0.001	0.002	0.002
Mecklenburg	0.007	0.008	0.008	0.009	0.010	0.011	0.012
Rowan	0.001	0.001	0.001	0.001	0.001	0.002	0.002
Union	0.001	0.001	0.001	0.001	0.001	0.002	0.002
Total	**0.013**	**0.014**	**0.014**	**0.016**	**0.017**	**0.022**	**0.023**

*Iredell County emissions for nonattainment area only

Table 4.3.4-7 VOC Emissions (tpd) from Clamshell Griddle Frying

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Gaston	0.000	0.000	0.000	0.000	0.000	0.000	0.000
*Iredell	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lincoln	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mecklenburg	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Rowan	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Union	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**

*Iredell County emissions for nonattainment area only

Table 4.3.4-8 Total VOC Emissions (tpd) from Charbroiling

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.016	0.017	0.020	0.021	0.022	0.026	0.027
Gaston	0.019	0.020	0.023	0.026	0.027	0.030	0.031
*Iredell	0.005	0.005	0.006	0.006	0.006	0.009	0.009
Lincoln	0.007	0.007	0.008	0.008	0.009	0.012	0.013
Mecklenburg	0.085	0.094	0.102	0.113	0.123	0.132	0.142
Rowan	0.013	0.014	0.015	0.018	0.019	0.020	0.021
Union	0.017	0.018	0.021	0.022	0.023	0.028	0.029
Total	**0.162**	**0.175**	**0.195**	**0.214**	**0.229**	**0.257**	**0.272**

*Iredell County emissions for nonattainment area only

4.3.5 Open Burning – Municipal Solid Waste and Yard Trimmings

It was assumed that all municipal solid waste (MSW) and yard trimmings were burned in the open for solid waste generated outside the municipal corporate limits. Since it is illegal to burn within the corporate limits, only the rural portion of the population was used. The rural population was calculated by applying the 2000 census rural population percentage to the total 2007 county population as shown in Table 2.2-2. The 2007 total population for each county was obtained from the North Carolina Office of State Budget and Management, State Data Center.

The base year emissions were calculated using equations 4.3.5-1 and 4.3.5-2. The projected future year emissions were calculated using equation 4.3.5-3.

$$EM_{MSW} = \frac{\text{county rural population} * CF * EF}{2{,}000 \text{ lb/tons}} * (1 \text{ year}/365 \text{ days}) \qquad 4.3.5\text{-}1$$

$$EM_{Yard} = \frac{\text{county rural population} * \text{\% of forested acres} * \text{load waste burned} * CF * EF}{2{,}000 \text{ lb/tons}} * (1 \text{ year}/365 \text{ days}) \qquad 4.3.5\text{-}2$$

$$PJEM = EM * GF_a \qquad 4.3.5\text{-}3$$

where:

EM = total daily emissions in tons/day
CF = conversion factors, 3.77 lbs MSW/person/day and 0.59 lbs yard trimmings/person/day
EF = emission factors are:
- VOC_{MSW} = 6.7 lbs/ton burned/year
- NOx_{MSW} = 6 lbs/ton burned/year
- VOC_{Yard} = 28 lbs/ton burned/year
- NOx_{Yard} = 6.2 lbs/ton burned/year

PJEM = projected future emissions in tons/day
GF_a = growth factor (a) for projected future years

Since the NCDAQ has an open burning regulation that prohibits the burning of man-made materials, the emissions estimated for MSW were reduced to account for this rule. The control efficiency is 100% since no burning yields no emissions. The rule penetration is also 100% since the regulation prohibits the burning of man-made materials statewide. Finally the rule effectiveness was set to a conservative 50% for the base year since the NCDAQ knows that burning of man-made materials does occur. The NCDAQ has started an aggressive campaign to make the public aware that it is illegal to burn man-made materials. The NCDAQ has sponsored radio ads as well as billboard signs in an effort to educate the public. Additionally, the NCDAQ has developed an educational video discussing open burning and the State's regulation. This video has been distributed to the fire departments across the State. Finally, at the 2009 and 2010

North Carolina State Fair, the NCDAQ had a booth that allowed staff to talk with the general public about the open burning regulations and provide hand outs that discussed what was legal to burn. The NCDAQ expects that as the public becomes more aware of the open burning regulations, the rule effective will increase to 75% by 2022. A gradual increase in the rule effectiveness for the future years was applied. Table 4.3.5-1 below displays the rule effective percentages used to calculate the controlled emissions.

Table 4.3.5-1 Rule Effectiveness for MSW Open Burning

2007	2010	2013	2016	2019	2022	2025
0.50	0.56	0.62	0.67	0.70	0.75	0.75

The formula used to apply these controls to the emissions estimates is shown below in equations 4.3.5-4 and 4.3.5-5.

$$EM_{P,MSW,Controlled} = EM_{P,MSW} \times [1 - (CE \times RP \times RE)] \quad 4.3.5\text{-}4$$

$$PJ_aEM_{Controlled} = PJ_aEM \times [1 - (CE \times RP \times RE)] \quad 4.3.5\text{-}5$$

where:

$EM_{P,MSW,Controlled}$ = controlled emissions from burning MSW for pollutant (P)
$EM_{P,MSW}$ = emissions from burning MSW for pollutant (P)
CE = control efficiency
RP = rule penetration
RE = rule effectiveness
$PJ_aEM_{Controlled}$ = controlled projected future year (a) emissions for county
PJ_aEM = projected future year (a) emissions for county

The VOC and NOx emission estimates, in tons/day, from the open burning of MSW and yard trimmings for the Metrolina nonattainment area are listed in Tables 4.3.5-2 through 4.3.5-5. The total VOC and NOx emissions from open burning are shown in Tables 4.3.5-6 and 4.3.5-7, respectively.

Table 4.3.5-2 VOC Emissions (tpd) from Municipal Solid Waste Burning

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.152	0.133	0.121	0.111	0.105	0.092	0.096
Gaston	0.148	0.130	0.118	0.108	0.103	0.089	0.093
*Iredell	0.081	0.071	0.065	0.059	0.056	0.049	0.051
Lincoln	0.149	0.131	0.119	0.108	0.103	0.090	0.094
Mecklenburg	0.111	0.098	0.089	0.081	0.077	0.067	0.070
Rowan	0.186	0.163	0.148	0.135	0.129	0.112	0.117
Union	0.300	0.264	0.240	0.219	0.209	0.182	0.190
Total	**1.125**	**0.990**	**0.900**	**0.820**	**0.782**	**0.681**	**0.711**

*Iredell County emissions for nonattainment area only

Table 4.3.5-3 NOx Emissions (tpd) from Municipal Solid Waste Burning

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.137	0.120	0.109	0.099	0.095	0.083	0.086
Gaston	0.133	0.117	0.106	0.097	0.092	0.080	0.084
*Iredell	0.073	0.064	0.058	0.053	0.050	0.044	0.046
Lincoln	0.134	0.117	0.107	0.097	0.093	0.081	0.084
Mecklenburg	0.100	0.088	0.080	0.073	0.069	0.061	0.063
Rowan	0.167	0.147	0.133	0.122	0.116	0.101	0.105
Union	0.270	0.237	0.216	0.197	0.187	0.163	0.170
Total	**1.011**	**0.890**	**0.809**	**0.738**	**0.702**	**0.612**	**0.639**

*Iredell County emissions for nonattainment area only

Table 4.3.5-4 VOC Emissions (tpd) from Burning of Yard Trimmings

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.013	0.014	0.014	0.015	0.016	0.017	0.017
Gaston	0.013	0.014	0.014	0.015	0.016	0.017	0.017
*Iredell	0.007	0.007	0.008	0.008	0.009	0.009	0.009
Lincoln	0.013	0.014	0.014	0.015	0.016	0.017	0.017
Mecklenburg	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Rowan	0.016	0.017	0.018	0.019	0.020	0.020	0.021
Union	0.026	0.027	0.029	0.030	0.032	0.033	0.035
Total	**0.088**	**0.093**	**0.097**	**0.102**	**0.109**	**0.113**	**0.116**

*Iredell County emissions for nonattainment area only

Table 4.3.5-5 NOx Emissions (tpd) from Burning of Yard Trimmings

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.003	0.003	0.003	0.003	0.004	0.004	0.004
Gaston	0.003	0.003	0.003	0.003	0.004	0.004	0.004
*Iredell	0.002	0.002	0.002	0.002	0.002	0.003	0.003
Lincoln	0.003	0.003	0.003	0.003	0.004	0.004	0.004
Mecklenburg	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Rowan	0.004	0.004	0.004	0.005	0.005	0.005	0.005
Union	0.006	0.006	0.007	0.007	0.007	0.008	0.008
Total	**0.021**	**0.021**	**0.022**	**0.023**	**0.026**	**0.028**	**0.028**

*Iredell County emissions for nonattainment area only

Table 4.3.5-6 Total VOC Emissions (tpd) from Open Burning

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.165	0.147	0.135	0.126	0.121	0.109	0.113
Gaston	0.161	0.144	0.132	0.123	0.119	0.106	0.110
*Iredell	0.088	0.078	0.073	0.067	0.065	0.058	0.060
Lincoln	0.162	0.145	0.133	0.123	0.119	0.107	0.111
Mecklenburg	0.111	0.098	0.089	0.081	0.077	0.067	0.070
Rowan	0.202	0.180	0.166	0.154	0.149	0.132	0.138
Union	0.326	0.291	0.269	0.249	0.241	0.215	0.225
Total	**1.215**	**1.083**	**0.997**	**0.923**	**0.891**	**0.794**	**0.827**

*Iredell County emissions for nonattainment area only

Table 4.3.5-7 Total NOx Emissions (tpd) from Open Burning

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.140	0.123	0.112	0.102	0.099	0.087	0.090
Gaston	0.136	0.120	0.109	0.100	0.096	0.084	0.088
*Iredell	0.078	0.197	0.180	0.164	0.157	0.138	0.049
Lincoln	0.137	0.120	0.110	0.100	0.097	0.085	0.088
Mecklenburg	0.100	0.088	0.080	0.073	0.069	0.061	0.063
Rowan	0.171	0.151	0.137	0.127	0.121	0.106	0.110
Union	0.276	0.243	0.223	0.204	0.194	0.171	0.178
Total	**1.032**	**0.911**	**0.831**	**0.761**	**0.728**	**0.641**	**0.666**

*Iredell County emissions for nonattainment area only

4.3.6 Small Stationary Combustion Sources

This source category covers emissions from natural gas (NG), liquid petroleum gas (LPG), fuel oil, coal and wood combustion in the residential, commercial/institutional (referred to as commercial) and industrial sectors.

The "demand for energy" for these fuel types is known as fuel usage. The 2007 fuel usage data for North Carolina was obtained from the U.S. Department of Energy, Energy Information Administration (EIA) website for fuel consumption.

The following table shows the fuel usage for the residential, commercial and industrial sectors.

Table 4.3.6-1 2007 Fuel Use in North Carolina

Fuel	Units	Residential	Commercial	Industrial
Natural Gas	10^6 ft^3	58,909	45,861	89,289
LPG	gallons	239,256,678	41,811,847	184,668,990
Oil	gallons	117,527,897	66,949,824	295,999,749
Coal	tons	4,447	40,020	0
Wood	tons	1,466,667	233,333	6,633,333

The emission factors used to estimate the emissions, except residential wood, were obtained from E.H. Pechan & Associates, Inc. based on the ongoing emission factor development work conducted by the Eastern Regional Technical Advisory Group in conjunction with the USEPA. The residential wood emission factors were obtained from a tool developed by the USEPA to calculate the emissions generated from residential wood combustion.

The emission factors used are shown in Table 4.3.6-2 given on the following page.

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Table 4.3.6-2 Fuel Combustion Emission Factors

Fuel	Units	NOx	VOC
Residential			
NG	lb/10^6 ft^3	94	5.5
LPG	lb/gal	0.013	0.001
Fuel Oil	lb/gal	0.018	0.000173
Coal	lb/ton	9.1	10
Wood	lb/ton	2.6	229
Commercial			
NG	lb/10^6 ft^3	100	5.5
LPG	lb/gal	0.014	0.0011
Fuel Oil	lb/gal	0.033875	0.000735
Coal	lb/ton	9.3	0.467
Industrial			
NG	lb/10^6 ft^3	100	5.5
LPG	lb/gal	0.014	0.0011
Fuel Oil	lb/gal	0.033875	0.000735

Residential Combustion Sources

The residential category for the fuel oil, coal, NG and LPG sources fuel usage for the Metrolina nonattainment area was calculated by apportioning the State total fuel usage to a county level. Fuel usage was apportioned by applying the ratio of the number of households heated with the appropriate fuel type in a county to the total households in the State heated with the appropriate fuel type, see equation 4.3.6-1.

$$\text{no. gal. fuel per cnty} = (\text{no. gal. fuel for State}) * \frac{(\text{no. housing units heated by fuel per county})}{(\text{no. housing units heated by fuel in State})} \qquad 4.3.6\text{-}1$$

The number of households heated with fuel oil, coal, NG and LPG was obtained from the U.S. Census Bureau based on the latest census data which is 2000. The number of households heated per fuel type is shown in Table 4.3.6-3 given on the following page.

Table 4.3.6-3 Residential Fuel Type

	Number of Households per Fuel Type			
County	Fuel Oil	Coal	NG	LPG
Cabarrus	4,435	0	19,468	3,085
Gaston	5,605	7	35,677	3,628
Iredell	6,073	15	13,301	3,317
Lincoln	3,346	0	2,893	2,102
Mecklenburg	6,568	29	142,812	4,009
Rowan	7,175	27	14,687	2,633
Union	3,002	0	12,680	7,120

For the residential wood combustion emissions, the USEPA developed a tool to generate the emissions for this subcategory. The emissions for this subcategory are for housing units with fireplaces as their main source of heating. The activity data used in the calculation was also obtained from the tool the USEPA developed to calculate residential wood combustion emissions. The emissions calculation is shown in equation 4.4.6-2.

$$EM = \frac{\text{activity data} * EF}{2{,}000 \text{ lbs/ton}} * (1 \text{ year}/365 \text{ days}) \qquad 4.3.6\text{-}2$$

where:

EM = total daily emissions in tons/day
EF = emission factors for VOC = 18.9 lbs/ton burned/year and NOx = 2.6 lbs/ton burned/year
activity data = tons wood burned per year per county as shown below

Cabarrus	0
Gaston	0
Iredell	15.01
Lincoln	14.14
Mecklenburg	0
Rowan	13.22
Union	0

Commercial and Industrial Combustion Sources

Commercial and industrial fuel usage was apportioned according to the number of employees in the commercial/industrial business establishments in the State and the Metrolina nonattainment counties. Fuel usage was apportioned to the county level by applying the ratio of county employment to the total State employment, see equation 4.3.6-3.

$$\text{no. gal. fuel per county} = (\text{no. gal. fuel for State}) * \frac{(\text{commercial/industrial employment per county})}{(\text{commercial/industrial employment in State})} \qquad 4.3.6\text{-}3$$

The commercial employment data was obtained from the County Business Patterns for NAICS codes 42 (wholesale trade) through 81 (other services - except public administration). For industrial combustion, the employment data was also obtained from the County Business Patterns for NAICS codes 31-33 (manufacturing). The total number of employees for these establishments was used to allocate emissions to the county level. The 2007 commercial and industrial employment for each county are shown in Table 4.3.6-4.

Table 4.3.6-4 Commercial and Industrial Combustion Employment

County	2007 Commercial Employment	2007 Industrial Employment
Cabarrus	32,560	2,760
Gaston	33,862	5,484
Iredell	32,159	4,471
Lincoln	9,800	1,323
Mecklenburg	274,725	14,984
Rowan	20,095	3,550
Union	24,489	3,687

For the residential source sectors, the growth factors are based on the population for each county. The population growth factors are in Table 2.2-2.

The commercial combustion growth factors were generated from the statewide employment data for NAICS codes 42 (wholesale trade) through 81 (other services - except public administration). The industrial combustion growth factors were also generated from statewide data using NAICS codes 31-33 (manufacturing). The FORECAST function in Microsoft EXCEL was used to determine the future year employment data based on the past statewide employment data for 2003 - 2008. The FORECAST tool uses linear interpolation to project future values based on the historic data.

The growth factors were developed based on the ratio of the base year employment to the future years' employment, see equation 4.3.6-4.

$$\text{Commercial/Industrial Growth Factors} = \frac{FY_{emp}}{BY_{emp}} \qquad 4.3.6\text{-}4$$

where:

BY_{emp} = base year employment per county
FY_{emp} = future years' employment per county

Table 4.3.6-5 shows the commercial and industrial combustion growth factors.

Table 4.3.6-5 Growth Factors for Commercial and Industrial Combustion

	2010	2013	2016	2019	2022	2025
Commercial	1.0501	1.1111	1.1720	1.2330	1.2940	1.3549
Industrial	0.9559	0.9195	0.8831	0.8468	0.8104	0.7740

The emissions for the 2007 base year emissions for each small stationary combustion source were calculated using equations 4.3.6-5 through 4.3.6-9.

$$EM_{coal} = \frac{\text{no. tons/year coal} * EF_{coal}}{2{,}000 \text{ lb/ton}} * (1 \text{ year}/365 \text{ days}) - pse \qquad 4.3.6\text{-}5$$

$$EM_{NG} = \frac{\text{no. ft}^3\text{/year NG} * EF_{NG}}{2{,}000 \text{ lbs /ton}} * (1 \text{ year}/365 \text{ days}) - pse \qquad 4.3.6\text{-}6$$

$$EM_{LPG} = \frac{\text{no. gal/year LPG} * EF_{LPG}}{2{,}000 \text{ lbs /ton}} * (1 \text{ year}/365 \text{ days}) - pse \qquad 4.3.6\text{-}7$$

$$EM_{fuel\ oil} = \frac{\text{no. gal/year fuel oil} * EF_{oil}}{2{,}000 \text{ lbs /ton}} * (1 \text{ year}/365 \text{ days}) - pse \qquad 4.3.6\text{-}8$$

$$EM_{wood} = \frac{\text{no. ton/year wood} * EF_{wood}}{2{,}000 \text{ lbs /ton}} * (1 \text{ year}/365 \text{ days}) - pse \qquad 4.3.6\text{-}9$$

where:

EM_{coal} = daily total coal emissions in tons/day
EM_{NG} = daily total Ng emissions in tons/day
EM_{LPG} = daily total LPG emissions in tons/day
$EM_{fuel\ oil}$ = daily total fuel oil emissions in tons/day
EM_{wood} = daily total wood emissions in tons/day
EF_{coal} = emission factor for coal combustion per pollutant
EF_{NG} = emission factor for NG combustion per pollutant
EF_{LPG} = emission factor for LPG combustion per pollutant
EF_{oil} = emission factor for fuel oil combustion per pollutant
EF_{wood} = emission factor for wood combustion per pollutant
pse = point source emissions

The emissions for the projected future years for all of the small stationary combustion sources were calculated using equation 4.4.6-10

$$PJEM = EM * GF_a \qquad 4.3.6\text{-}10$$

where:

$PJEM$ = projected future year emissions in tons/day
GF_a = growth factor (a) for projected future years.

The NOx and VOC emissions estimates for each residential fuel combustion source, in tons/day, for the residential source sector are listed in Tables 4.3.6-6 through 4.3.6-15. The total VOC and NOx emissions for the residential combustion sources are in Tables 4.4.6-16 and 4.4.6-17.

Table 4.3.6-6 VOC Emissions (tpd) for Residential Coal Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Gaston	0.0009	0.0009	0.0010	0.0010	0.0011	0.0011	0.0012
*Iredell	0.0006	0.0006	0.0007	0.0007	0.0007	0.0008	0.0008
Lincoln	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mecklenburg	0.0038	0.0040	0.0042	0.0044	0.0046	0.0048	0.0051
Rowan	0.0036	0.0038	0.0040	0.0042	0.0044	0.0046	0.0048
Union	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0089**	**0.0093**	**0.0099**	**0.0103**	**0.0108**	**0.0113**	**0.0119**

*Iredell County emissions for nonattainment area only

Table 4.3.6-7 NOx Emissions (tpd) for Residential Coal Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Gaston	0.0008	0.0008	0.0009	0.0009	0.0010	0.0010	0.0011
*Iredell	0.0006	0.0006	0.0007	0.0007	0.0007	0.0008	0.0008
Lincoln	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mecklenburg	0.0035	0.0037	0.0039	0.0041	0.0043	0.0045	0.0047
Rowan	0.0033	0.0035	0.0037	0.0038	0.0040	0.0042	0.0044
Union	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0082**	**0.0086**	**0.0092**	**0.0095**	**0.0100**	**0.0105**	**0.0110**

*Iredell County emissions for nonattainment area only

Table 4.3.6-8 VOC Emissions (tpd) for Residential LPG Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Gaston	0.001	0.001	0.001	0.001	0.001	0.001	0.001
*Iredell	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lincoln	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Mecklenburg	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Rowan	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Union	0.003	0.003	0.003	0.003	0.004	0.004	0.004
Total	**0.008**	**0.008**	**0.008**	**0.008**	**0.009**	**0.009**	**0.009**

*Iredell County emissions for nonattainment area only

Table 4.3.6-9 NOx Emissions (tpd) for Residential LPG Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.029	0.031	0.032	0.034	0.035	0.037	0.039
Gaston	0.034	0.036	0.038	0.040	0.042	0.043	0.045
*Iredell	0.010	0.011	0.011	0.012	0.012	0.013	0.013
Lincoln	0.020	0.021	0.022	0.023	0.024	0.026	0.027
Mecklenburg	0.038	0.040	0.042	0.044	0.046	0.048	0.051
Rowan	0.025	0.026	0.028	0.029	0.031	0.032	0.033
Union	0.067	0.071	0.074	0.078	0.082	0.086	0.089
Total	**0.223**	**0.236**	**0.247**	**0.260**	**0.272**	**0.285**	**0.297**

*Iredell County emissions for nonattainment area only

Table 4.3.6-10 VOC Emissions (tpd) for Residential NG Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.011	0.012	0.012	0.013	0.013	0.014	0.015
Gaston	0.021	0.022	0.023	0.024	0.026	0.027	0.028
*Iredell	0.003	0.003	0.003	0.003	0.004	0.004	0.004
Lincoln	0.002	0.002	0.002	0.002	0.002	0.003	0.003
Mecklenburg	0.083	0.087	0.092	0.097	0.101	0.106	0.111
Rowan	0.009	0.009	0.010	0.010	0.011	0.011	0.012
Union	0.007	0.007	0.008	0.008	0.009	0.009	0.009
Total	**0.136**	**0.142**	**0.150**	**0.157**	**0.166**	**0.174**	**0.182**

*Iredell County emissions for nonattainment area only

Table 4.3.6-11 NOx Emissions (tpd) for Residential NG Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.193	0.203	0.214	0.225	0.236	0.246	0.257
Gaston	0.354	0.373	0.393	0.412	0.432	0.452	0.471
*Iredell	0.043	0.045	0.048	0.050	0.052	0.055	0.057
Lincoln	0.029	0.031	0.032	0.034	0.035	0.037	0.039
Mecklenburg	1.416	1.492	1.571	1.650	1.728	1.807	1.886
Rowan	0.146	0.154	0.162	0.170	0.178	0.186	0.194
Union	0.126	0.133	0.140	0.147	0.154	0.161	0.168
Total	**2.307**	**2.431**	**2.560**	**2.688**	**2.815**	**2.944**	**3.072**

*Iredell County emissions for nonattainment area only

Table 4.3.6-12 VOC Emissions (tpd) for Residential Fuel Oil Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Gaston	0.001	0.001	0.001	0.001	0.001	0.001	0.001
*Iredell	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lincoln	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Mecklenburg	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Rowan	0.002	0.002	0.002	0.002	0.002	0.003	0.003
Union	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Total	**0.007**	**0.007**	**0.007**	**0.007**	**0.007**	**0.008**	**0.008**

*Iredell County emissions for nonattainment area only

Table 4.3.6-13 NOx Emissions (tpd) for Residential Fuel Oil Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.025	0.026	0.028	0.029	0.031	0.032	0.033
Gaston	0.031	0.033	0.034	0.036	0.038	0.040	0.041
*Iredell	0.011	0.012	0.012	0.013	0.013	0.014	0.015
Lincoln	0.019	0.020	0.021	0.022	0.023	0.024	0.025
Mecklenburg	0.036	0.038	0.040	0.042	0.044	0.046	0.048
Rowan	0.040	0.042	0.044	0.047	0.049	0.051	0.053
Union	0.017	0.018	0.019	0.020	0.021	0.022	0.023
Total	**0.179**	**0.189**	**0.198**	**0.209**	**0.219**	**0.229**	**0.238**

*Iredell County emissions for nonattainment area only

Table 4.3.6-14 VOC Emissions (tpd) for Residential Wood Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.019	0.020	0.021	0.022	0.023	0.024	0.025
Gaston	0.023	0.024	0.026	0.027	0.028	0.029	0.031
*Iredell	0.006	0.006	0.007	0.007	0.007	0.008	0.008
Lincoln	0.017	0.018	0.019	0.020	0.021	0.022	0.023
Mecklenburg	0.124	0.131	0.138	0.144	0.151	0.158	0.165
Rowan	0.016	0.017	0.018	0.019	0.020	0.020	0.021
Union	0.021	0.022	0.023	0.024	0.026	0.027	0.028
Total	**0.226**	**0.238**	**0.252**	**0.263**	**0.276**	**0.288**	**0.301**

*Iredell County emissions for nonattainment area only

Table 4.3.6-15 NOx Emissions (tpd) for Residential Wood Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.003	0.003	0.003	0.003	0.004	0.004	0.004
Gaston	0.003	0.003	0.003	0.003	0.004	0.004	0.004
*Iredell	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Lincoln	0.002	0.002	0.002	0.002	0.002	0.003	0.003
Mecklenburg	0.017	0.018	0.019	0.020	0.021	0.022	0.023
Rowan	0.002	0.002	0.002	0.002	0.002	0.003	0.003
Union	0.003	0.003	0.003	0.003	0.004	0.004	0.004
Total	**0.031**	**0.032**	**0.033**	**0.034**	**0.038**	**0.041**	**0.042**

*Iredell County emissions for nonattainment area only

Table 4.3.6-16 Total VOC Emissions (tpd) for Residential Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.032	0.034	0.035	0.037	0.038	0.040	0.042
Gaston	0.047	0.049	0.052	0.054	0.057	0.059	0.062
*Iredell	0.010	0.010	0.011	0.011	0.012	0.013	0.013
Lincoln	0.021	0.022	0.023	0.024	0.025	0.027	0.028
Mecklenburg	0.213	0.224	0.236	0.247	0.259	0.271	0.283
Rowan	0.032	0.033	0.035	0.036	0.038	0.040	0.042
Union	0.032	0.033	0.035	0.036	0.040	0.041	0.042
Total	**0.387**	**0.405**	**0.427**	**0.445**	**0.469**	**0.491**	**0.512**

*Iredell County emissions for nonattainment area only

Table 4.3.6-17 Total NOx Emissions (tpd) for Residential Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.250	0.263	0.277	0.291	0.306	0.319	0.333
Gaston	0.423	0.446	0.469	0.492	0.517	0.540	0.562
*Iredell	0.066	0.070	0.073	0.077	0.079	0.084	0.087
Lincoln	0.070	0.074	0.077	0.081	0.084	0.090	0.094
Mecklenburg	1.511	1.592	1.676	1.760	1.843	1.928	2.013
Rowan	0.216	0.228	0.240	0.252	0.264	0.276	0.287
Union	0.213	0.225	0.236	0.248	0.261	0.272	0.284
Total	**2.749**	**2.898**	**3.048**	**3.201**	**3.354**	**3.509**	**3.660**

*Iredell County emissions for nonattainment area only

The NOx and VOC emissions estimates, in tons/day, for the commercial combustion sources are shown in Tables 4.3.6-18 through 4.3.6-27 and summarized in Tables 4.3.6-28 and 4.3.6-29. The industrial combustion sources VOC and NOx emissions estimates, in tons/day, are shown in Tables 4.3.6-30 through 4.3.6-37and summarized in Tables 4.3.6-38 and 4.3.6-39. There are no wood combustion emissions estimates for the commercial and industrial source sectors because the only emission factors for wood combustion is residential furnaces which are captured in the residential source sector. Additionally, there are no coal combustion emissions for the industrial source sector because the emissions generated from coal are accounted for in the point sources inventory.

Point sources are those stationary sources that require an air permit to operate. In general, these sources have a potential to emit more than 5 tons per year of CO, NO_x, PM, SO_2 and/or VOC from a single facility. Point sources that meet this criterion are accounted for in the point source emissions inventory. They are subtracted from the area source emissions inventory to prevent double counting of emissions. The 2007 point source emissions data was subtracted from the overall area source emissions calculation. Tables 4.3.6-40 through 4.3.6-45 illustrates the point source emissions that were subtracted from the commercial and industrial fuel oil, NG and wood combustion sources. The remaining commercial and industrial combustion sources do not have point source emissions for the Metrolina nonattainment counties.

Table 4.3.6-18 VOC Emissions (tpd) for Commercial Coal Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Gaston	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
*Iredell	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Lincoln	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mecklenburg	0.0004	0.0004	0.0004	0.0005	0.0005	0.0005	0.0005
Rowan	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Union	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0004**	**0.0004**	**0.0004**	**0.0005**	**0.0005**	**0.0005**	**0.0005**

*Iredell County emissions for nonattainment area only

Table 4.3.6-19 NOx Emissions (tpd) for Commercial Coal Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.0101	0.0106	0.0112	0.0118	0.0125	0.0131	0.0137
Gaston	0.0105	0.0110	0.0117	0.0123	0.0129	0.0136	0.0142
*Iredell	0.0033	0.0035	0.0037	0.0039	0.0041	0.0043	0.0045
Lincoln	0.0030	0.0032	0.0033	0.0035	0.0037	0.0039	0.0041
Mecklenburg	0.0852	0.0895	0.0947	0.0999	0.1051	0.1102	0.1154
Rowan	0.0062	0.0065	0.0069	0.0073	0.0076	0.0080	0.0084
Union	0.0076	0.0080	0.0084	0.0089	0.0094	0.0098	0.0103
Total	**0.1259**	**0.1323**	**0.1399**	**0.1476**	**0.1553**	**0.1629**	**0.1706**

*Iredell County emissions for nonattainment area only

Table 4.3.6-20 VOC Emissions (tpd) for Commercial LPG Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Gaston	0.001	0.001	0.001	0.001	0.001	0.001	0.001
*Iredell	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lincoln	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mecklenburg	0.008	0.008	0.009	0.009	0.010	0.010	0.011
Rowan	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Union	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Total	**0.012**	**0.012**	**0.013**	**0.013**	**0.014**	**0.014**	**0.015**

*Iredell County emissions for nonattainment area only

Table 4.3.6-21 NOx Emissions (tpd) for Commercial LPG Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.018	0.019	0.020	0.021	0.022	0.023	0.024
Gaston	0.018	0.019	0.020	0.021	0.022	0.023	0.024
*Iredell	0.006	0.006	0.007	0.007	0.007	0.008	0.008
Lincoln	0.005	0.005	0.006	0.006	0.006	0.006	0.007
Mecklenburg	0.148	0.155	0.164	0.173	0.182	0.192	0.201
Rowan	0.011	0.012	0.012	0.013	0.014	0.014	0.015
Union	0.012	0.013	0.013	0.014	0.015	0.016	0.016
Total	**0.218**	**0.229**	**0.242**	**0.255**	**0.268**	**0.282**	**0.295**

*Iredell County emissions for nonattainment area only

Table 4.3.6-22 VOC Emissions (tpd) for Commercial NG Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.004	0.004	0.004	0.005	0.005	0.005	0.005
Gaston	0.000	0.000	0.000	0.000	0.000	0.000	0.000
*Iredell	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Lincoln	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mecklenburg	0.036	0.038	0.040	0.042	0.044	0.047	0.049
Rowan	0.003	0.003	0.003	0.004	0.004	0.004	0.004
Union	0.003	0.003	0.003	0.004	0.004	0.004	0.004
Total	**0.047**	**0.049**	**0.051**	**0.056**	**0.058**	**0.061**	**0.063**

*Iredell County emissions for nonattainment area only

Table 4.3.6-23 NOx Emissions (tpd) for Commercial NG Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.064	0.067	0.071	0.075	0.079	0.083	0.087
Gaston	0.035	0.037	0.039	0.041	0.043	0.045	0.047
*Iredell	0.026	0.027	0.029	0.030	0.032	0.034	0.035
Lincoln	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mecklenburg	0.651	0.684	0.723	0.763	0.803	0.842	0.882
Rowan	0.045	0.047	0.050	0.053	0.055	0.058	0.061
Union	0.051	0.054	0.057	0.060	0.063	0.066	0.069
Total	**0.872**	**0.916**	**0.969**	**1.022**	**1.075**	**1.128**	**1.181**

*Iredell County emissions for nonattainment area only

Table 4.3.6-24 VOC Emissions (tpd) for Commercial Fuel Oil Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Gaston	0.000	0.000	0.000	0.000	0.000	0.000	0.000
*Iredell	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lincoln	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mecklenburg	0.004	0.004	0.004	0.005	0.005	0.005	0.005
Rowan	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Union	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	**0.004**	**0.004**	**0.004**	**0.005**	**0.005**	**0.005**	**0.005**

*Iredell County emissions for nonattainment area only

Table 4.3.6-25 NOx Emissions (tpd) for Commercial Fuel Oil Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.013	0.014	0.014	0.015	0.016	0.017	0.018
Gaston	0.023	0.024	0.026	0.027	0.028	0.030	0.031
*Iredell	0.007	0.007	0.008	0.008	0.009	0.009	0.009
Lincoln	0.009	0.009	0.010	0.011	0.011	0.012	0.012
Mecklenburg	0.240	0.252	0.267	0.281	0.296	0.311	0.325
Rowan	0.011	0.012	0.012	0.013	0.014	0.014	0.015
Union	0.008	0.008	0.009	0.009	0.010	0.010	0.011
Total	**0.311**	**0.326**	**0.346**	**0.364**	**0.384**	**0.403**	**0.421**

*Iredell County emissions for nonattainment area only

Table 4.3.6-26 VOC Emissions (tpd) for Commercial Wood Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Gaston	0.001	0.001	0.001	0.001	0.001	0.001	0.001
*Iredell	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lincoln	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mecklenburg	0.007	0.007	0.008	0.008	0.009	0.009	0.009
Rowan	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Union	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	**0.009**	**0.009**	**0.010**	**0.010**	**0.011**	**0.011**	**0.011**

*Iredell County emissions for nonattainment area only

Table 4.3.6-27 NOx Emissions (tpd) for Commercial Wood Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.010	0.011	0.011	0.012	0.012	0.013	0.014
Gaston	0.011	0.012	0.012	0.013	0.014	0.014	0.015
*Iredell	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lincoln	0.003	0.003	0.003	0.004	0.004	0.004	0.004
Mecklenburg	0.087	0.091	0.097	0.102	0.107	0.113	0.118
Rowan	0.004	0.004	0.004	0.005	0.005	0.005	0.005
Union	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	**0.115**	**0.121**	**0.127**	**0.136**	**0.142**	**0.149**	**0.156**

*Iredell County emissions for nonattainment area only

Table 4.3.6-28 Total VOC Emissions (tpd) for Commercial Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.006	0.006	0.006	0.007	0.007	0.007	0.007
Gaston	0.002	0.002	0.002	0.002	0.002	0.002	0.002
*Iredell	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Lincoln	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mecklenburg	0.055	0.057	0.061	0.065	0.069	0.072	0.075
Rowan	0.004	0.004	0.004	0.005	0.005	0.005	0.005
Union	0.004	0.004	0.004	0.005	0.005	0.005	0.005
Total	**0.072**	**0.074**	**0.078**	**0.085**	**0.089**	**0.092**	**0.095**

*Iredell County emissions for nonattainment area only

Table 4.3.6-29 Total NOx Emissions (tpd) for Commercial Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.115	0.122	0.127	0.135	0.142	0.149	0.147
Gaston	0.098	0.103	0.109	0.114	0.120	0.126	0.131
*Iredell	0.042	0.044	0.048	0.049	0.052	0.055	0.057
Lincoln	0.020	0.020	0.022	0.025	0.025	0.026	0.027
Mecklenburg	1.211	1.272	1.346	1.419	1.493	1.568	1.641
Rowan	0.077	0.082	0.085	0.091	0.096	0.099	0.104
Union	0.079	0.083	0.087	0.092	0.097	0.105	0.106
Total	**1.642**	**1.726**	**1.824**	**1.925**	**2.025**	**2.125**	**2.223**

*Iredell County emissions for nonattainment area only

Table 4.3.6-30 VOC Emissions (tpd) for Industrial LPG Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.0022	0.0021	0.0020	0.0019	0.0019	0.0018	0.0017
Gaston	0.0023	0.0022	0.0021	0.0020	0.0019	0.0019	0.0018
*Iredell	0.0007	0.0007	0.0006	0.0006	0.0006	0.0006	0.0005
Lincoln	0.0007	0.0007	0.0006	0.0006	0.0006	0.0006	0.0005
Mecklenburg	0.0186	0.0178	0.0171	0.0164	0.0158	0.0151	0.0144
Rowan	0.0014	0.0013	0.0013	0.0012	0.0012	0.0011	0.0011
Union	0.0017	0.0016	0.0016	0.0015	0.0014	0.0014	0.0013
Total	**0.0276**	**0.0264**	**0.0253**	**0.0242**	**0.0234**	**0.0225**	**0.0213**

*Iredell County emissions for nonattainment area only

Table 4.3.6-31 NOx Emissions (tpd) for Industrial LPG Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.0401	0.0383	0.0369	0.0354	0.0340	0.0325	0.0310
Gaston	0.0417	0.0399	0.0383	0.0368	0.0353	0.0338	0.0323
*Iredell	0.0129	0.0123	0.0119	0.0114	0.0109	0.0105	0.0100
Lincoln	0.0121	0.0116	0.0111	0.0107	0.0102	0.0098	0.0094
Mecklenburg	0.3382	0.3233	0.3110	0.2987	0.2864	0.2741	0.2618
Rowan	0.0247	0.0236	0.0227	0.0218	0.0209	0.0200	0.0191
Union	0.0301	0.0288	0.0227	0.0266	0.0255	0.0244	0.0233
Total	**0.4998**	**0.4778**	**0.4596**	**0.4414**	**0.4232**	**0.4051**	**0.3869**

*Iredell County emissions for nonattainment area only

Table 4.3.6-32 VOC Emissions (tpd) for Industrial NG Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.0060	0.0057	0.0055	0.0053	0.0051	0.0049	0.0046
Gaston	0.0023	0.0022	0.0021	0.0020	0.0019	0.0019	0.0018
*Iredell	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Lincoln	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mecklenburg	0.0931	0.0890	0.0856	0.0822	0.0788	0.0754	0.0721
Rowan	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Union	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.1014**	**0.0969**	**0.0932**	**0.0895**	**0.0858**	**0.0822**	**0.0785**

*Iredell County emissions for nonattainment area only

Table 4.3.6-33 NOx Emissions (tpd) for Industrial NG Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.0289	0.0276	0.0266	0.0255	0.0245	0.0234	0.0224
Gaston	0.0064	0.0061	0.0059	0.0057	0.0054	0.0052	0.0050
*Iredell	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Lincoln	0.0075	0.0072	0.0069	0.0066	0.0064	0.0061	0.0058
Mecklenburg	1.6919	1.6173	1.5557	1.4941	1.4327	1.3711	1.3095
Rowan	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Union	0.0654	0.0625	0.0601	0.0578	0.0554	0.0530	0.0506
Total	**1.8001**	**1.7207**	**1.6552**	**1.5897**	**1.5244**	**1.4588**	**1.3933**

*Iredell County emissions for nonattainment area only

Table 4.3.6-34 VOC Emissions (tpd) for Industrial Fuel Oil Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Gaston	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
*Iredell	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Lincoln	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mecklenburg	0.0022	0.0021	0.0020	0.0019	0.0019	0.0018	0.0017
Rowan	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Union	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0023**	**0.0022**	**0.0021**	**0.0020**	**0.0020**	**0.0019**	**0.0018**

*Iredell County emissions for nonattainment area only

Table 4.3.6-35 NOx Emissions (tpd) for Industrial Fuel Oil Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Gaston	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
*Iredell	0.0032	0.0031	0.0029	0.0028	0.0027	0.0026	0.0025
Lincoln	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mecklenburg	0.2232	0.2134	0.2052	0.1971	0.1890	0.1809	0.1728
Rowan	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Union	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.2264**	**0.2165**	**0.2081**	**0.1999**	**0.1917**	**0.1835**	**0.1753**

*Iredell County emissions for nonattainment area only

Table 4.3.6-36 NOx Emissions (tpd) for Industrial Wood Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.0013	0.0012	0.0012	0.0011	0.0011	0.0011	0.0010
Gaston	0.0014	0.0013	0.0013	0.0012	0.0012	0.0011	0.0011
*Iredell	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Lincoln	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mecklenburg	0.0111	0.0106	0.0102	0.0098	0.0094	0.0090	0.0086
Rowan	0.0008	0.0008	0.0007	0.0007	0.0007	0.0006	0.0006
Union	0.0010	0.0010	0.0009	0.0009	0.0008	0.0008	0.0008
Total	**0.0156**	**0.0149**	**0.0143**	**0.0137**	**0.0132**	**0.0126**	**0.0121**

*Iredell County emissions for nonattainment area only

Table 4.3.6-37 NOx Emissions (tpd) for Industrial Wood Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.0170	0.0163	0.0156	0.0150	0.0144	0.0138	0.0132
Gaston	0.0177	0.0169	0.0163	0.0156	0.0150	0.0143	0.0137
*Iredell	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Lincoln	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mecklenburg	0.1438	0.1375	0.1322	0.1270	0.1218	0.1165	0.1113
Rowan	0.0103	0.0098	0.0095	0.0091	0.0087	0.0083	0.0080
Union	0.0128	0.0122	0.0118	0.0113	0.0108	0.0104	0.0099
Total	**0.2016**	**0.1927**	**0.1854**	**0.1780**	**0.1707**	**0.1633**	**0.1561**

*Iredell County emissions for nonattainment area only

Table 4.3.6-38 Total VOC Emissions (tpd) for Industrial Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.010	0.009	0.009	0.008	0.008	0.008	0.007
Gaston	0.006	0.006	0.006	0.005	0.005	0.005	0.005
*Iredell	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Lincoln	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Mecklenburg	0.125	0.120	0.115	0.110	0.106	0.101	0.097
Rowan	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Union	0.003	0.003	0.003	0.002	0.002	0.002	0.002
Total	**0.148**	**0.142**	**0.137**	**0.129**	**0.125**	**0.120**	**0.115**

*Iredell County emissions for nonattainment area only

Table 4.3.6-39 Total NOx Emissions (tpd) for Industrial Combustion

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.086	0.082	0.080	0.076	0.072	0.069	0.067
Gaston	0.066	0.063	0.060	0.059	0.055	0.053	0.051
*Iredell	0.016	0.015	0.015	0.014	0.014	0.013	0.013
Lincoln	0.020	0.019	0.018	0.018	0.016	0.016	0.015
Mecklenburg	2.397	2.290	2.204	2.117	2.030	1.943	1.855
Rowan	0.035	0.034	0.032	0.031	0.030	0.028	0.027
Union	0.108	0.104	0.100	0.096	0.091	0.087	0.084
Total	**2.728**	**2.607**	**2.509**	**2.411**	**2.308**	**2.209**	**2.112**

*Iredell County emissions for nonattainment area only

Table 4.3.6-40 Point Source Commercial Fuel Oil Combustion Emissions (tpd)

County	NOx	VOC
Cabarrus	0.016	0.000
Gaston	0.007	0.000
*Iredell	0.002	0.000
Lincoln	0.000	0.000
Mecklenburg	0.001	0.000
Rowan	0.006	0.000
Union	0.014	0.001
Total	**0.046**	**0.001**

*Iredell County emissions for nonattainment area only

Table 4.3.6-41 Point Source Commercial NG Combustion Emissions (tpd)

County	NOx	VOC
Cabarrus	0.046	0.002
Gaston	0.083	0.025
*Iredell	0.014	0.026
Lincoln	0.096	0.023
Mecklenburg	0.215	0.010
Rowan	0.027	0.000
Union	0.074	0.000
Total	**0.555**	**0.086**

*Iredell County emissions for nonattainment area only

Table 4.3.6-42 Point Source Commercial Wood Combustion Emissions (tpd)

County	NOx	VOC
Cabarrus	0.000	0.000
Gaston	0.000	0.000
*Iredell	0.004	0.000
Lincoln	0.000	0.000
Mecklenburg	0.000	0.000
Rowan	0.002	0.000
Union	0.045	0.003
Total	**0.051**	**0.003**

* Iredell County emissions for nonattainment area only

Table 4.3.6-43 Point Source Industrial Fuel Oil Combustion Emissions (tpd)

County	NOx	VOC
Cabarrus	0.009	0.000
Gaston	0.001	0.000
*Iredell	0.005	0.000
Lincoln	0.012	0.000
Mecklenburg	0.000	0.000
Rowan	0.016	0.000
Union	0.008	0.000
Total	**0.051**	**0.000**

*Iredell County emissions for nonattainment area only

Table 4.3.6-44 Point Source Industrial NG Combustion Emissions (tpd)

County	NOx	VOC
Cabarrus	0.169	0.003
Gaston	0.201	0.006
*Iredell	1.608	0.241
Lincoln	0.047	0.008
Mecklenburg	0.176	0.005
Rowan	0.242	0.102
Union	0.084	0.008
Total	**2.527**	**0.373**

*Iredell County emissions for nonattainment area only

Table 4.3.6-45 Point Source Industrial Wood Combustion Emissions (tpd)

County	NOx	VOC
Cabarrus	0.000	0.000
Gaston	0.000	0.000
*Iredell	0.009	0.001
Lincoln	0.025	0.001
Mecklenburg	0.000	0.000
Rowan	0.000	0.000
Union	0.000	0.000
Total	**0.034**	**0.002**

*Iredell County emissions for nonattainment area only

4.3.7 Agricultural Burning

This source subcategory covers burning practices used to clear and/or prepare land for planting. These operations include stubble burning, burning or agricultural crop residues, and the burning of stand field crops as part of harvesting (e.g., wheat). According to the North Carolina Department of Agriculture, when soybeans are double cropped with wheat, the wheat stubble is usually burned back after harvest about one fourth of the time. According to Dr. J. Dunphy, a soybean specialist at North Carolina State University, the acres of soybean double cropped with wheat in North Carolina is approximately equal to the acres of wheat planted. Therefore, ¼ of the acreage of wheat planted is used to calculate the emissions from agricultural burning practices in North Carolina.

The fuel loading factor and the yield of pollutant for burning wheat stubble was obtained from AP-42, Table 2.4.2. The fuel loading factor is 1.9 tons of fuel consumed per acre burned. The yield of pollutant was dependent upon whether the field was head-fire burned or back-fire burned. The percentage of each burning type used was not available, therefore, the assumption was made that each type was used 50 percent of the time. The yield of pollutant used, 11 lbs. of VOC per ton of fuel consumed, is an average of the two types of burning. To calculate the emission factor for VOC emissions, the fuel loading factor is multiplied by the yield of pollutant.

$$\begin{aligned} EF_{VOC} &= \text{(1.9 tons/acre) (11 lbs VOC/ton burned)} \\ &= \text{20.9 lbs VOC/acre burned} \end{aligned}$$

The annual emissions were calculated using the number of acres burned and the per acre emission factor. According to the North Carolina Department of Agriculture, field burning occurs only during June and July, therefore, the daily emissions for agricultural burning were calculated by dividing the annual emissions by 61 days. No seasonal adjustment is needed since all of the burning occurs during the ozone season.

The number of acres of wheat planted was obtained from the North Carolina Agriculture Statistic Division and is tabulated in Table 4.3.7-1 below.

Table 4.3.7-1 Acres of Land Burned by Agricultural Burning

County	Number of Wheat Acres in 2007
Cabarrus	3,300
Gaston	0
Iredell	8,700
Lincoln	3,300
Mecklenburg	1,400
Rowan	8,400
Union	40,000

The projected future year emissions were grown using growth factors that were linear interpolated using Microsoft EXCEL FORECAST. The historic data for the total number of wheat acres planted for 2003-2008 were used for the linear interpolation. Statewide wheat acreage was used because it was available for 2003-2008. The growth factors are shown in Table 4.3.7-2.

Table 4.3.7-2 Growth Factors for Agricultural Burning

2010	2013	2016	2019	2022	2025
1.2931	1.5026	1.7122	1.9217	2.1312	2.3407

The emissions for 2007 were calculated using equation 4.3.7-1 and the emissions for the interim year and future year were calculated using equation 4.3.7-2.

$$EM = \frac{(\frac{1}{4} \text{ x wheat acreage}) * EF}{2{,}000 \text{ lbs/ton}} * (1 \text{ year}/61 \text{ days}) \qquad 4.3.7\text{-}1$$

$$PJEM = EM * GF_a \qquad 4.3.7\text{-}2$$

where:

EM = total daily emissions in tons/day

EF = emission factor, VOC = 20.9 lbs/acre burned/year
PJEM = projected future emissions in tons/day
GF_a = growth factor (a) for projected future years

The VOC emission estimates, in tons/day, from agricultural burning for the Metrolina nonattainment area are listed in Table 4.3.7-3.

Table 4.3.7-3 VOC Emissions (tpd) from Agricultural Burning

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.141	0.182	0.212	0.241	0.271	0.300	0.330
Gaston	0.000	0.000	0.000	0.000	0.000	0.000	0.000
*Iredell	0.121	0.156	0.182	0.207	0.233	0.258	0.283
Lincoln	0.141	0.182	0.212	0.241	0.271	0.300	0.330
Mecklenburg	0.060	0.078	0.090	0.103	0.115	0.128	0.140
Rowan	0.360	0.466	0.541	0.616	0.692	0.767	0.843
Union	1.713	2.215	2.574	2.933	3.292	3.651	4.010
Total	**2.536**	**3.279**	**3.811**	**4.341**	**4.874**	**5.404**	**5.936**

*Iredell County emissions for nonattainment area only

4.4 BIOGENIC EMISSIONS

Biogenic emissions are primarily VOC emissions from vegetation and are kept constant through all years when modeling ozone. Since the redesignation plan is a comparison of future year to base year emissions and the biogenic emissions are kept constant, the biogenic emissions do not play a part in the redesignation demonstration. Upon discussions with the USEPA Region 4, it was agreed that the biogenic emissions did not need to be estimated for the redesignation demonstration and maintenance plan.

4.5 SUMMARY OF AREA SOURCE EMISSIONS

The total area source emissions for the Metrolina nonattainment area are summarized in the tables below. All of the emissions are in tons per day.

Table 4.5-1 Total Area Source VOC Emissions (tpd)

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	5.06	5.12	5.07	5.09	5.24	5.39	5.67
Gaston	6.30	6.32	6.27	6.28	6.41	6.51	6.92
*Iredell	1.93	2.14	2.15	2.18	2.25	2.31	2.43
Lincoln	2.83	2.89	2.90	2.93	3.02	3.10	3.31
Mecklenburg	27.57	27.02	25.88	25.21	25.57	25.88	27.86
Rowan	4.97	5.10	5.12	5.19	5.32	5.44	5.83
Union	8.59	9.08	9.22	9.48	9.97	10.43	11.24
Total	**57.25**	**57.67**	**56.61**	**56.36**	**57.78**	**59.06**	**63.26**

*Iredell County emissions for nonattainment area only

Table 4.5-2 Total Area Source NOx Emissions (tpd)

County	2007	2010	2013	2016	2019	2022	2025
Cabarrus	0.59	0.59	0.60	0.61	0.62	0.63	0.65
Gaston	0.72	0.73	0.75	0.77	0.79	0.80	0.83
*Iredell	0.20	0.20	0.20	0.20	0.20	0.20	0.21
Lincoln	0.25	0.23	0.23	0.22	0.22	0.22	0.22
Mecklenburg	5.22	5.25	5.31	5.37	5.44	5.50	5.58
Rowan	0.50	0.50	0.50	0.50	0.51	0.51	0.53
Union	0.68	0.66	0.65	0.64	0.64	0.63	0.65
Total	**8.16**	**8.16**	**8.24**	**8.31**	**8.42**	**8.49**	**8.67**

*Iredell County emissions for nonattainment area only

Appendix B.3

On-Road Mobile Sources
Emission Inventory Documentation

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1.0 INTRODUCTION AND SCOPE

The on-road mobile source emissions for the Charlotte-Gastonia-Rock-Hill, NC-SC 8-hour ozone nonattainment area (referred to as the Metrolina area) comprise 46% nitrogen oxides (NOx) emissions and 40% of the man-made volatile organic compounds (VOCs) emissions. The Metrolina nonattainment area includes the North Carolina Counties of Cabarrus, Gaston, Lincoln, Mecklenburg, Rowan, and Union; Coddle Creek and Davidson Townships in Iredell County, North Carolina and Rock Hill Metropolitan Planning Organization boundary in York County, South Carolina. This document outlines the on-road mobile source documentation for the North Carolina portion of the Metrolina nonattainment area. The South Carolina Department of Health and Environmental Control have developed a maintenance plan for the South Carolina portion of the nonattainment area which can be found at the following website: http://www.scdhec.gov/environment/baq/Metrolina-SC_Redesignation/.

This appendix covers the procedures associated with the emissions inventory development of on-road mobile sources. On-road mobile source emission inventories were developed for 2010, 2013, 2016, 2019, 2022 and 2025 for a typical ozone season weekday for the ozone precursor pollutants NOx and VOCs.

2.0 OVERALL METHODOLOGY

2.1 EMISSION ESTIMATION APPROACH

Mobile source emissions are estimated by the methodologies suggested in the United States Environmental Protection Agency (USEPA) documents Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, Policy Guidance on the Use of MOVES2010 for State Implementation Plan Development, Transportation Conformity, and Other Purposes (EPA-420-B-09-046, December 2009), and Technical Guidance on the Use of MOVES2010 for Emission Inventory Preparation in State Implementation Plans and Transportation Conformity (EPA-420-B-10-023, April 2010).

In December 2009, the USEPA released a new model for mobile sources. MOVES (MOtor Vehicle Emissions Simulator) is a computer program designed by the USEPA to estimate air pollution emissions from mobile sources. MOVES2010a (hereafter referred to as MOVES) replaces the USEPA's previous emissions model for on-road mobile sources, MOBILE6.2. MOVES can be used to estimate exhaust and evaporative emissions as well as brake and tire wear emissions from all types of on-road vehicles.

One important new feature of MOVES is the option to calculate emissions either as inventory estimates (total emissions in units of mass) or, emission rates (emissions per unit of distance for running emissions or per vehicle for starts, extended idle and resting evaporative emissions) in a look-up table format.

Use of the inventory option simplifies the post-processing of MOVES output, but it requires VMT and vehicle population data as an input to MOVES. When using the emission rates option, VMT and vehicle population are applied during post-processing external to MOVES. Either approach can be used to develop emissions estimates for state implementation plans (SIPs). If inventory option is selected, MOVES provides emissions estimates as mass, using VMT and vehicle population entered by the user. If emission rate option is selected, MOVES provides emission rates as mass per unit of activity. The emission rates option produces a look-up table of emission rates that must be post-processed to produce an inventory. The North Carolina Division of Air Quality (NCDAQ) is electing to run the model in the inventory mode due to faster model run times and fewer post-processing requirements.

3.0 QUALITY ASSURANCE MEASURES

The quality assurance (QA) for the highway mobile source category can be broken into two components: 1) input files and 2) MOVES outputs/summaries. Each of these components is 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 areas. Once the speeds are deemed reasonable, the NCDAQ enters the speed information into MOVES input files. In addition to the speed information, the user enters data to characterize local meteorology, fleet and activity information. All input files are checked 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 noted back to the person who generated the input files for correction. Additionally, a report is kept that identifies the person who produced the input file, the person that QA’d the file, and where the data originated. Once the input files have passed through the QA procedure, MOVES is run to generate emissions.

4.0 DISCUSSION OF ON-ROAD MOBILE SOURCES

On-road mobile sources produce emissions of a host of pollutants. For the purpose of this maintenance plan, only the ozone precursor pollutants, NOx and VOC are estimated. The objective of this section is to describe the source category, the input files, and the emissions estimation procedures. This section also includes tables summarizing the estimated emissions for the projection years by county.

4.1 INTRODUCTION AND SCOPE

On-road highway mobile sources are considered as those vehicles that travel on the roadways. On-road mobile sources are a major contributor to NOx emissions in North Carolina and a less significant contributor to VOC emissions since naturally occurring are ~ 90% of the total VOC emitted. 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.

A very important component of the highway mobile emission estimation process is interagency consultation. The primary transportation partners involved in the Metrolina interagency consultation process included: NCDOT, USEPA, Federal Highway Administration (FHWA), Cabarrus-Rowan municipal planning organization (MPO), Mecklenburg-Union MPO (MUMPO), Lake Norman regional planning organization (RPO), Rocky River RPO and Mecklenburg County Air Quality (MCAQ). Specifically, MUMPO and NCDOT run the travel demand model (TDM) for the area and provide speeds and vehicle miles traveled (VMT). The NCDAQ consulted with the transportation partners for the appropriate speeds and VMT to use as well as Motor Vehicle Emissions Budget (MVEB) for transportation conformity purposes.

4.2 MOVES INPUT ASSUMPTIONS

The following documents the data used to create the MOVES input files. Due to the size and the complexity of the MOVES input and output files, the MOVES input files and output files will be provided electronically.

4.2.1 Speed Assumptions

Vehicle power, speed, and acceleration have a significant effect on vehicle emissions. MOVES models those emission effects by assigning activity to specific drive cycles or operating mode distributions. The distribution of vehicle hours traveled (VHT) by average speed was used to determine an appropriate operating mode distribution. The Average Speed Distribution importer in MOVES calls for a speed distribution in VHT in 16 speed bins, by each road type, source type, and hour of the day included in the analysis. The methodology used to develop the average speed distribution inputs is documented below.

The speeds were generated from the region's TDM. Speeds were provided for 2010, 2013, 2016, 2019, 2022 and 2025 for four time periods during the day; AM Peak, Midday, PM Peak and Night. Tables 4.2.1 provides a summary of the speeds in miles per hour (mph) for the Metrolina area. 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		UMA	Urban Minor Arterial
RMiC	Rural Minor Collector		UC	Urban Collector
RL	Rural Local		UL	Urban Local
			UH	Urban HOV

Table 4.2.1 Regional Model Speeds for the Metrolina Area (miles/hour)

Year	Time	RI	RPA	RMA	RMjC	RMiC	RL	UI	UF	UPA	UMA	UC	UL	UH
Cabarrus														
2010	AM	NA	48	52	42	40	28	41	NA	31	30	29	24	NA
	Midday	NA	53	58	47	44	28	66	NA	34	31	31	22	NA
	PM	NA	49	48	40	39	28	37	NA	28	28	27	22	NA
	Night	NA	57	60	52	47	28	68	NA	42	39	38	26	NA
2013	AM	NA	49	51	38	39	28	44	NA	30	29	27	24	NA
	Midday	NA	53	55	43	42	28	66	NA	33	31	30	22	NA
	PM	NA	48	48	36	37	28	40	NA	28	27	25	22	NA
	Night	NA	56	59	51	46	28	68	NA	41	39	38	25	NA
2016	AM	NA	48	51	37	38	27	41	NA	29	28	26	23	NA
	Midday	NA	52	55	41	41	28	63	NA	31	30	29	21	NA
	PM	NA	48	47	34	36	28	36	NA	25	25	23	22	NA
	Night	NA	56	59	49	46	28	68	NA	40	39	37	25	NA
2019	AM	NA	47	48	36	37	27	39	NA	28	27	25	23	NA
	Midday	NA	51	53	40	41	27	61	NA	30	29	28	22	NA
	PM	NA	47	44	33	34	28	33	NA	24	24	23	22	NA
	Night	NA	56	56	49	45	28	68	NA	40	38	37	25	NA
2022	AM	NA	45	47	34	36	27	43	NA	27	27	23	23	NA
	Midday	NA	50	52	38	40	27	62	NA	30	29	28	21	NA
	PM	NA	46	45	31	33	27	39	NA	24	24	21	22	NA
	Night	NA	55	56	48	45	28	68	NA	40	38	37	25	NA
2025	AM	NA	45	45	33	35	26	42	NA	26	26	23	22	NA
	Midday	NA	50	51	37	38	27	61	NA	29	28	27	21	NA
	PM	NA	45	43	31	33	27	38	NA	23	23	21	22	NA
	Night	NA	55	54	47	43	28	68	NA	40	38	36	25	NA

Year	Time	RI	RPA	RMA	RMjC	RMiC	RL	UI	UF	UPA	UMA	UC	UL	UH
Gaston														
2010	AM	61	57	43	42	40	28	43	52	30	31	29	24	NA
	Midday	63	58	54	49	40	28	63	55	34	35	29	24	NA
	PM	56	57	45	41	39	29	43	52	29	30	25	24	NA
	Night	63	58	57	51	41	28	63	56	39	40	33	24	NA
2013	AM	60	57	39	41	39	28	42	52	30	29	29	24	NA
	Midday	63	58	53	48	40	28	63	54	34	35	29	24	NA
	PM	55	57	41	41	39	28	41	52	28	29	25	24	NA
	Night	63	58	57	51	41	28	63	56	39	39	34	24	NA
2016	AM	59	56	36	39	39	28	44	50	31	30	28	24	NA
	Midday	63	63	49	47	40	28	62	53	34	35	31	24	NA
	PM	54	56	39	38	39	28	42	49	29	30	25	24	NA
	Night	63	63	53	51	40	28	63	56	39	39	36	24	NA
2019	AM	57	54	34	37	39	28	42	50	30	29	28	24	NA
	Midday	63	63	48	45	40	28	62	53	34	34	30	24	NA
	PM	50	53	37	36	38	28	40	48	28	29	24	24	NA
	Night	63	63	53	50	40	27	63	56	39	39	36	25	NA
2022	AM	55	51	31	35	37	28	40	49	29	28	27	24	NA
	Midday	62	63	46	43	39	27	62	53	34	34	30	24	NA
	PM	46	51	35	34	37	28	38	48	27	28	24	24	NA
	Night	63	63	52	50	40	27	63	55	39	39	36	25	NA
2025	AM	51	46	30	34	36	28	41	48	30	28	27	24	NA
	Midday	62	63	45	42	38	27	61	52	34	34	29	24	NA
	PM	40	45	33	33	36	28	38	48	28	28	24	24	NA
	Night	63	64	51	49	39	27	63	55	39	39	35	25	NA
Iredell														
2010	AM	59	NA	16	30	26	30	53	NA	25	26	17	24	NA
	Midday	68	NA	16	34	28	30	65	NA	25	26	17	25	NA
	PM	61	NA	12	26	27	29	53	NA	21	23	16	24	NA
	Night	68	NA	33	43	39	31	68	NA	36	36	35	26	NA
2013	AM	53	NA	15	28	26	29	48	NA	25	25	27	25	NA
	Midday	68	NA	14	34	28	29	61	NA	25	27	27	25	NA
	PM	56	NA	12	25	28	28	44	NA	21	23	23	24	NA
	Night	68	NA	32	42	42	30	68	NA	36	36	38	26	NA
2016	AM	43	NA	13	27	25	29	43	NA	23	25	25	25	NA
	Midday	67	NA	13	32	28	29	57	NA	25	25	25	25	NA
	PM	49	NA	12	24	27	28	39	NA	21	22	23	24	NA
	Night	68	NA	30	41	43	30	68	NA	35	35	39	26	NA

Year	Time	RI	RPA	RMA	RMjC	RMiC	RL	UI	UF	UPA	UMA	UC	UL	UH
Iredell (continued)														
2019	AM	35	NA	12	24	24	28	38	NA	22	24	24	24	NA
	Midday	66	NA	12	30	29	28	55	NA	24	25	24	24	NA
	PM	41	NA	11	21	26	27	35	NA	19	20	22	23	NA
	Night	68	NA	28	40	43	30	68	NA	34	35	37	26	NA
2022	AM	26	NA	11	22	23	28	34	NA	22	23	23	24	NA
	Midday	64	NA	11	28	28	28	51	NA	23	24	24	24	NA
	PM	33	NA	11	19	25	26	31	NA	18	19	21	23	NA
	Night	68	NA	27	39	44	30	68	NA	33	35	37	26	NA
2025	AM	68	NA	10	25	21	27	51	NA	20	22	22	24	66
	Midday	68	NA	11	26	26	28	62	NA	21	23	23	24	69
	PM	68	NA	10	19	22	26	50	NA	17	18	20	22	47
	Night	68	NA	25	39	42	30	68	NA	33	34	36	26	69
Lincoln														
2010	AM	NA	57	42	56	43	28	NA	68	32	34	35	26	NA
	Midday	NA	62	44	57	46	28	NA	68	36	38	37	26	NA
	PM	NA	57	35	56	43	29	NA	68	30	33	34	25	NA
	Night	NA	66	51	58	47	28	NA	68	43	44	39	27	NA
2013	AM	NA	56	46	56	44	28	NA	68	36	35	34	26	NA
	Midday	NA	61	49	57	46	28	NA	68	39	38	36	26	NA
	PM	NA	54	43	55	44	28	NA	68	35	33	33	25	NA
	Night	NA	65	55	58	47	28	NA	68	45	44	39	27	NA
2016	AM	NA	53	45	55	43	28	NA	68	35	34	33	25	NA
	Midday	NA	60	47	57	46	28	NA	68	38	37	36	25	NA
	PM	NA	52	42	55	43	28	NA	68	34	32	32	25	NA
	Night	NA	65	53	58	47	28	NA	68	44	43	39	26	NA
2019	AM	NA	52	44	55	43	28	NA	68	34	33	32	25	NA
	Midday	NA	59	46	56	45	28	NA	68	37	36	35	25	NA
	PM	NA	51	41	54	42	28	NA	68	33	31	31	24	NA
	Night	NA	65	52	58	47	28	NA	68	44	43	39	26	NA
2022	AM	NA	51	44	53	42	28	NA	68	33	32	32	25	NA
	Midday	NA	58	45	55	45	28	NA	68	37	35	35	25	NA
	PM	NA	50	39	52	41	28	NA	68	32	31	31	24	NA
	Night	NA	64	51	56	47	28	NA	68	43	43	39	26	NA
2025	AM	NA	50	42	53	41	28	NA	68	33	31	31	25	NA
	Midday	NA	57	43	55	44	28	NA	68	36	34	34	25	NA
	PM	NA	49	38	52	40	28	NA	68	31	29	30	24	NA
	Night	NA	64	49	56	47	28	NA	68	42	42	38	26	NA

Year	Time	RI	RPA	RMA	RMjC	RMiC	RL	UI	UF	UPA	UMA	UC	UL	UH
Mecklenburg														
2010	AM	NA	36	32	30	37	30	46	49	24	24	22	22	63
	Midday	NA	45	43	40	42	29	58	55	28	28	27	21	65
	PM	NA	37	38	31	36	30	42	47	22	23	21	19	66
	Night	NA	49	45	46	45	29	62	58	37	37	36	24	NA
2013	AM	NA	33	30	30	35	29	44	49	24	24	21	22	63
	Midday	NA	43	42	39	40	29	57	55	27	27	26	21	65
	PM	NA	34	37	29	34	29	40	46	21	22	20	19	66
	Night	NA	48	45	46	45	29	62	58	37	37	35	24	NA
2016	AM	NA	33	29	32	34	29	44	51	23	24	21	21	66
	Midday	NA	43	40	39	40	29	55	57	27	27	25	20	67
	PM	NA	34	36	30	32	29	41	47	21	22	20	19	67
	Night	NA	49	45	46	45	29	63	60	37	36	35	24	NA
2019	AM	NA	32	27	30	32	29	42	51	23	23	20	21	66
	Midday	NA	42	39	37	39	29	53	57	26	26	25	20	67
	PM	NA	33	34	28	30	29	39	47	20	21	19	19	67
	Night	NA	49	45	45	44	29	63	60	36	36	35	24	NA
2022	AM	NA	30	25	29	30	28	41	49	22	22	19	21	66
	Midday	NA	40	38	36	38	29	52	57	25	26	24	20	67
	PM	NA	31	32	27	28	28	38	46	19	20	18	18	67
	Night	NA	48	45	45	44	29	61	60	36	36	35	24	0
2025	AM	NA	29	24	29	31	28	43	50	22	22	19	21	66
	Midday	NA	39	37	36	37	29	55	57	25	25	23	20	68
	PM	NA	32	31	29	29	28	41	45	19	20	18	18	58
	Night	NA	48	44	45	44	29	62	60	35	36	35	24	69
Rowan														
2010	AM	NA	33	55	52	46	29	60	NA	39	35	33	24	NA
	Midday	NA	51	58	55	49	29	65	NA	39	35	31	23	NA
	PM	NA	42	54	51	46	29	59	NA	37	33	28	22	NA
	Night	NA	59	60	58	50	29	67	NA	45	41	38	25	NA
2013	AM	NA	54	54	51	46	29	59	NA	38	34	33	24	NA
	Midday	NA	58	58	55	49	29	65	NA	39	35	30	24	NA
	PM	NA	55	53	51	46	29	58	NA	36	32	28	23	NA
	Night	NA	60	60	58	50	29	67	NA	44	41	37	25	NA
2016	AM	NA	53	54	50	45	29	58	NA	37	33	32	24	NA
	Midday	NA	58	57	54	48	29	64	NA	38	34	29	24	NA
	PM	NA	54	52	49	44	29	57	NA	35	31	27	23	NA
	Night	NA	60	60	57	50	29	67	NA	44	41	37	25	NA

Year	Time	RI	RPA	RMA	RMjC	RMiC	RL	UI	UF	UPA	UMA	UC	UL	UH
Rowan (continued)														
	AM	NA	52	53	49	44	29	57	NA	37	33	31	24	NA
	Midday	NA	57	57	53	48	29	63	NA	38	34	29	24	NA
	PM	NA	53	51	48	43	29	56	NA	35	31	26	23	NA
2019	Night	NA	60	60	56	49	29	67	NA	44	40	37	25	NA
	AM	NA	51	51	48	43	29	61	NA	36	32	31	24	NA
	Midday	NA	57	56	53	47	29	63	NA	38	33	28	24	NA
	PM	NA	51	50	47	42	29	60	NA	34	30	26	23	NA
2022	Night	NA	60	60	56	49	29	66	NA	44	40	37	25	NA
	AM	NA	50	51	47	43	29	60	NA	36	31	30	24	NA
	Midday	NA	56	56	52	47	29	62	NA	38	33	28	24	NA
	PM	NA	51	49	46	42	29	60	NA	33	29	26	23	NA
2025	Night	NA	60	59	56	49	29	66	NA	44	40	37	25	NA
Union														
	AM	NA	50	48	45	45	31	NA	29	34	28	33	26	NA
	Midday	NA	52	51	48	47	30	NA	38	38	31	36	27	NA
	PM	NA	51	47	45	45	31	NA	28	32	26	30	26	NA
2010	Night	NA	53	56	52	48	31	NA	47	44	39	43	28	NA
	AM	NA	50	47	44	44	31	NA	27	33	27	31	26	NA
	Midday	NA	52	50	47	46	30	NA	36	37	30	35	27	NA
	PM	NA	51	45	44	44	31	NA	27	31	25	28	26	NA
2013	Night	NA	53	56	51	48	30	NA	46	44	38	42	28	NA
	AM	NA	52	39	43	43	31	NA	44	36	26	29	26	NA
	Midday	NA	54	43	46	45	30	NA	53	38	29	33	26	NA
	PM	NA	53	38	42	41	31	NA	50	33	23	26	26	NA
2016	Night	NA	55	51	50	47	31	NA	54	44	38	41	28	NA
	AM	NA	52	38	41	42	30	NA	41	35	25	28	25	NA
	Midday	NA	53	41	44	45	30	NA	53	38	29	32	26	NA
	PM	NA	53	37	40	40	30	NA	49	33	23	25	25	NA
2019	Night	NA	55	51	50	48	31	NA	54	44	38	41	28	NA
	AM	NA	52	39	43	43	31	NA	44	36	26	29	26	NA
	Midday	NA	54	43	46	45	30	NA	53	38	29	33	26	NA
	PM	NA	53	38	42	41	31	NA	50	33	23	26	26	NA
2022	Night	NA	55	51	50	47	31	NA	54	44	38	41	28	NA
	AM	NA	51	31	38	40	30	NA	39	34	25	27	25	NA
	Midday	NA	53	36	41	43	30	NA	55	37	29	31	26	NA
	PM	NA	51	32	37	37	30	NA	43	31	23	24	25	NA
2025	Night	NA	54	44	48	47	31	NA	57	44	38	40	28	NA

MOVES uses four different roadway type categories that are affected by the average speed distribution input: rural restricted access, rural unrestricted access, urban restricted access, and urban unrestricted access (these road types are discussed in more detail in Section 4.2.6). In MOVES, local roadways are included with arterials and collectors in the urban and rural unrestricted access roads category. The USEPA recommends that the average speed distribution for local roadway activity be included as part of a weighted distribution of average speed across all unrestricted roads along with the distribution of average speeds for arterials and connectors.

When only a single average speed is available for a specific road type and that average speed is not identical to the average speed in a particular speed bin, MOVES guidance stipulates that users should apply the following formula for creating the appropriate speed distribution among two adjacent speed bins.

The general formula is:

VHT Fraction A in Speed Bin with closest average speed lower than observed average speed +
VHT Fraction B in Speed Bin with closest average speed higher that observed average speed = 1

VHT Fraction $A_{(low\ bin)}$ = 1 – [(observed average speed – average speed of lower speed bin) / (average speed of higher speed bin – average speed of lower speed bin)]

VHT Fraction $B_{(high\ bin)}$ = 1- [(average speed of higher speed bin – observed average speed) / (average speed of higher speed bin – average speed of lower speed bin)]

Or more simply: VHT Fraction B = 1 – VHT fraction A

The following is an example of applying the above equations. If the single average speed for a roadway is 58 miles per hour, the average speed distribution will be split between the 55 and 60 mph speed bins. The appropriate VHT fractions are found with the following equations:

VHT fraction $A_{(low\ bin)}$ = 1 – [(58 mph Avg. Speed – 55 mph (Bin Speed)) / (60 mph (Bin Speed) – 55 mph (Bin Speed)] = 0.4

VHT fraction $B_{(high\ bin)}$ = 1 – [(60 mph (Bin Speed) – 58 mph Avg. Speed) / (60 mph (Bin Speed) – 55 mph (Bin Speed)] = 0.6

VHT Fraction $A_{(low\ bin)}$ + VHT Fraction $B_{(high\ bin)}$ = 1

0.4 + 0.6 = 1

As stated above, MOVES uses only four different roadway types: rural restricted access, rural unrestricted access, urban restricted access and urban unrestricted access. This means that the speeds for multiple roadway types need to be combined into the appropriate speed bins. To create the speed bin fractions for combined roadways the VMT for each road way is used to weight the speed bin fraction. For example, below are speeds and VMT for urban restricted access road types:

Road type	Speed (miles/hour)	VMT (hourly miles)
Urban Interstate	63	250,000
Urban Freeway	56	100,000

The first step is to determine the speed bin fractions for each road type separately. For the urban interstate road type, the speed 63 is split between the MOVES speed bins of 60 and 65 as described above, which results in the VHT fractions of 0.4 and 0.6 for speed bins 60 and 65, respectively. Similarly, the speed for the urban freeway road type (56 miles/hour) is split between the MOVES speed bins of 55 and 60 and results in the VHT fractions of 0.8 and 0.2, respectively.

The next step requires road type VMT to weigh the VHT Fractions so that the final MOVES speed bin fractions can be developed. The VHT Fraction, specific to the road type and speed bin, are multiplied by the corresponding hourly VMT. These hourly totals are divided by the total VMT for that hour for the road type category (in this example, urban restricted access includes urban interstate and urban freeway). The following equation is used to calculate the combined speed bin fractions:

$$VHT_{(Speed\ Bin\ X)} = \left[\sum (VHT\ Fraction_{(RT)} \times hourly\ VMT_{(RT)})\right] \div \left[\sum hourly\ VMT_{(RT)}\right]$$

Where:

RT = the HPMS road type

In this example, the Highway Performance Monitoring System (HPMS) road types are urban interstate (UI) and urban freeway (UF) and the speed bins are 55, 60 and 65. The table below summarizes the speed bin fractions for this example.

HPMS Road Type	Speed Bin 55	Speed Bin 60	Speed Bin 65
Urban Interstate	0.0	0.4	0.6
Urban Freeway	0.8	0.2	0.0

Using the equation below, the final MOVES speed bin fractions are calculated for the urban restricted access road type.

$$VHT_{(\text{Speed Bin X})} = \frac{[(\text{VHT Fraction}_{(UI)} * \text{hourly VMT}_{(UI)}) + (\text{VHT Fraction}_{(UF)} * \text{hourly VMT}_{(UF)})]}{(\text{hourly VMT}_{(UI)} + \text{hourly VMT}_{(UF)})}$$

$$VHT_{(\text{Speed Bin 55})} = \frac{[(0.0 * 250{,}000) + (0.8 * 100{,}000)]}{(250{,}000 + 100{,}000)}$$

$$VHT_{(\text{Speed Bin 55})} = 0.2286$$

$$VHT_{(\text{Speed Bin 60})} = \frac{[(0.4 * 250{,}000) + (0.2 * 100{,}000)]}{(250{,}000 + 100{,}000)}$$

$$VHT_{(\text{Speed Bin 60})} = 0.3428$$

$$VHT_{(\text{Speed Bin 65})} = \frac{[(0.6 * 250{,}000) + (0.0 * 100{,}000)]}{(250{,}000 + 100{,}000)}$$

$$VHT_{(\text{Speed Bin 65})} = 0.4286$$

The sum of the VHT fractions for all speed bins within a road type category must add up to 1.0. The hourly VHT fractions by speed bin and road type are then processed through a MOVES supplied converter to develop the speed distribution file by hour and road type.

4.2.2 Vehicle Age Distribution

The age distribution of vehicle fleets can vary significantly from area to area. Fleets with a higher percentage of older vehicles will have higher emissions for two reasons. Older vehicles have typically been driven more miles and have experienced more deterioration in emission control systems. Additionally, a higher percentage of older vehicles also implies that there are more vehicles in the fleet that do not meet newer, more stringent emissions standards. Surveys of registration data indicate considerable local variability in vehicle age distributions.

For SIP and conformity purposes, the USEPA recommends and encourages states to develop local age distributions. A typical vehicle fleet includes a mix of vehicles of different ages. MOVES covers a 31 year range of vehicle ages, with vehicles 30 years and older grouped together. MOVES allows the user to specify the fraction of vehicles in each of 30 vehicle ages for each of the 13 source types in the model.

Local age distributions can be estimated from local vehicle registration data. The vehicle age distribution comes from annual registration data for North Carolina from the NCDOT. For this analysis, the age distribution was generated based on the 2010 data. The NCDOT provided the data based on the number of vehicle types per year from 1974 through 2010. Since MOVES categorizes the vehicle fleet into different vehicle classes and more model years, EPA has created data converters that take registration distribution input files created for MOBILE6.2 and converts them to the appropriate age distribution input tables for MOVES. 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).

4.2.3 Vehicle Mix Assumptions

Vehicle mix or VMT mix is used by MOVES to convert annual VMT to VMT by HPMS class, VMT fractions by hour, and VMT by road type distribution. The vehicle mix is developed by the same method used in MOBILE6.2, as outlined below. The resulting file is used in a MOVES supplied converter to develop the VMT by HPMS class, VMT fractions by hour, and VMT by road type distribution.

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 on-road mobile emissions in an area to use data that accurately reflects the vehicles types traveling on each of these different road types.

In August 2004, the USEPA released the guidance document EPA420-R-04-013, <u>Technical Guidance on the Use of MOBILE6.2 for Emission Inventory Preparation</u>, which outlines how to convert the Highway Performance Monitoring System (HPMS) traffic count data to MOBILE6.2 vehicle mix data. Outlined below is the methodology used to convert the 13 HPMS vehicle types count data reported to FHWA and generate a state specific vehicle mix.

The North Carolina HPMS data used to generate the statewide vehicle mix was based on 2009. The use of the 2009 data for all years is described below. Table 4.2.3-1, given on the following page, shows the percent of vehicles per vehicle type for each of the 12 road classes.

Table 4.2.3-1 2009 North Carolina HPMS Data

FC	Functional Classification	Samples	MC	Cars	2A4T	Bus	2ASU	3ASU	4ASU	4AST	5AST	6AST	5AMT	6AMT	7AMT
1	Rural Principal Arterial - Interstate	33	0.0036	0.6500	0.1340	0.0066	0.0245	0.0077	0.0004	0.0129	0.1529	0.0017	0.0038	0.0017	0.0004
2	Rural Principal Arterial	80	0.0070	0.6669	0.1851	0.0085	0.0348	0.0114	0.0009	0.0154	0.0646	0.0029	0.0014	0.0006	0.0005
6	Rural Minor Arterial	23	0.0054	0.7099	0.1774	0.0079	0.0307	0.0105	0.0009	0.0091	0.0450	0.0023	0.0002	0.0000	0.0005
7	Rural Major Collector	22	0.0046	0.6629	0.2215	0.0079	0.0392	0.0098	0.0004	0.0125	0.0390	0.0018	0.0001	0.0001	0.0002
8	Rural Minor Collector	22	0.0076	0.6990	0.2030	0.0077	0.0408	0.0088	0.0007	0.0102	0.0199	0.0019	0.0001	0.0000	0.0003
9	Rural Local System	30	0.0105	0.6611	0.2231	0.0179	0.0537	0.0133	0.0012	0.0096	0.0081	0.0012	0.0000	0.0000	0.0003
11	Urban Principal Arterial - Interstate	80	0.0040	0.7167	0.1507	0.0063	0.0237	0.0073	0.0004	0.0069	0.0803	0.0009	0.0018	0.0008	0.0002
12	Urban Principal Arterial - Frwy/Expwy	54	0.0055	0.7194	0.1711	0.0066	0.0272	0.0085	0.0007	0.0121	0.0454	0.0011	0.0017	0.0005	0.0001
14	Urban Principal Arterial	59	0.0048	0.7303	0.1787	0.0064	0.0282	0.0085	0.0012	0.0089	0.0297	0.0021	0.0004	0.0004	0.0003
16	Urban Minor Arterial	29	0.0053	0.7647	0.1622	0.0073	0.0268	0.0095	0.0012	0.0081	0.0118	0.0013	0.0016	0.0000	0.0003
17	Urban Collector	32	0.0065	0.7659	0.1720	0.0073	0.0274	0.0083	0.0005	0.0051	0.0062	0.0006	0.0000	0.0000	0.0001
19	Urban Local System	16	0.0095	0.7321	0.1814	0.0209	0.0353	0.0087	0.0003	0.0049	0.0060	0.0009	0.0000	0.0001	0.0000

4.2.4 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 MOBILE6.2 vehicle categories. This mapping is outlined below:

Table 4.2.4-1 Mapping of HPMS data to MOBILE6.2 Categories

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 4.2.3-1 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 2009 fractions were used since the state specific data is from 2009. 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 4.2.3-1 above:

Passenger Cars	=	65.00%	5 axel Trailer	=	15.29%
Pickup Trucks	=	13.40%	6 axel Trailer	=	0.17%
Bus	=	0.66%	5 axel Multi Trailer	=	0.38%
2 axel Trucks	=	2.45%	6 axel Multi Trailer	=	0.17%
3 axel Trucks	=	0.77%	7 axel Multi Trailer	=	0.04%
4 axel Trucks	=	0.04%	Motorcycles	=	0.36%
4 axel Trailer	=	1.29%			

Therefore, the five general categories are:

Motorcycles	=	0.36%	Heavy Duty Buses	=	0.66%
Light Duty Vehicles	=	65.00%	Heavy Duty Vehicles	=	20.60%
Light Duty Trucks	=	13.40%			

From Table 4.1.2 in Technical Guidance on the Use of MOBILE6.2 for Emission Inventory Preparation, the 2009 national average vehicle mix for light duty vehicles is 0.3669, and the light duty trucks, buses and heavy duty trucks are listed below:

Light Duty Trucks		
LDT1	=	0.0869
LDT2	=	0.2894
LDT3	=	0.0892
LDT4	=	0.041
Total	**=**	**0.5065**

Busses		
HDBS	=	0.002
HDBT	=	0.001
Total	**=**	**0.003**

Heavy Duty Trucks		
HDV2B	=	0.0389
HDV3	=	0.0038
HDV4	=	0.0032
HDV5	=	0.0024
HDV6	=	0.0087
HDV7	=	0.0103
HDV8A	=	0.0112
HDV8B	=	0.0398
Total	=	**0.1183**

Using the methodology described in Section 4.1.5 in Technical Guidance on the Use of MOBILE6.2 for Emission Inventory Preparation the new 2009 North Carolina statewide mix was developed. The one deviation from the guidance was that the NCDAQ grouped the light duty vehicles with the light duty trucks to normalize the vehicle mix. This was done because it is difficult to distinguish between light duty vehicles from light duty trucks in the count data. The basic formula for developing the mix is shown below,

$$\text{Vehicle Type} = \frac{\text{(2009 M6.2 fraction for vehicle)} * \text{(2009 State total for group)}}{\text{(2009 M6.2 total for subcategory)}}$$

Table 4.2.4-2 displays the calculation for each vehicle type for the 2009 rural interstate vehicle mix.

Table 4.2.4-2 Calculation of New 2009 Statewide Rural Interstate Vehicle Mix

Vehicle Type		Calculation		New 2009 Mix
MC	=	MC	=	0.0036
Light Duty Vehicles and Trucks				
LDV	=	0.3669 x (0.7840/0.8734)	=	0.3293
LDT1	=	0.0869 x (0.7840/0.8734)	=	0.0780
LDT2	=	0.2894 x (0.7840/0.8734)	=	0.2598
LDT3	=	0.0892 x (0.7840/0.8734)	=	0.0801
LDT4	=	0.0410 x (0.7840/0.8734)	=	0.0368
Heavy Duty Vehicles				
HDV2B	=	0.0389 x (0.2060/0.1183)	=	0.0677
HDV3	=	0.0038 x (0.2060/0.1183)	=	0.0066
HDV4	=	0.0032 x (0.2060/0.1183)	=	0.0056
HDV5	=	0.0024 x (0.2060/0.1183)	=	0.0042
HDV6	=	0.0087 x (0.2060/0.1183)	=	0.0151
HDV7	=	0.0103 x (0.2060/0.1183)	=	0.0179
HDV8A	=	0.0112 x (0.2060/0.1183)	=	0.0195
HDV8B	=	0.0398 x (0.2060/0.1183)	=	0.0693
Buses				
HDBS	=	0.0020 x (0.0066/0.0030)	=	0.0044
HDBT	=	0.0010 x (0.0066/0.0030)	=	0.0022

2010 Statewide Vehicle Mix

Once the 2009 new 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	=	78.75%
Heavy Duty Vehicles	=	21.25%

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 2010 are listed below.

Light Duty Vehicles		
LDV	=	0.3544
LDT1	=	0.0891
LDT2	=	0.2965
LDT3	=	0.0914
LDT4	=	0.042
MC	=	0.0054
Total	**=**	**0.8788**

Heavy Duty Vehicles		
HDV2B	=	0.039
HDV3	=	0.0038
HDV4	=	0.0032
HDV5	=	0.0024
HDV6	=	0.0087
HDV7	=	0.0103
HDV8A	=	0.0112
HDV8B	=	0.0399
HDBS	=	0.002
HDBT	=	0.001
Total	**=**	**0.1215**

The North Carolina 2010 vehicle mix was created using the MOBILE6.2 fractions using the following formula:

$$\text{Vehicle Type} = (\text{2010 M6 fraction for vehicle}) \times \frac{(\text{2009 State total for group})}{(\text{2010 M6 total for group})}$$

Table 4.2.4-3 below displays the calculations used to generate the 2010 North Carolina vehicle mix for rural interstate.

Table 4.2.4-3 Calculation of 2010 Statewide Rural Interstate Vehicle Mix

Vehicle Type		Calculation		2010 State Mix
Light Duty Vehicles				
LDV	=	0.3544 x (0.7875/0.8788)	=	0.3176
LDT1	=	0.0891 x (0.7875/0.8788)	=	0.0798
LDT2	=	0.2965 x (0.7875/0.8788)	=	0.2657
LDT3	=	0.0914 x (0.7875/0.8788)	=	0.0819
LDT4	=	0.0420 x (0.7875/0.8788)	=	0.0376
MC	=	0.0054 x (0.7875/0.8788)		0.0048
Heavy Duty Vehicles				
HDV2B	=	0.0390 x (0.2125/0.1215)	=	0.0682
HDV3	=	0.0038 x (0.2125/0.1215)	=	0.0066
HDV4	=	0.0032 x (0.2125/0.1215)	=	0.0056
HDV5	=	0.0024 x (0.2125/0.1215)	=	0.0042
HDV6	=	0.0087 x (0.2125/0.1215)	=	0.0152
HDV7	=	0.0103 x (0.2125/0.1215)	=	0.0180
HDV8A	=	0.0112 x (0.2125/0.1215)	=	0.0196
HDV8B	=	0.0399 x (0.2125/0.1215)	=	0.0698
HDBS	=	0.0020 x (0.2125/0.1215)	=	0.0035
HDBT	=	0.0010 x (0.2125/0.1215)	=	0.0017

This method was used to generate the other years vehicle mixes as well. The North Carolina transportation partners consider the statewide vehicle mix to be the best representation of the vehicle population in the Metrolina nonattainment area. The MOVES model requires that the total vehicle mix equals 1.0000, therefore when the mix totals slightly more than or less than 1.0000, the vehicle mix for LDV is adjusted to account for the difference. For example, the following 2010 mix sums to 0.9998, therefore the final vehicle mix fraction for LDV will be 0.3178 so that the total vehicle mix for rural interstates will be 1.0000. The vehicle mixes for all years can be found in Section 5.1 of this appendix.

As stated earlier in this section, vehicle mix or VMT mix is used in MOVES converters to develop VMT by HPMS class, VMT fractions by hour, and VMT by road type distribution, which are inputs to the model.

4.2.5 Vehicles/Equipment: On-Road Vehicle Equipment

The Vehicles/Equipment menu item and panel is used to specify the vehicle types that are included in the MOVES run. MOVES allows the user to select from among 13 "source use types" (the terminology that MOVES uses to describe vehicle types), and four different fuel types (gasoline, diesel, compressed natural gas (CNG), and electricity).

Users must select the appropriate fuel and vehicle type combinations in the On Road Vehicle Equipment panel to reflect the full range of vehicles that will operate in the county. In general, users should simply select all valid diesel, gasoline, and CNG (only transit buses) vehicle and fuel combinations, unless data is available showing that some vehicles or fuels are not used in the area of analysis.

4.2.6 Road Type

The Road Type Panel is used to define the types of roads that are included in the run. MOVES defines five different Road Types:

- Off-Network (roadtype 1) – all locations where the predominant activity is vehicle starts, parking and idling (parking lots, truck stops, rest areas, freight or bus terminals)
- Rural Restricted Access (2) – rural highways that can only be accessed by an on-ramp
- Rural Unrestricted Access (3) – all other rural roads (arterials, connectors, and local streets)
- Urban Restricted Access (4) – urban highways or freeways that can only be accessed by an on-ramp
- Urban Unrestricted Access (5) – all other urban roads (arterials, connectors, and local streets)

Users should select the road types present in the area being analyzed. The determination of rural or urban road types should be based on the HPMS classification of the roads in the county being analyzed.

The NCDAQ followed the USEPA guidance that states that all SIP and regional conformity analyses must include the Off-Network road type in order to account for emissions from vehicle starts, extended idle activity, and evaporative emissions (for VOCs). The Off-Network road type is automatically selected when start or extended idle pollutant processes are chosen and must be selected for all evaporative emissions to be quantified. Off-Network activity in MOVES is primarily determined by the Source Type Population input, which is described in Section 4.2.9 of this document. Some evaporative emissions are estimated on roadways (i.e., roadtypes 2, 3, 4, and 5) to account for evaporative emissions that occur when vehicles are driving. All roads types are automatically selected when Refueling emission processes are selected.

MOVES uses Road Type to assign default drive cycles to activity on road types 2, 3, 4, and 5. For example, for unrestricted access road types, MOVES uses drive cycles that assume stop and go driving, including multiple accelerations, decelerations, and short periods of idling. For restricted access road types, MOVES uses drive cycles that include a higher fraction of cruise activity with less time spent accelerating or idling, although some ramp activity is also included.

4.2.7 Pollutants and Processes

In MOVES, pollutant refers to particular types of pollutants or precursors of the pollutant, such as NOx or VOCs, while process refers to the mechanism by which emissions are created, such as running exhaust or start exhaust. Users must select all processes associated with a particular pollutant in order to account for all emissions of that pollutant. For example, there are 11 separate pollutant processes in MOVES for VOC, i.e. hydrocarbon emissions; all 11 must be selected when estimating VOC emissions. For this maintenance plan the pollutants under consideration were NOx and VOC.

4.2.8 Temperature and Relative Humidity Assumptions

Local temperature and humidity data are required inputs for MOVES. Ambient temperature is a key factor in estimating emission rates for on-road vehicles with substantial effects on most pollutant processes. Relative humidity is also important for estimating NOx emissions from motor vehicles. MOVES requires a temperature (in degrees Fahrenheit) and relative humidity (in percent – 0 to 100 scale) for each hour selected in the Run Spec. For example, MOVES requires a 24-hour temperature and humidity profile to model a full day of emissions on an hourly basis. For mobile source emission estimates, the NCDAQ used 2010 July monthly averages for the 24-hour temperature and relative humidity profiles from the Charlotte-Douglas International Airport (KCLT). Data were obtained North Carolina State Climate Retrieval and Observations Network of the Southeast Database (CRONOS). The temperature and relative humidity profiles as presented in the MOVES input files are listed in Section 5.2.

4.2.9 Source Type Population

Source type (i.e., vehicle type) population is used by MOVES to calculate start and evaporative emissions. In MOVES, start and resting evaporative emissions are related to the population of vehicles in an area. Since vehicle type population directly determines start and evaporative emission, users must develop local data for this input.

MOVES uses a vehicle classification system based on the way vehicles are classified in the Federal Highway Administration's HPMS rather than on the way they are classified in the USEPA emissions regulations; thus making it easier for users to develop local data for MOVES. MOVES categorizes vehicles into 13 source types, which are subsets of 6 HPMS vehicle types in MOVES, as shown in the crosswalk in Table 4.2.9-1. The USEPA believes that states should be able to develop population data for many of these source type categories from state motor vehicle registration data (e.g., motorcycles, passenger cars, passenger trucks, light commercial trucks) and from local transit agencies, school districts, bus companies, and refuse haulers (intercity, transit, and school buses, and refuse trucks). The NCDOT supplied the NCDAQ with source population data as described in the following section.

Table 4.2.9-1 MOVES Source Types and HPMS Vehicle Types

Source Type ID	Source Types	HPMS Vehicle Type ID	HPMS Vehicle Type
11	Motorcycle	10	Motorcycles
21	Passenger Car	20	Passenger Cars
31	Passenger Truck	30	Other 2 axle-4 tire vehicles
32	Light Commercial Truck	30	Other 2 axle-4 tire vehicles
41	Intercity Bus	40	Buses
42	Transit Bus	40	Buses
43	School Bus	40	Buses
51	Refuse Truck	50	Single Unit Trucks
52	Single Unit Short-haul Truck	50	Single Unit Trucks
53	Single Unit Long-haul Truck	50	Single Unit Trucks
54	Motor Home	50	Single Unit Trucks
61	Combination Short-haul Truck	60	Combination Trucks
62	Combination Long-haul Truck	60	Combination Trucks

Source Type Population – Local Data

MOVES uses allocation factors to distribute emissions and activity (such as vehicle type populations) to individual counties. The NCDAQ is committed to using representative local data which will over ride MOVES default values through the County Data Manager. This decision was based on the fact that default allocation factors used in MOVES are derived from the VMT. Since the allocations are based on VMT, the vehicle populations allocated to counties are proportional to the VMT being allocated to that county. The NCDAQ corresponded with the USEPA Office of Transportation and Air Quality (OTAQ) to arrive at an acceptable method to allocate current year as well as to project future year vehicle populations to source type populations. The NCDAQ believes that using MOVES default vehicle population to estimate a fraction is the best method of taking state specific vehicle registration data and allocating county total vehicles to specific vehicle source types.

MOVES categorize vehicles into 13 source types, which are subsets of 6 HPMS vehicle types. Presently NCDAQ is unable to develop county source type population data for many of these source type categories based on how NCDOT collect vehicle registration data. The latest vehicle registration data broken down by county and towns is available by January of each year. Since the vehicle types database available from NCDOT differs from what MOVES2010a expects, the NCDAQ relies on MOVES default fractions and applies these fractions to county total vehicle population, minus trailers. It is assumed that trailers do not have engines and do not generate VMT.

For future year MOVES runs, the NCDAQ needed to be able to grow the vehicle population reflective of the county of interest. From FHWA Highway Statistics graph of Licensed Drivers, Vehicle Registrations, and Resident Population, the NCDAQ has determined that growth in human population is a better indicator of growth in vehicle ownership as compared to VMT growth. Figure 4.2.9-1 shows the relationship of vehicle registration to resident population below.

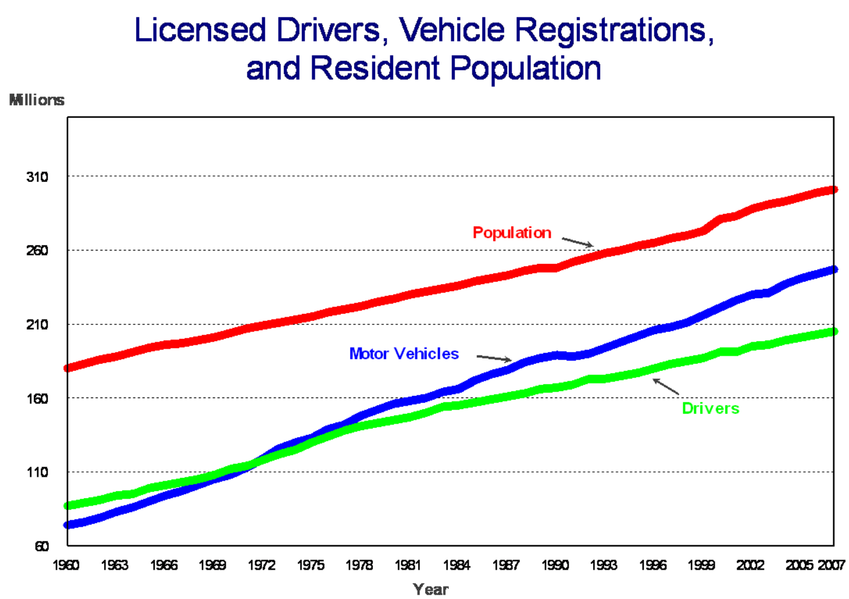

Figure 4.2.9-1 Federal Highway Association Statistics Graph

In order to forecast future year vehicle population and disaggregate to the appropriate source type, a reliable source of county population is needed. The North Carolina Office of State

Budget and Management (OSBM) coordinates with the Census in the Federal State Cooperative Program for population estimates for all state government data, with special emphasis on a consistent set of population projections. On OSBM website are annual certified county population estimates which account for births, deaths and natural growth representing a net migration populous at the county level.

Population data is updated annually in May and certified by September for the previous year's data. Projected annual county population estimates are available to adjust future year county vehicle populations as needed. The USEPA has indicated that using human population growth as a surrogate to project vehicle population growth is an acceptable option. An example of how a 2013 vehicle population would be calculated based on projected 2010 human population follows:

$$\text{Vehicle Pop}_{2013} = \text{Vehicle Pop}_{2010} * (\text{Human Pop}_{2013} / \text{Human Pop}_{2010})$$

4.2.10 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. Cabarrus, Gaston, Mecklenburg and Union Counties were phased in July 2002, Iredell and Rowan were phased-in July 1, 2003 and Lincoln was phased in January 2004.

Inspection and maintenance programs continue to be important local control programs in many nonattainment areas. MOVES includes the capability of modeling all the aspects of an I/M program that have a significant impact on vehicle emissions. The USEPA recommends that users modeling an existing I/M program in MOVES begin by examining the default I/M program description included in MOVES for the particular county in question. The NCDAQ modified the default data in MOVES to reflect county specific compliance factors.

4.2.11 Reid Vapor Pressure and Fuel Assumptions

In general, users should first review the MOVES default fuel formulation and fuel supply data, and then make changes only where local volumetric fuel property information is available. The lone exception to this guidance is in the case of Reid Vapor Pressure (RVP) where a user should change the value to reflect the regulatory requirements and differences between ethanol- and non-ethanol blended gasolines. The current version of MOVES does not allow the user to create new fuel identification numbers. Thus, per current the USEPA guidance, the NCDAQ edited the default fuel supply tables for the individual counties to reflect the county-specific monthly RVP data.

The RVP reflects a gasoline's volatility. Lower RVP leads to lower VOC emissions from gasoline handling and lowers vapor losses from motor vehicles. Gasoline with an RVP of 7.8 pounds per square inch (psi) is required to be used during May through September for Gaston and Mecklenburg Counties. Gasoline with an RVP of 9.0 psi is sold in Cabarrus, Iredell, Lincoln, Rowan and Union Counties year round.

4.2.12 Diesel Sulfur Content Assumptions

The diesel fuel sulfur content for conventional diesel fuel is required in MOVES to generate fine particulate matter emission factors because the amount of sulfur in diesel fuel directly correlates to sulfate particulate emissions. The USEPA recommends a diesel fuel sulfur content of 43 parts per million (ppm) for the period June 2006-May 2010 and 11 ppm for June 2010 -2015. The default fuelSubtypeId for conventional diesel fuel in MOVES was used for all years.

4.2.13 VMT Assumptions

As input, MOVES requires *annual* VMT by HPMS vehicle class. The USEPA has created a tool that allows users to input average annual daily VMT as well as monthly and weekend day adjustment factors to create the annual VMT by HPMS class and appropriate monthly and daily adjustments needed by MOVES. The USEPA has also created a set of software tools that can import VMT tables by MOBILE6.2 vehicle types (either 8, 12, 16, or 28 MOBILE6.2 vehicle types) and facility types, as well as MOBILE6.2 hourly VMT fractions, VMT mix, and ramp fractions and convert these to the equivalent MOVES tables of VMT by HPMS class, VMT fractions by hour, and road type distribution. Mapping MOBILE6.2 vehicle types to their equivalent MOVES source types is a complex process. The USEPA strongly encourages states to use the converter tools to create the appropriate MOVES input tables from MOBILE6.2 data to avoid errors.

The VMT data were provided for each year and each time period (i.e., AM Peak, Midday, PM Peak, and Night). Tables 4.2.13-1 through Table 4.2.13-7 list the VMT used in the emissions calculations.

Table 4.2.13-1 Modeled Daily Vehicle Miles Traveled for Cabarrus County

Roadtype	2010 VMT				
	AM Peak	Midday	PM Peak	Night	Daily
Rural Interstate	0	0	0	0	0
Rural Principal Arterial	35,590	45,488	39,921	27,589	148,588
Rural Minor Arterial	55,153	60,964	60,239	37,029	213,385
Rural Major Collector	88,577	109,884	97,705	61,841	358,008
Rural Minor Collector	54,612	66,600	68,885	34,980	225,078
Rural Local	101,446	143,465	121,634	76,834	443,379
Urban Interstate	283,042	367,096	303,343	210,124	1,163,605
Urban Freeway/Xprway	0	0	0	0	0
Urban Principal Arterial	185,520	271,057	215,244	159,960	831,780
Urban Minor Arterial	184,188	275,476	209,216	153,644	822,524
Urban Collector	138,778	208,125	167,772	97,350	612,024
Urban Local	192,063	303,586	226,183	149,993	871,825
	2013 VMT				
	AM Peak	Midday	PM Peak	Night	Daily
Rural Interstate	0	0	0	0	0
Rural Principal Arterial	39,690	49,744	43,924	29,564	162,922
Rural Minor Arterial	57,579	66,303	63,817	40,285	227,983
Rural Major Collector	96,286	122,000	107,152	69,310	394,749
Rural Minor Collector	62,542	76,133	77,570	39,591	255,837
Rural Local	112,935	160,718	135,518	86,098	495,269
Urban Interstate	305,951	396,182	327,132	223,159	1,252,425
Urban Freeway/Xprway	0	0	0	0	0
Urban Principal Arterial	192,786	285,433	224,489	166,822	869,530
Urban Minor Arterial	202,876	302,243	229,675	168,931	903,725
Urban Collector	152,677	230,977	182,953	107,757	674,364
Urban Local	206,400	332,279	244,643	163,129	946,452
	2016 VMT				
	AM Peak	Midday	PM Peak	Night	Daily
Rural Interstate	0	0	0	0	0
Rural Principal Arterial	42,496	52,723	47,270	31,546	174,036
Rural Minor Arterial	61,043	73,111	67,349	44,932	246,435
Rural Major Collector	97,633	128,497	110,054	72,336	408,520
Rural Minor Collector	67,403	85,069	83,797	43,425	279,694
Rural Local	129,997	184,933	155,216	98,903	569,048
Urban Interstate	318,805	427,587	341,056	237,946	1,325,393
Urban Freeway/Xprway	0	0	0	0	0
Urban Principal Arterial	208,861	307,528	244,589	179,951	940,929
Urban Minor Arterial	214,807	326,221	246,392	182,376	969,796
Urban Collector	164,162	253,789	199,403	117,134	734,487
Urban Local	224,917	366,811	268,995	177,306	1,038,029

Table 4.2.13-1 Modeled Daily Vehicle Miles Traveled for Cabarrus County

	2019 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Interstate	0	0	0	0	0
Rural Principal Arterial	46,013	57,265	50,799	33,950	188,027
Rural Minor Arterial	60,983	73,294	67,907	45,404	247,587
Rural Major Collector	103,008	136,067	116,310	76,872	432,257
Rural Minor Collector	72,994	91,996	90,098	46,924	302,012
Rural Local	144,495	203,426	171,777	108,765	628,462
Urban Interstate	324,373	447,401	347,149	248,308	1,367,231
Urban Freeway/Xprway	0	0	0	0	0
Urban Principal Arterial	218,364	320,374	255,813	186,491	981,042
Urban Minor Arterial	223,401	339,171	256,044	190,274	1,008,891
Urban Collector	173,037	266,504	209,538	123,121	772,201
Urban Local	238,629	386,419	284,786	186,569	1,096,402
	2022 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Interstate	0	0	0	0	0
Rural Principal Arterial	48,990	60,663	53,415	36,471	199,539
Rural Minor Arterial	66,800	81,942	74,082	50,549	273,373
Rural Major Collector	108,654	145,766	122,279	83,354	460,053
Rural Minor Collector	80,220	101,324	97,059	51,788	330,391
Rural Local	162,455	230,449	191,592	123,605	708,100
Urban Interstate	378,844	500,294	413,943	280,357	1,573,439
Urban Freeway/Xprway	0	0	0	0	0
Urban Principal Arterial	223,501	331,841	259,891	190,521	1,005,753
Urban Minor Arterial	259,983	391,305	302,857	213,176	1,167,320
Urban Collector	181,641	279,561	221,429	130,658	813,290
Urban Local	250,494	406,069	299,765	195,845	1,152,174
	2025 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Interstate	0	0	0	0	0
Rural Principal Arterial	51,036	64,504	55,692	38,431	209,663
Rural Minor Arterial	66,296	81,398	74,675	49,592	271,961
Rural Major Collector	110,597	151,992	124,432	87,746	474,766
Rural Minor Collector	81,047	105,692	98,788	54,680	340,207
Rural Local	174,454	248,983	204,492	135,167	763,096
Urban Interstate	380,602	513,553	414,700	287,718	1,596,574
Urban Freeway/Xprway	0	0	0	0	0
Urban Principal Arterial	230,151	342,977	267,123	196,160	1,036,412
Urban Minor Arterial	265,724	404,010	308,437	220,165	1,198,335
Urban Collector	186,133	291,374	225,625	136,681	839,813
Urban Local	263,882	427,636	315,600	206,180	1,213,298

Table 4.2.13-2 Daily Vehicle Miles Traveled for Gaston County

	2010 VMT				
	AM Peak	Midday	PM Peak	Night	Daily
Rural Interstate	38,049	43,969	40,960	25,380	148,358
Rural Principal Arterial	56,191	58,932	59,554	36,764	211,442
Rural Minor Arterial	64,646	77,620	70,228	42,629	255,124
Rural Major Collector	79,524	99,964	94,267	59,854	333,609
Rural Minor Collector	40,572	46,092	49,579	24,774	161,018
Rural Local	71,279	99,584	87,569	53,901	312,333
Urban Interstate	461,227	554,059	495,307	338,729	1,849,322
Urban Freeway/Xprway	24,176	28,961	25,039	17,693	95,869
Urban Principal Arterial	274,039	380,351	311,777	218,210	1,184,378
Urban Minor Arterial	209,453	302,066	247,573	170,942	930,034
Urban Collector	57,397	78,510	70,128	40,842	246,877
Urban Local	203,415	324,067	238,718	168,607	934,807
	2013 VMT				
	AM Peak	Midday	PM Peak	Night	Daily
Rural Interstate	39,920	46,879	42,542	26,866	156,208
Rural Principal Arterial	57,530	60,049	59,597	38,012	215,188
Rural Minor Arterial	71,617	85,918	78,877	47,154	283,566
Rural Major Collector	85,009	107,250	99,803	63,740	355,803
Rural Minor Collector	43,389	49,328	53,106	26,419	172,241
Rural Local	75,729	106,826	91,902	57,861	332,319
Urban Interstate	473,043	576,738	505,107	351,848	1,906,735
Urban Freeway/Xprway	24,520	29,373	25,343	17,972	97,208
Urban Principal Arterial	285,899	393,624	326,360	226,281	1,232,163
Urban Minor Arterial	222,284	319,668	260,111	182,535	984,598
Urban Collector	61,364	83,850	73,860	43,295	262,370
Urban Local	216,940	342,924	253,970	179,110	992,944
	2016 VMT				
	AM Peak	Midday	PM Peak	Night	Daily
Rural Interstate	41,133	49,894	43,581	28,427	163,034
Rural Principal Arterial	150,473	138,873	162,660	89,374	541,381
Rural Minor Arterial	71,892	85,254	78,539	45,483	281,168
Rural Major Collector	94,931	121,870	109,496	73,984	400,282
Rural Minor Collector	45,450	52,107	56,054	27,221	180,832
Rural Local	83,919	115,016	99,592	61,802	360,329
Urban Interstate	501,406	624,663	538,159	379,030	2,043,259
Urban Freeway/Xprway	27,805	33,317	29,658	20,412	111,193
Urban Principal Arterial	281,400	387,539	321,926	220,311	1,211,176
Urban Minor Arterial	223,195	324,074	260,777	184,186	992,232
Urban Collector	69,475	94,480	84,150	49,768	297,873
Urban Local	226,084	358,545	265,622	188,662	1,038,913

Table 4.2.13-2 Daily Vehicle Miles Traveled for Gaston County

	2019 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Interstate	43,595	53,497	45,803	30,402	173,296
Rural Principal Arterial	158,849	153,604	173,689	97,192	583,333
Rural Minor Arterial	76,065	90,633	83,267	48,501	298,466
Rural Major Collector	101,209	131,044	116,682	79,543	428,478
Rural Minor Collector	50,052	57,972	61,952	30,096	200,072
Rural Local	92,692	125,631	109,639	67,179	395,141
Urban Interstate	518,164	658,008	552,534	397,170	2,125,876
Urban Freeway/Xprway	29,020	35,037	30,850	21,278	116,185
Urban Principal Arterial	297,049	402,781	338,851	229,275	1,267,956
Urban Minor Arterial	235,275	340,235	274,662	194,050	1,044,222
Urban Collector	74,201	100,424	89,714	52,727	317,065
Urban Local	240,133	377,501	281,438	198,744	1,097,816
	2022 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Interstate	45,776	57,246	47,761	32,509	183,292
Rural Principal Arterial	166,208	164,997	182,286	103,896	617,387
Rural Minor Arterial	80,231	95,982	87,785	51,223	315,221
Rural Major Collector	106,869	139,945	124,026	85,324	456,163
Rural Minor Collector	55,281	63,210	67,442	33,096	219,029
Rural Local	101,307	136,022	119,958	72,761	430,049
Urban Interstate	531,714	691,869	566,924	417,898	2,208,405
Urban Freeway/Xprway	30,063	36,479	31,874	22,121	120,538
Urban Principal Arterial	312,436	418,722	357,357	237,716	1,326,231
Urban Minor Arterial	248,315	356,886	289,286	203,019	1,097,506
Urban Collector	79,638	105,714	95,531	55,172	336,054
Urban Local	253,405	397,156	297,323	209,445	1,157,329
	2025 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Interstate	47,967	61,058	49,360	34,318	192,704
Rural Principal Arterial	185,541	186,126	204,809	119,854	696,330
Rural Minor Arterial	83,004	100,319	91,613	53,700	328,636
Rural Major Collector	116,783	153,236	133,068	91,543	494,630
Rural Minor Collector	58,819	66,614	70,978	35,120	231,531
Rural Local	107,825	145,757	130,910	77,627	462,120
Urban Interstate	575,079	754,580	613,869	451,709	2,395,237
Urban Freeway/Xprway	30,606	37,615	32,214	22,844	123,279
Urban Principal Arterial	327,495	437,242	376,870	245,322	1,386,928
Urban Minor Arterial	261,780	365,587	303,416	208,786	1,139,569
Urban Collector	80,646	108,733	96,882	58,752	345,014
Urban Local	265,889	414,290	311,390	219,353	1,210,922

Table 4.2.13-3 Daily Vehicle Miles Traveled for Iredell County

	2010 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Interstate	57,107	73,775	58,830	38,418	228,130
Rural Principal Arterial	0	0	0	0	0
Rural Minor Arterial	17,581	27,805	19,409	17,810	82,606
Rural Major Collector	38,351	56,035	43,800	31,757	169,943
Rural Minor Collector	48,689	67,453	56,490	32,699	205,332
Rural Local	101,262	152,561	118,678	77,971	450,472
Urban Interstate	214,263	297,168	228,933	168,484	908,848
Urban Freeway/Xprway	0	0	0	0	0
Urban Principal Arterial	31,526	51,921	36,821	29,673	149,941
Urban Minor Arterial	41,103	65,287	46,496	36,750	189,637
Urban Collector	46,316	77,174	53,670	40,775	217,935
Urban Local	85,967	147,751	103,374	67,503	404,595
	2013 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Interstate	60,907	79,552	63,384	41,332	245,175
Rural Principal Arterial	0	0	0	0	0
Rural Minor Arterial	18,078	28,512	20,174	18,321	85,086
Rural Major Collector	40,694	59,367	46,413	34,379	180,853
Rural Minor Collector	52,559	72,863	60,697	35,499	221,617
Rural Local	115,046	175,266	134,567	88,827	513,706
Urban Interstate	231,120	328,445	247,783	184,652	992,000
Urban Freeway/Xprway	0	0	0	0	0
Urban Principal Arterial	32,272	53,161	37,476	29,999	152,908
Urban Minor Arterial	42,380	65,741	47,876	37,799	193,796
Urban Collector	54,385	88,086	62,687	42,526	247,685
Urban Local	91,890	157,637	109,768	72,838	432,133
	2016 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Interstate	65,226	85,475	67,475	44,390	262,567
Rural Principal Arterial	0	0	0	0	0
Rural Minor Arterial	19,072	30,325	20,962	19,628	89,988
Rural Major Collector	42,420	61,954	49,288	35,785	189,447
Rural Minor Collector	56,682	79,768	65,193	38,834	240,476
Rural Local	124,872	191,020	146,256	97,487	559,634
Urban Interstate	243,099	346,703	260,734	194,834	1,045,370
Urban Freeway/Xprway	0	0	0	0	0
Urban Principal Arterial	33,482	54,981	38,217	30,824	157,503
Urban Minor Arterial	43,571	68,821	48,917	39,640	200,948
Urban Collector	57,584	93,618	66,030	44,549	261,781
Urban Local	97,205	167,553	116,070	76,134	456,962

Table 4.2.13-3 Daily Vehicle Miles Traveled for Iredell County

	2019 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Interstate	68,960	91,195	71,402	47,900	279,456
Rural Principal Arterial	0	0	0	0	0
Rural Minor Arterial	19,533	31,278	21,881	20,354	93,046
Rural Major Collector	44,976	65,853	52,685	37,485	200,999
Rural Minor Collector	60,239	85,416	69,382	41,828	256,864
Rural Local	136,060	208,529	159,117	106,493	610,199
Urban Interstate	254,749	365,580	272,349	206,613	1,099,291
Urban Freeway/Xprway	0	0	0	0	0
Urban Principal Arterial	35,069	57,033	40,269	32,976	165,348
Urban Minor Arterial	45,448	70,802	51,024	40,398	207,671
Urban Collector	60,687	98,596	69,350	46,864	275,496
Urban Local	104,295	178,746	124,216	81,561	488,818
	2022 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Interstate	72,553	96,710	75,159	51,192	295,614
Rural Principal Arterial	0	0	0	0	0
Rural Minor Arterial	20,405	32,934	23,007	20,648	96,994
Rural Major Collector	47,134	69,749	55,536	38,725	211,143
Rural Minor Collector	64,378	91,349	74,380	45,022	275,130
Rural Local	146,060	225,857	170,459	115,657	658,034
Urban Interstate	265,825	383,565	283,614	217,168	1,150,173
Urban Freeway/Xprway	0	0	0	0	0
Urban Principal Arterial	36,414	58,880	42,165	34,797	172,256
Urban Minor Arterial	47,588	73,502	53,592	41,719	216,401
Urban Collector	62,881	101,916	71,830	48,689	285,317
Urban Local	110,482	188,994	131,047	85,998	516,520
	2025 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Interstate	67,707	92,526	66,873	54,822	281,927
Rural Principal Arterial	0	0	0	0	0
Rural Minor Arterial	20,814	34,615	23,224	22,040	100,693
Rural Major Collector	45,767	71,228	52,922	40,710	210,628
Rural Minor Collector	66,720	96,554	75,864	48,359	287,498
Rural Local	156,817	242,534	181,903	123,761	705,015
Urban Interstate	319,361	437,325	346,645	232,221	1,335,552
Urban Freeway/Xprway	0	0	0	0	0
Urban Principal Arterial	38,136	62,369	43,874	36,256	180,635
Urban Minor Arterial	48,298	76,623	54,839	43,420	223,180
Urban Collector	64,613	106,331	74,421	52,612	297,977
Urban Local	115,997	200,296	137,823	91,737	545,853

Table 4.2.13-4 Modeled Daily Vehicle Miles Traveled for Lincoln County

	2010 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Interstate	0	0	0	0	0
Rural Principal Arterial	21,699	27,686	23,150	15,289	87,823
Rural Minor Arterial	73,615	99,011	75,993	59,912	308,531
Rural Major Collector	50,912	64,500	58,065	36,492	209,969
Rural Minor Collector	55,394	62,958	63,791	33,620	215,763
Rural Local	146,290	205,018	171,165	106,525	628,999
Urban Interstate	0	0	0	0	0
Urban Freeway/Xprway	53,403	61,079	57,768	33,509	205,760
Urban Principal Arterial	16,751	24,721	18,224	15,245	74,941
Urban Minor Arterial	71,910	102,964	78,198	63,088	316,161
Urban Collector	17,557	24,771	21,089	13,039	76,456
Urban Local	41,412	65,887	48,569	34,905	190,773
	2013 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Interstate	0	0	0	0	0
Rural Principal Arterial	23,188	29,615	24,716	16,393	93,912
Rural Minor Arterial	107,645	144,944	117,874	83,754	454,217
Rural Major Collector	54,304	68,830	61,370	38,898	223,402
Rural Minor Collector	56,727	64,637	63,750	34,462	219,575
Rural Local	144,169	208,472	169,443	110,220	632,304
Urban Interstate	0	0	0	0	0
Urban Freeway/Xprway	54,822	62,997	58,679	34,685	211,183
Urban Principal Arterial	28,570	40,195	31,988	22,408	123,161
Urban Minor Arterial	68,337	98,137	75,567	61,732	303,774
Urban Collector	19,293	27,097	22,974	14,202	83,567
Urban Local	44,890	71,428	52,948	37,697	206,963
	2016 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Interstate	0	0	0	0	0
Rural Principal Arterial	24,990	31,988	26,639	17,681	101,297
Rural Minor Arterial	112,043	154,449	121,777	88,904	477,173
Rural Major Collector	58,122	73,839	65,272	41,674	238,908
Rural Minor Collector	62,553	71,092	69,100	37,648	240,392
Rural Local	160,529	231,253	186,466	121,512	699,760
Urban Interstate	0	0	0	0	0
Urban Freeway/Xprway	59,293	68,314	65,367	37,153	230,128
Urban Principal Arterial	30,173	42,664	33,477	23,814	130,128
Urban Minor Arterial	71,156	102,574	78,681	64,744	317,154
Urban Collector	21,057	29,120	24,521	15,030	89,728
Urban Local	47,841	76,393	56,574	40,100	220,909

Table 4.2.13-4 Modeled Daily Vehicle Miles Traveled for Lincoln County

	2019 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Interstate	0	0	0	0	0
Rural Principal Arterial	26,729	34,249	28,485	18,946	108,409
Rural Minor Arterial	116,215	162,611	127,355	94,662	500,844
Rural Major Collector	61,859	79,109	69,386	44,576	254,930
Rural Minor Collector	69,448	79,168	77,067	41,399	267,082
Rural Local	178,120	257,103	206,420	134,007	775,650
Urban Interstate	0	0	0	0	0
Urban Freeway/Xprway	63,842	73,568	70,469	39,677	247,557
Urban Principal Arterial	31,377	44,979	35,198	25,291	136,845
Urban Minor Arterial	74,674	108,521	82,625	68,719	334,539
Urban Collector	22,953	31,944	26,824	16,393	98,113
Urban Local	51,462	82,434	61,260	43,129	238,285
	2022 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Interstate	0	0	0	0	0
Rural Principal Arterial	28,446	36,498	30,315	20,190	115,449
Rural Minor Arterial	122,886	173,027	134,885	100,921	531,719
Rural Major Collector	63,835	82,057	71,525	45,984	263,400
Rural Minor Collector	75,316	86,822	83,759	44,927	290,825
Rural Local	195,023	281,951	226,259	146,306	849,539
Urban Interstate	0	0	0	0	0
Urban Freeway/Xprway	68,497	78,303	75,244	42,295	264,339
Urban Principal Arterial	32,806	47,190	36,747	26,319	143,062
Urban Minor Arterial	77,276	112,760	85,755	70,982	346,773
Urban Collector	24,322	33,961	28,568	17,343	104,195
Urban Local	54,151	86,634	64,629	45,242	250,655
	2025 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Interstate	0	0	0	0	0
Rural Principal Arterial	30,157	38,711	32,090	21,442	122,399
Rural Minor Arterial	122,549	174,647	136,273	101,486	534,955
Rural Major Collector	67,151	87,036	75,274	48,822	278,283
Rural Minor Collector	79,619	95,054	88,483	49,286	312,442
Rural Local	211,565	308,437	244,143	159,954	924,099
Urban Interstate	0	0	0	0	0
Urban Freeway/Xprway	71,715	82,927	79,522	44,032	278,197
Urban Principal Arterial	33,426	48,640	37,591	27,376	147,033
Urban Minor Arterial	80,750	118,739	89,263	75,260	364,012
Urban Collector	26,213	36,623	30,519	18,644	111,999
Urban Local	57,831	92,591	68,995	48,147	267,565

Table 4.2.13-5 Modeled Daily Vehicle Miles Traveled for Mecklenburg County

	2010 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Principal Arterial	37,607	45,986	42,338	27,117	153,048
Rural Minor Arterial	17,023	20,700	19,749	13,711	71,182
Rural Major Collector	16,862	22,570	19,703	10,535	69,670
Rural Minor Collector	32,474	40,495	41,432	20,832	135,233
Rural Local	66,263	89,945	81,369	42,693	280,269
Urban Interstate	1,736,609	2,268,124	1,919,704	1,315,657	7,240,094
Urban Freeway/Xprway	1,110,226	1,389,995	1,282,080	723,369	4,505,670
Urban Principal Arterial	1,111,629	1,680,204	1,284,698	944,660	5,021,191
Urban Minor Arterial	1,024,878	1,553,321	1,202,756	841,426	4,622,381
Urban Collector	806,596	1,207,264	941,722	642,619	3,598,201
Urban Local	1,459,707	2,340,210	1,736,882	1,126,041	6,662,840
Urban HOV	17,763	374	7,595	0	25,733
	2013 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Principal Arterial	41,842	52,184	47,660	31,107	172,793
Rural Minor Arterial	18,110	22,074	21,075	14,584	75,844
Rural Major Collector	17,717	24,810	21,328	11,914	75,769
Rural Minor Collector	35,360	45,669	44,763	23,383	149,174
Rural Local	80,837	113,409	98,815	52,845	345,905
Urban Interstate	1,790,341	2,359,615	1,968,068	1,364,383	7,482,406
Urban Freeway/Xprway	1,159,775	1,468,138	1,341,647	764,373	4,733,934
Urban Principal Arterial	1,160,728	1,761,649	1,352,005	984,438	5,258,820
Urban Minor Arterial	1,074,833	1,629,080	1,260,429	877,703	4,842,045
Urban Collector	841,681	1,267,545	983,510	675,933	3,768,668
Urban Local	1,536,645	2,471,519	1,828,373	1,188,629	7,025,167
Urban HOV	17,602	303	7,967	0	25,873
	2016 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Principal Arterial	42,660	53,538	47,969	31,229	175,396
Rural Minor Arterial	19,065	24,075	22,019	15,635	80,794
Rural Major Collector	17,934	25,351	21,231	12,155	76,671
Rural Minor Collector	43,161	52,900	53,266	26,638	175,965
Rural Local	93,621	135,009	115,314	63,786	407,730
Urban Interstate	1,856,011	2,430,999	2,043,046	1,436,279	7,766,336
Urban Freeway/Xprway	1,484,718	1,792,182	1,687,746	941,597	5,906,243
Urban Principal Arterial	1,194,134	1,815,382	1,392,400	1,010,663	5,412,580
Urban Minor Arterial	1,115,478	1,701,624	1,310,980	918,352	5,046,434
Urban Collector	903,538	1,365,613	1,054,847	728,332	4,052,330
Urban Local	1,598,889	2,590,037	1,910,539	1,238,597	7,338,062
Urban HOV	44,438	36,700	43,327	0	124,464

Table 4.2.13-4 Modeled Daily Vehicle Miles Traveled for Lincoln County

	2019 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Principal Arterial	45,215	57,443	51,441	33,304	187,403
Rural Minor Arterial	19,989	25,273	23,052	16,367	84,681
Rural Major Collector	19,040	27,517	22,442	13,680	82,679
Rural Minor Collector	46,196	58,038	57,523	29,049	190,806
Rural Local	108,110	158,312	131,861	74,340	472,624
Urban Interstate	1,900,274	2,520,921	2,086,577	1,483,625	7,991,396
Urban Freeway/Xprway	1,570,842	1,904,217	1,779,708	997,516	6,252,282
Urban Principal Arterial	1,243,793	1,894,512	1,452,987	1,048,898	5,640,190
Urban Minor Arterial	1,167,478	1,785,865	1,375,410	963,129	5,291,882
Urban Collector	936,720	1,422,485	1,095,011	756,503	4,210,719
Urban Local	1,683,707	2,734,487	2,013,722	1,304,515	7,736,432
Urban HOV	47,035	43,346	45,296	0	135,677
	2022 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Principal Arterial	47,774	61,659	54,464	35,593	199,491
Rural Minor Arterial	21,411	27,484	24,491	17,459	90,845
Rural Major Collector	19,824	29,450	23,403	14,386	87,063
Rural Minor Collector	49,670	64,261	60,927	31,620	206,477
Rural Local	122,866	181,884	148,739	85,874	539,363
Urban Interstate	1,953,228	2,618,892	2,149,214	1,563,834	8,285,168
Urban Freeway/Xprway	1,638,757	2,016,936	1,852,082	1,058,859	6,566,633
Urban Principal Arterial	1,303,758	1,982,095	1,520,208	1,083,557	5,889,618
Urban Minor Arterial	1,218,751	1,862,936	1,429,950	985,164	5,496,801
Urban Collector	980,541	1,495,668	1,142,460	795,041	4,413,709
Urban Local	1,773,508	2,885,345	2,120,505	1,370,344	8,149,702
Urban HOV	50,548	45,957	46,923	0	143,428
	2025 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Principal Arterial	48,249	63,729	54,627	36,262	202,867
Rural Minor Arterial	22,193	28,581	25,532	17,915	94,221
Rural Major Collector	18,716	28,198	21,274	14,942	83,131
Rural Minor Collector	50,442	67,676	60,793	33,787	212,698
Rural Local	132,813	202,262	159,193	97,025	591,293
Urban Interstate	1,982,450	2,699,764	2,191,510	1,619,029	8,492,753
Urban Freeway/Xprway	1,774,694	2,150,463	1,984,173	1,125,976	7,035,306
Urban Principal Arterial	1,321,943	2,019,508	1,537,863	1,108,501	5,987,815
Urban Minor Arterial	1,251,364	1,918,963	1,469,853	1,012,841	5,653,020
Urban Collector	1,015,063	1,557,112	1,179,789	830,673	4,582,637
Urban Local	1,851,611	3,021,403	2,210,142	1,437,419	8,520,574
Urban HOV	131,158	106,133	165,669	430.3804	403,391

Table 4.2.13-6 Modeled Daily Vehicle Miles Traveled for Rowan County

	2010 VMT				
	AM Peak	Midday	PM Peak	Night	Daily
Rural Interstate	0	0	0	0	0
Rural Principal Arterial	36,101	45,300	39,563	24,517	145,482
Rural Minor Arterial	22,610	30,033	24,912	18,409	95,964
Rural Major Collector	123,341	144,775	135,528	88,766	492,410
Rural Minor Collector	84,315	93,772	95,299	48,814	322,200
Rural Local	121,685	163,400	140,307	91,899	517,291
Urban Interstate	341,925	417,675	370,880	240,733	1,371,212
Urban Freeway/Xprway	0	0	0	0	0
Urban Principal Arterial	111,275	161,461	125,307	90,514	488,556
Urban Minor Arterial	123,333	186,268	141,648	104,011	555,259
Urban Collector	120,897	168,487	141,612	89,811	520,807
Urban Local	165,261	261,977	193,655	132,090	752,984
	2013 VMT				
	AM Peak	Midday	PM Peak	Night	Daily
Rural Interstate	0	0	0	0	0
Rural Principal Arterial	38,819	48,803	42,594	25,946	156,161
Rural Minor Arterial	23,678	31,776	26,484	20,031	101,969
Rural Major Collector	129,431	151,206	142,099	92,222	514,958
Rural Minor Collector	89,551	99,045	101,577	51,814	341,986
Rural Local	127,858	170,928	147,212	95,977	541,975
Urban Interstate	359,744	444,089	388,311	256,404	1,448,548
Urban Freeway/Xprway	0	0	0	0	0
Urban Principal Arterial	115,437	165,808	130,437	92,105	503,787
Urban Minor Arterial	127,918	192,234	147,426	108,655	576,233
Urban Collector	128,048	176,700	150,249	93,242	548,239
Urban Local	171,846	269,386	201,954	135,967	779,152
	2016 VMT				
	AM Peak	Midday	PM Peak	Night	Daily
Rural Interstate	0	0	0	0	0
Rural Principal Arterial	40,280	50,490	44,034	27,244	162,049
Rural Minor Arterial	24,662	33,743	27,319	22,068	107,792
Rural Major Collector	135,519	159,284	150,006	95,480	540,289
Rural Minor Collector	95,136	107,030	108,569	55,180	365,915
Rural Local	137,434	183,356	158,010	102,134	580,934
Urban Interstate	378,323	471,697	407,432	272,587	1,530,039
Urban Freeway/Xprway	0	0	0	0	0
Urban Principal Arterial	122,927	176,192	139,092	97,762	535,974
Urban Minor Arterial	134,648	202,131	155,236	113,883	605,899
Urban Collector	137,829	189,407	161,897	99,603	588,736
Urban Local	182,979	286,909	215,065	144,517	829,470

Table 4.2.13-4 Modeled Daily Vehicle Miles Traveled for Lincoln County

	2019 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Interstate	0	0	0	0	0
Rural Principal Arterial	42,291	53,903	47,046	28,679	171,920
Rural Minor Arterial	26,067	35,124	28,587	22,853	112,631
Rural Major Collector	141,360	165,533	156,342	99,667	562,901
Rural Minor Collector	99,796	110,972	114,225	56,937	381,930
Rural Local	146,861	195,055	167,686	107,809	617,411
Urban Interstate	396,841	502,362	426,415	289,223	1,614,841
Urban Freeway/Xprway	0	0	0	0	0
Urban Principal Arterial	129,049	182,225	145,919	101,387	558,580
Urban Minor Arterial	141,060	212,445	162,806	119,175	635,486
Urban Collector	146,028	198,715	171,320	103,969	620,032
Urban Local	191,905	300,118	226,015	151,123	869,161
	2022 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Interstate	0	0	0	0	0
Rural Principal Arterial	45,225	56,488	50,214	30,221	182,150
Rural Minor Arterial	27,658	36,607	30,225	23,301	117,791
Rural Major Collector	145,266	173,505	159,282	105,567	583,620
Rural Minor Collector	106,934	121,583	122,089	60,633	411,239
Rural Local	157,788	212,478	181,312	116,455	668,033
Urban Interstate	442,577	544,991	479,137	312,226	1,778,930
Urban Freeway/Xprway	0	0	0	0	0
Urban Principal Arterial	127,218	183,498	144,113	103,182	558,011
Urban Minor Arterial	147,934	221,546	169,852	123,832	663,164
Urban Collector	154,405	210,339	178,715	110,787	654,246
Urban Local	204,155	316,081	240,122	160,268	920,626
	2025 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Interstate	0	0	0	0	0
Rural Principal Arterial	45,295	57,045	50,077	31,219	183,636
Rural Minor Arterial	27,995	37,404	30,543	24,291	120,234
Rural Major Collector	151,455	181,649	166,287	109,822	609,213
Rural Minor Collector	109,447	128,016	125,585	64,524	427,573
Rural Local	164,162	222,637	187,941	121,913	696,653
Urban Interstate	460,161	569,011	498,439	326,951	1,854,562
Urban Freeway/Xprway	0	0	0	0	0
Urban Principal Arterial	130,986	188,630	148,741	106,239	574,595
Urban Minor Arterial	152,646	227,301	174,772	127,085	681,805
Urban Collector	159,755	219,223	184,351	115,937	679,266
Urban Local	210,336	327,227	246,921	166,025	950,509

Table 4.2.13-7 Modeled Daily Vehicle Miles Traveled for Union County

	2010 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Interstate	0	0	0	0	0
Rural Principal Arterial	66,095	90,044	70,912	50,153	277,203
Rural Minor Arterial	23,799	29,708	26,926	16,955	97,388
Rural Major Collector	234,097	321,432	262,696	180,874	999,098
Rural Minor Collector	70,306	90,025	80,488	47,643	288,462
Rural Local	256,808	348,000	301,414	176,137	1,082,360
Urban Interstate	0	0	0	0	0
Urban Freeway/Xprway	21,816	28,689	21,557	15,528	87,589
Urban Principal Arterial	140,826	202,346	155,696	114,362	613,230
Urban Minor Arterial	95,737	145,234	110,355	87,736	439,062
Urban Collector	112,734	161,729	129,913	81,712	486,088
Urban Local	204,051	314,213	240,419	163,392	922,074
	2013 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Interstate	0	0	0	0	0
Rural Principal Arterial	70,096	96,044	75,072	53,588	294,799
Rural Minor Arterial	24,786	32,658	29,029	18,953	105,426
Rural Major Collector	252,669	351,610	283,699	200,275	1,088,252
Rural Minor Collector	80,709	104,375	93,854	54,951	333,889
Rural Local	300,162	408,814	349,995	206,434	1,265,405
Urban Interstate	0	0	0	0	0
Urban Freeway/Xprway	22,998	30,410	22,674	16,605	92,687
Urban Principal Arterial	149,005	214,505	164,498	120,074	648,082
Urban Minor Arterial	102,821	155,838	118,260	93,893	470,812
Urban Collector	123,687	178,885	141,387	91,287	535,246
Urban Local	225,374	347,969	265,295	179,610	1,018,248
	2016 VMT				
	AM Peak	**Midday**	**PM Peak**	**Night**	**Daily**
Rural Interstate	0	0	0	0	0
Rural Principal Arterial	160,023	177,453	177,162	92,714	607,353
Rural Minor Arterial	23,381	32,613	27,078	20,989	104,061
Rural Major Collector	259,513	362,214	290,126	210,809	1,122,662
Rural Minor Collector	91,501	121,675	105,823	63,729	382,729
Rural Local	343,946	483,486	399,068	247,682	1,474,183
Urban Interstate	0	0	0	0	0
Urban Freeway/Xprway	64,021	69,225	68,596	34,310	236,153
Urban Principal Arterial	132,754	198,301	148,989	112,006	592,050
Urban Minor Arterial	108,579	162,990	123,503	99,146	494,218
Urban Collector	130,873	191,796	149,585	99,519	571,774
Urban Local	237,943	371,634	279,437	192,262	1,081,276

Table 4.2.13-4 Modeled Daily Vehicle Miles Traveled for Lincoln County

	2019 VMT				
	AM Peak	Midday	PM Peak	Night	Daily
Rural Interstate	0	0	0	0	0
Rural Principal Arterial	172,591	193,904	191,458	99,908	657,860
Rural Minor Arterial	24,335	34,577	28,960	22,647	110,520
Rural Major Collector	279,585	390,361	311,398	230,294	1,211,637
Rural Minor Collector	105,587	141,474	121,414	73,462	441,937
Rural Local	396,161	561,899	459,642	284,691	1,702,393
Urban Interstate	0	0	0	0	0
Urban Freeway/Xprway	67,442	75,198	72,810	36,526	251,977
Urban Principal Arterial	140,179	208,894	156,652	117,034	622,758
Urban Minor Arterial	118,461	178,366	135,017	105,455	537,298
Urban Collector	139,983	205,921	159,820	108,372	614,096
Urban Local	258,284	403,674	303,811	207,468	1,173,236
	2022 VMT				
	AM Peak	Midday	PM Peak	Night	Daily
Rural Interstate	0	0	0	0	0
Rural Principal Arterial	181,156	205,192	200,657	105,091	692,097
Rural Minor Arterial	25,743	36,328	30,652	23,388	116,110
Rural Major Collector	300,966	422,231	334,872	246,949	1,305,017
Rural Minor Collector	118,270	158,448	135,832	83,729	496,279
Rural Local	450,271	641,612	523,268	327,296	1,942,447
Urban Interstate	0	0	0	0	0
Urban Freeway/Xprway	70,067	79,008	75,521	38,146	262,743
Urban Principal Arterial	147,757	220,094	166,430	122,357	656,639
Urban Minor Arterial	125,368	189,430	142,382	110,258	567,438
Urban Collector	148,648	219,417	168,591	115,684	652,340
Urban Local	276,633	433,651	325,170	220,529	1,255,982
	2025 VMT				
	AM Peak	Midday	PM Peak	Night	Daily
Rural Interstate	0	0	0	0	0
Rural Principal Arterial	209,437	243,558	224,845	123,565	801,405
Rural Minor Arterial	24,485	34,116	28,922	21,174	108,697
Rural Major Collector	313,439	442,672	351,393	260,180	1,367,685
Rural Minor Collector	128,889	175,387	148,948	91,878	545,102
Rural Local	507,846	722,676	588,557	370,849	2,189,928
Urban Interstate	0	0	0	0	0
Urban Freeway/Xprway	77,531	91,291	83,472	43,635	295,929
Urban Principal Arterial	147,912	218,330	168,825	121,717	656,784
Urban Minor Arterial	129,140	194,064	148,010	110,953	582,166
Urban Collector	151,092	225,560	174,321	120,889	671,862
Urban Local	288,313	453,888	340,532	230,782	1,313,516

4.3 ESTIMATED EMISSIONS FROM ON-ROAD MOBILE SOURCES

Using the inventory approach in the MOVES model gives a summary of emissions in tons per typical summer day, by county. Table 4.3-1 summarizes the NOx emissions and Table 4.3-2 summarizes the VOC emissions.

Table 4.3-1 On-Road Mobile Source NOx Emissions by County (tons/day)

County	2010	2013	2016	2019	2022	2025
Cabarrus	14.48	11.81	9.79	7.90	6.95	6.17
Gaston	13.64	10.18	8.10	6.61	5.76	5.37
Iredell	8.91	7.09	5.75	4.69	4.00	3.63
Lincoln	5.80	4.73	3.85	3.16	2.69	2.42
Mecklenburg	69.21	52.08	41.47	33.82	32.00	27.24
Rowan	12.96	10.06	8.03	6.41	5.46	4.81
Union	13.26	10.97	9.44	7.90	6.81	6.26
Total	**138.26**	**106.92**	**86.43**	**70.49**	**63.67**	**55.90**

Table 4.3-2 On-Road Mobile Source VOC Emissions by County (tons/day)

County	2010	2013	2016	2019	2022	2025
Cabarrus	7.54	6.05	5.04	4.18	3.63	3.53
Gaston	6.24	4.67	3.72	3.08	2.69	2.57
Iredell	5.51	4.32	3.55	2.95	2.53	2.45
Lincoln	3.21	2.52	2.05	1.69	1.44	1.39
Mecklenburg	30.42	22.91	18.32	15.20	13.65	12.64
Rowan	6.32	4.82	3.84	3.10	2.60	2.45
Union	7.46	6.03	5.06	4.27	3.67	3.64
Total	**66.70**	**51.32**	**41.58**	**34.47**	**30.21**	**28.67**

4.4 MOTOR VEHICLE EMISSIONS BUDGET FOR CONFORMITY

4.4.1 Transportation Conformity

The purpose of transportation conformity is to ensure that Federal transportation actions occurring in a nonattainment and maintenance areas does not hinder the area from attaining and maintaining the 1997 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 MVEBs as defined in this maintenance plan.

There was discussion through the interagency consultation process on the years to set MVEBs for the Metrolina maintenance plan. According to Section 93.118 of the transportation conformity rule, a maintenance plan must establish MVEBs for the last year of the maintenance plan (in this case, 2025). Through the interagency consultation process, it was decided that another MVEB would be set for the year 2013 in the Metrolina maintenance plan.

4.4.2 Allocation of a Portion of the Safety Margin

A safety margin is the difference between the attainment level of emissions from all source categories (i.e., point, area, on-road and nonroad mobile) and the projected level of emissions from all source categories. The State may choose to allocate some of the safety margin to the MVEBs, for transportation conformity purposes, so long as the total level of emissions from all source categories remains below the attainment level of emissions.

The NCDAQ has decided to allocate a portion of the safety margin to the MVEBs to allow for unanticipated growth in VMT, changes and uncertainty in vehicle mix assumptions, etc. that will influence the emission estimations. The NCDAQ has developed and implemented a five-step approach for determining the amount of safety margin to apply to the MVEBs.

Step 1 Percentage below the standard

All counties get 2% of their emissions allocated to MVEB in 2013

This component of the methodology takes into account the current (2008-2010) monitored ozone design value in the nonattainment area relative to the level of the standard. In the Metrolina area, the highest current ozone design value is 0.082 ppm. Therefore, based on the latest monitored ozone data, the area is 2% below the standard. This percentage is used to adjust the mobile source emissions in 2013 and 2025 for purposes of establishing MVEBs.

Step 2 Account for unanticipated model input data changes

All counties get an additional 5% of their emissions allocated to MVEB in 2013

This component of the methodology takes into account that model input data changes that can impact the emissions. The model inputs include, but are not limited to, the vehicle mix assumptions and the vehicle age distribution. Additionally, occasionally there are updates to the mobile model which may impact the emissions. This 5% allocation will account for this type of change and added to the percentage in Step 1 in determining the final allocation to the MVEBs for 2013.

Step3 Provide flexibility and account for rapid growth for counties that are determined to be medium to small contributors to the on-road mobile NOx emissions inventory

> *Counties that are less than 8% of total on-road mobile source NOx emissions get an additional 5% of their emissions allocated to MVEB in 2013*
>
> *Counties that are 8% to 25 % of total on-road mobile source NOx emissions get an additional 3 % of their emissions allocated to MVEB in 2013*

Two counties are less than 8% of the total on-road mobile source NOx emissions inventory for the North Carolina portion of the Metrolina nonattainment area: Iredell and Lincoln. Since these counties' emissions are so small and are considered in a high growth area, the NCDAQ has decided to provide an additional 5% of their emission to allocate to the 2013 MVEBs. This 5% will be added to the percentage determined in Step 1 and Step 2.

There are four counties that are between 8% and 25% of the total on-road mobile source NOx emissions inventory. They include Cabarrus, Gaston, Rowan and Union Counties. Since these medium contributors are also in a high growth area, the NCDAQ has decided to provide an additional percentage of their emissions to the MVEB allocation but believed that a lesser amount than the small contributors was warranted. Therefore, an additional 3% of their emissions will be allocated to the 2013 MVEBs. This 3% will be added to the percentages determined in Step 1 and Step 2.

Step 4 Account for input uncertainty in final year of the maintenance plan

> *All counties get 10% additional of their emissions allocated to MVEB in 2025.*

In addition to the percent increase determined for the 2013 MVEB outlined in Steps 1 through 3, an additional increase of 10% of their on-road mobile source emissions will be added to the 2025 MVEBs. This additional allocation is to account for potential changes in VMT, vehicle mix and vehicle age distribution. This additional percentage is added to the current percentages outlined in the steps above. The NCDAQ believes this additional 10% is appropriate for the 2025 because ozone values will continue to drop as NOx levels in 2025 are projected to be about 40% less than what they are for the base year in the nonattainment area.

Step 5 Ensure the sum of the safety margins applied to the MVEB does not exceed 50% of the total safety margin available

The NCDAQ will implement a cap to the safety margin allocated to the MVEBs. The sum of the safety margin allocations applied to the MVEBs in the entire nonattainment area cannot exceed

50% of the total safety margin available. In this analysis, the total allocation added to the 2013 MVEBs for the North Carolina portion of the Metrolina nonattainment area is 8,498 kg/day (9.37 tons/day), or 17% of the total NOx safety margin available and 4,156 kg/day (4.58 tons/day) or 23% of the total VOC safety margin available. The total allocation added to the 2025 MVEBs for the North Carolina portion of the Metrolina nonattainment area is 9,150 kg/day (10.48 tons/day) or 9% of the total NOx safety margin available and 4,926 kg/day (5.43 tons/day) or 16% of the total VOC safety margin available. Therefore, the Step 5 cap has not been exceeded.

Table 4.4.2-1 summarizes the percent increase to the MVEB for purposes of transportation conformity for each county in the Metrolina nonattainment area.

Table 4.4.2-1 Percent Increase To MVEB

County	2013	2025
Cabarrus	10%	20%
Gaston	10%	20%
Iredell	12%	22%
Lincoln	12%	22%
Mecklenburg	7%	17%
Rowan	10%	20%
Union	10%	20%

4.4.3 Motor Vehicle Emission Budgets

Although the emissions up to this point have been expressed in terms of tons per day, the MVEBs will be set in terms of kilograms (kg) per day. The reason for the change is so that the MVEBs will be defined in a smaller unit of measurement. Additionally, in past conformity determinations there have been concerns with how the tons per day MVEBs were rounded to the hundredth place. Setting the MVEBs in kilograms per day will avoid these concerns in future conformity determinations. The tables below shows the counties with their highway mobile NOx and VOC emissions expressed in tons per day and the corresponding kilograms per day values for 2013 and 2025. The MOVES model reports emissions out several decimal places and for this plan the emissions have been rounded to the second decimal place. The conversion to kilograms used the actual emissions reported in the MOVES model. The conversion was done utilizing the “CONVERT” function in an EXCEL spreadsheet.

Table 4.4.3-2 Highway Mobile Source NOx Emissions North Carolina Portion of the Metrolina Nonattainment Area

County	2013			2025	
	Tons/day	Kg/day		Tons/day	Kg/day
Cabarrus	11.81	10,711		6.17	5,597
Gaston	10.18	9,235		5.37	4,872
Iredell*	7.09	6,433		3.63	3,293
Lincoln	4.73	4,289		2.42	2,195
Mecklenburg	52.08	47,243		27.24	24,712
Rowan	10.06	9,127		4.81	4,364
Union	10.97	9,955		6.26	5,679
Total	**106.92**	**96,993**		**55.90**	**50,712**

*Iredell County emissions for nonattainment area only

Table 4.4.3-3 Highway Mobile Source VOC Emissions North Carolina Portion of the Metrolina Nonattainment Area

County	2013			2025	
	Tons/day	Kg/day		Tons/day	Kg/day
Cabarrus	6.05	5,491		3.53	3,202
Gaston	4.67	4,240		2.57	2,331
Iredell*	4.32	3,920		2.45	2,223
Lincoln	2.52	2,282		1.39	1,261
Mecklenburg	22.91	20,783		12.64	11,467
Rowan	4.82	4,372		2.45	2,223
Union	6.03	5,467		3.64	3,302
Total	**51.32**	**46,555**		**28.67**	**26,009**

*Iredell County emissions for nonattainment area only

As part of the consultation process on setting MVEBs, the NCDAQ discussed several options for setting the geographic extent of the MVEBs with the transportation partners. The NCDAQ requested feedback on these options or other alternatives for consideration from the transportation partners. The NCDAQ received feedback from only two of the transportation partners. Therefore, as part of the public comment process, the NCDAQ provided several options for establishing the MVEBs. The options included:

- Option A – county level MVEBs;
- Option B – MVEBs set as grouped counties based on counties that contain a Metropolitan Planning Organization (MPO) and/or Rural Planning Organization (RPO) and a sub-MPO budget for Mecklenburg County;

- Option C – MVEBs set as grouped counties based on counties that contain a Metropolitan Planning Organization (MPO) and/or Rural Planning Organization (RPO);
- Option D – MVEBs set for Cabarrus Rowan MPO (CRMPO), one MVEB for the remaining MPOs and RPOs and a sub-MPO budget for Mecklenburg County.

During the public comment period, comments regarding geographical extent for the MVEBs were received from the USEPA, CRMPO and the Mecklenburg Union MPO (MUMPO). The USEPA preferred Option A and CRMPO preferred Options B or C. MUMPO requested that Mecklenburg County not have separate sub-MPO budget, that county level MVEBs not be set and that NCDAQ consider an alternative option similar to Option D without the sub-MPO budget for Mecklenburg County.

After considering the comments received, the NCDAQ has chosen to establish MVEBs based on Option C. This option is consistent with the CRMPO request and takes into consideration two of the comments from MUMPO. The NCDAQ believes that this option is a good compromise between how MVEBs have been established in the past, addressing the NCDAQ's concern with Mecklenburg County's on-road mobile source emissions and the preferences of the transportation partners. Further, the NCDAQ believes this approach provides additional flexibility to the transportation partners while providing adequate assurance that the ozone standard will be maintained in the region.

Therefore, MVEBs are set for the CRMPO (Cabarrus and Rowan Counties), for the Gaston Urban Area MPO and Lake Norman RPO (Gaston, Iredell, and Lincoln Counties), and for the MUMPO and Rocky River RPO (Mecklenburg and Union Counties). Tables 4.4.3-4 through 4.4.3-6 below provide the NOx and VOC MVEBs in kilograms per day, for transportation conformity purposes, for 2013 and 2025. Upon the USEPA's affirmative adequacy finding for these sub-area MVEBs, they will become the applicable MVEBs for transportation conformity.

Table 4.4.3-4 Cabarrus-Rowan MPO MVEB in kilograms per day

	2013		2025	
	NOx	VOC	NOx	VOC
Base Emissions	19,838	9,863	9,961	5,425
Safety Margin Allocated to MVEB	1,984	986	1,992	1,085
Conformity MVEB	**21,822**	**10,849**	**11,953**	**6,510**

Includes all of Cabarrus and Rowan Counties

Table 4.4.3-5 Gaston Urban Area MPO/Lake Norman RPO MVEB in kilograms per day

	2013		2025	
	NOx	VOC	NOx	VOC
Base Emissions	19,957	10,442	10,360	5,815
Safety Margin Allocated to MVEB	2,211	1,168	2,181	1,232
Conformity MVEB	**22,168**	**11,610**	**12,541**	**7,047**

Includes all of Gaston and Lincoln Counties and the nonattainment portion of Iredell County

Table 4.4.3-6 Mecklenburg-Union MPO/Rocky River RPO MVEB in kilograms per day

	2013		2025	
	NOx	VOC	NOx	VOC
Base Emissions	57,198	26,250	30,391	14,769
Safety Margin Allocated to MVEB	4,303	2,002	5,337	2,609
Conformity MVEB	**61,501**	**28,252**	**35,728**	**17,378**

Includes all of Mecklenburg and Union Counties

5.0 MOVES INPUT DATA

Due to the size and the complexity of the MOVES input and output files, the MOVES input files and output files will be provided electronically. The MOBILE6.2 vehicle mix, as well as the temperature and humidity profiles used in MOVES are presented below.

5.1 NORTH CAROLINA'S VEHICLE MIX

5.1.1 2010 State Vehicle Mix

Rural

LDV	LDT1	LDT2	LDT3	LDT4	HDV2B	HDV3	HDV4
HDV5	HDV6	HDV7	HDV8a	HDV8b	HDBS	HDBT	MC
Interstate							
0.3178	0.0798	0.2657	0.0819	0.0376	0.0682	0.0066	0.0056
0.0042	0.0152	0.0180	0.0196	0.0698	0.0035	0.0017	0.0048
Princ. Art.							
0.3463	0.0871	0.2898	0.0893	0.0411	0.0453	0.0044	0.0037
0.0028	0.0101	0.0120	0.0130	0.0463	0.0023	0.0012	0.0053
Minor Art.							
0.3599	0.0905	0.3012	0.0929	0.0427	0.0344	0.0034	0.0028
0.0021	0.0077	0.0091	0.0099	0.0352	0.0018	0.0009	0.0055
Major Collector							
0.3584	0.0901	0.2999	0.0925	0.0425	0.0357	0.0035	0.0029
0.0022	0.0080	0.0094	0.0102	0.0365	0.0018	0.0009	0.0055

Minor Collector

0.3668	0.0922	0.3069	0.0946	0.0435	0.0290	0.0028	0.0024
0.0018	0.0065	0.0077	0.0083	0.0297	0.0015	0.0007	0.0056

Local

0.3609	0.0907	0.3018	0.0930	0.0428	0.0338	0.0033	0.0028
0.0021	0.0075	0.0089	0.0097	0.0346	0.0017	0.0009	0.0055

Urban

LDV	LDT1	LDT2	LDT3	LDT4	HDV2B	HDV3	HDV4
HDV5	HDV6	HDV7	HDV8a	HDV8b	HDBS	HDBT	MC
Interstate							
0.3515	0.0884	0.2940	0.0906	0.0417	0.0412	0.0040	0.0034
0.0025	0.0092	0.0109	0.0118	0.0422	0.0021	0.0011	0.0054
Freeway							
0.3613	0.0908	0.3023	0.0932	0.0428	0.0334	0.0033	0.0027
0.0021	0.0074	0.0088	0.0096	0.0342	0.0017	0.0009	0.0055
Princ. Art.							
0.3685	0.0927	0.3083	0.0951	0.0437	0.0276	0.0027	0.0023
0.0017	0.0062	0.0073	0.0079	0.0283	0.0014	0.0007	0.0056
Minor Art							
0.3759	0.0945	0.3145	0.0970	0.0446	0.0218	0.0021	0.0018
0.0013	0.0049	0.0057	0.0062	0.0223	0.0011	0.0006	0.0057
Coll							
0.3809	0.0958	0.3187	0.0982	0.0451	0.0178	0.0017	0.0015
0.0011	0.0040	0.0047	0.0051	0.0182	0.0009	0.0005	0.0058
Local							
0.3723	0.0936	0.3114	0.0960	0.0441	0.0247	0.0024	0.0020
0.0015	0.0055	0.0065	0.0071	0.0253	0.0013	0.0006	0.0057

5.1.2 2013 State Vehicle Mix

Rural

LDV	LDT1	LDT2	LDT3	LDT4	HDV2B	HDV3	HDV4
HDV5	HDV6	HDV7	HDV8a	HDV8b	HDBS	HDBT	MC
Interstate							
0.2897	0.0846	0.2817	0.0869	0.0399	0.0682	0.0066	0.0056
0.0042	0.0152	0.0180	0.0196	0.0698	0.0035	0.0017	0.0048
Princ. Art.							
0.3159	0.0923	0.3073	0.0947	0.0435	0.0453	0.0044	0.0037
0.0028	0.0101	0.0120	0.0130	0.0463	0.0023	0.0012	0.0052
Minor Art.							
0.3283	0.0959	0.3194	0.0985	0.0452	0.0344	0.0034	0.0028
0.0021	0.0077	0.0091	0.0099	0.0352	0.0018	0.0009	0.0054
Major Collector							
0.3270	0.0955	0.3180	0.0980	0.0450	0.0357	0.0035	0.0029
0.0022	0.0080	0.0094	0.0102	0.0365	0.0018	0.0009	0.0054

Minor Collector							
0.3346	0.0977	0.3254	0.1003	0.0461	0.0290	0.0028	0.0024
0.0018	0.0065	0.0077	0.0083	0.0297	0.0015	0.0007	0.0055
Local							
0.3291	0.0961	0.3201	0.0987	0.0453	0.0338	0.0033	0.0028
0.0021	0.0075	0.0089	0.0097	0.0346	0.0017	0.0009	0.0054

Urban

LDV	LDT1	LDT2	LDT3	LDT4	HDV2B	HDV3	HDV4
HDV5	HDV6	HDV7	HDV8a	HDV8b	HDBS	HDBT	MC
Interstate							
0.3207	0.0936	0.3118	0.0961	0.0441	0.0412	0.0040	0.0034
0.0025	0.0092	0.0109	0.0118	0.0422	0.0021	0.0011	0.0053
Freeway							
0.3294	0.0963	0.3206	0.0988	0.0454	0.0334	0.0033	0.0027
0.0021	0.0074	0.0088	0.0096	0.0342	0.0017	0.0009	0.0054
Princ. Art.							
0.3361	0.0982	0.3270	0.1008	0.0463	0.0276	0.0027	0.0023
0.0017	0.0062	0.0073	0.0079	0.0283	0.0014	0.0007	0.0055
Minor Art							
0.3429	0.1002	0.3335	0.1028	0.0472	0.0218	0.0021	0.0018
0.0013	0.0049	0.0057	0.0062	0.0223	0.0011	0.0006	0.0056
Coll							
0.3474	0.1015	0.3379	0.1042	0.0478	0.0178	0.0017	0.0015
0.0011	0.0040	0.0047	0.0051	0.0182	0.0009	0.0005	0.0057
Local							
0.3395	0.0992	0.3302	0.1018	0.0468	0.0247	0.0024	0.0020
0.0015	0.0055	0.0065	0.0071	0.0253	0.0013	0.0006	0.0056

5.1.3 2016 State Vehicle Mix

Rural

LDV	LDT1	LDT2	LDT3	LDT4	HDV2B	HDV3	HDV4
HDV5	HDV6	HDV7	HDV8a	HDV8b	HDBS	HDBT	MC
Interstate							
0.2694	0.0881	0.2933	0.0904	0.0415	0.0682	0.0068	0.0057
0.0042	0.0153	0.0181	0.0195	0.0696	0.0035	0.0017	0.0047
Princ. Art.							
0.2938	0.0961	0.3200	0.0986	0.0453	0.0452	0.0045	0.0038
0.0028	0.0102	0.0120	0.0129	0.0462	0.0023	0.0012	0.0051
Minor Art.							
0.3055	0.0999	0.3325	0.1025	0.0471	0.0344	0.0034	0.0029
0.0021	0.0077	0.0091	0.0098	0.0351	0.0018	0.0009	0.0053
Major Collector							
0.3041	0.0994	0.3311	0.1021	0.0469	0.0356	0.0035	0.0030
0.0022	0.0080	0.0095	0.0102	0.0364	0.0018	0.0009	0.0053

Minor Collector							
0.3113	0.1017	0.3388	0.1044	0.0480	0.0290	0.0029	0.0024
0.0018	0.0065	0.0077	0.0083	0.0296	0.0015	0.0007	0.0054
Local							
0.3060	0.1001	0.3332	0.1027	0.0472	0.0338	0.0034	0.0028
0.0021	0.0076	0.0090	0.0097	0.0345	0.0017	0.0009	0.0053

Urban							
LDV	LDT1	LDT2	LDT3	LDT4	HDV2B	HDV3	HDV4
HDV5	HDV6	HDV7	HDV8a	HDV8b	HDBS	HDBT	MC
Interstate							
0.2980	0.0975	0.3246	0.1001	0.0460	0.0412	0.0041	0.0035
0.0025	0.0093	0.0109	0.0118	0.0421	0.0021	0.0011	0.0052
Freeway							
0.3066	0.1002	0.3337	0.1029	0.0473	0.0334	0.0033	0.0028
0.0020	0.0075	0.0089	0.0095	0.0340	0.0017	0.0009	0.0053
Princ. Art.							
0.3129	0.1022	0.3404	0.1049	0.0482	0.0276	0.0027	0.0023
0.0017	0.0062	0.0073	0.0079	0.0282	0.0014	0.0007	0.0054
Minor Art							
0.3190	0.1043	0.3472	0.1070	0.0492	0.0217	0.0022	0.0018
0.0013	0.0049	0.0058	0.0062	0.0222	0.0011	0.0006	0.0055
Coll							
0.3232	0.1056	0.3518	0.1084	0.0498	0.0178	0.0018	0.0015
0.0011	0.0040	0.0047	0.0051	0.0182	0.0009	0.0005	0.0056
Local							
0.3157	0.1032	0.3438	0.1060	0.0487	0.0247	0.0025	0.0021
0.0015	0.0055	0.0066	0.0071	0.0252	0.0013	0.0006	0.0055

5.1.4 2019 State Vehicle Mix

Rural							
LDV	LDT1	LDT2	LDT3	LDT4	HDV2B	HDV3	HDV4
HDV5	HDV6	HDV7	HDV8a	HDV8b	HDBS	HDBT	MC
Interstate							
0.2556	0.0905	0.3013	0.0929	0.0427	0.0681	0.0067	0.0057
0.0043	0.0152	0.0180	0.0195	0.0697	0.0035	0.0017	0.0046
Princ. Art.							
0.2787	0.0987	0.3287	0.1013	0.0466	0.0452	0.0045	0.0038
0.0029	0.0101	0.0119	0.0130	0.0462	0.0023	0.0011	0.0050
Minor Art.							
0.2895	0.1026	0.3416	0.1053	0.0484	0.0344	0.0034	0.0029
0.0022	0.0077	0.0091	0.0099	0.0352	0.0017	0.0009	0.0052
Major Collector							
0.2884	0.1021	0.3401	0.1049	0.0482	0.0356	0.0035	0.0030
0.0023	0.0080	0.0094	0.0102	0.0364	0.0018	0.0009	0.0052

Minor Collector							
0.2951	0.1045	0.3481	0.1073	0.0494	0.0290	0.0029	0.0024
0.0018	0.0065	0.0076	0.0083	0.0296	0.0015	0.0007	0.0053
Local							
0.2904	0.1028	0.3423	0.1055	0.0485	0.0338	0.0033	0.0028
0.0021	0.0075	0.0089	0.0097	0.0346	0.0017	0.0009	0.0052

Urban							
LDV	LDT1	LDT2	LDT3	LDT4	HDV2B	HDV3	HDV4
HDV5	HDV6	HDV7	HDV8a	HDV8b	HDBS	HDBT	MC
Interstate							
0.2827	0.1001	0.3335	0.1028	0.0473	0.0412	0.0041	0.0035
0.0026	0.0092	0.0109	0.0118	0.0421	0.0021	0.0010	0.0051
Freeway							
0.2908	0.1029	0.3429	0.1057	0.0486	0.0333	0.0033	0.0028
0.0021	0.0074	0.0088	0.0096	0.0341	0.0017	0.0008	0.0052
Princ. Art.							
0.2965	0.1050	0.3497	0.1078	0.0496	0.0276	0.0027	0.0023
0.0018	0.0062	0.0073	0.0079	0.0282	0.0014	0.0007	0.0053
Minor Art							
0.3024	0.1071	0.3567	0.1100	0.0506	0.0217	0.0022	0.0018
0.0014	0.0049	0.0057	0.0062	0.0222	0.0011	0.0006	0.0054
Coll							
0.3064	0.1085	0.3614	0.1114	0.0512	0.0178	0.0018	0.0015
0.0011	0.0040	0.0047	0.0051	0.0182	0.0009	0.0005	0.0055
Local							
0.2993	0.1061	0.3532	0.1089	0.0501	0.0247	0.0024	0.0021
0.0016	0.0055	0.0065	0.0071	0.0252	0.0013	0.0006	0.0054

5.1.4 2022 and 2025 State Vehicle Mix

Rural							
LDV	LDT1	LDT2	LDT3	LDT4	HDV2B	HDV3	HDV4
HDV5	HDV6	HDV7	HDV8a	HDV8b	HDBS	HDBT	MC
Interstate							
0.2509	0.0913	0.3039	0.0937	0.0431	0.0681	0.0067	0.0057
0.0043	0.0153	0.0181	0.0196	0.0696	0.0034	0.0017	0.0046
Princ. Art.							
0.2736	0.0996	0.3315	0.1022	0.0470	0.0452	0.0044	0.0038
0.0029	0.0102	0.0120	0.0130	0.0462	0.0023	0.0011	0.0050
Minor Art.							
0.2843	0.1036	0.3446	0.1062	0.0489	0.0343	0.0034	0.0029
0.0022	0.0077	0.0091	0.0099	0.0351	0.0017	0.0009	0.0052
Major Collector							
0.2832	0.1031	0.3431	0.1057	0.0487	0.0356	0.0035	0.0030
0.0022	0.0080	0.0094	0.0102	0.0364	0.0018	0.0009	0.0052

Minor Collector							
0.2897	0.1055	0.3511	0.1082	0.0498	0.0290	0.0029	0.0024
0.0018	0.0065	0.0077	0.0083	0.0296	0.0015	0.0007	0.0053
Local							
0.2849	0.1038	0.3453	0.1064	0.0490	0.0338	0.0033	0.0028
0.0021	0.0076	0.0090	0.0097	0.0345	0.0017	0.0009	0.0052

Urban							
LDV	LDT1	LDT2	LDT3	LDT4	HDV2B	HDV3	HDV4
HDV5	HDV6	HDV7	HDV8a	HDV8b	HDBS	HDBT	MC
Interstate							
0.2774	0.1011	0.3364	0.1037	0.0477	0.0412	0.0041	0.0034
0.0026	0.0093	0.0109	0.0119	0.0421	0.0021	0.0010	0.0051
Freeway							
0.2854	0.1039	0.3458	0.1066	0.0491	0.0333	0.0033	0.0028
0.0021	0.0075	0.0088	0.0096	0.0341	0.0017	0.0008	0.0052
Princ. Art.							
0.2913	0.1060	0.3527	0.1087	0.0500	0.0276	0.0027	0.0023
0.0017	0.0062	0.0073	0.0079	0.0282	0.0014	0.0007	0.0053
Minor Art							
0.2970	0.1081	0.3598	0.1109	0.0510	0.0217	0.0021	0.0018
0.0014	0.0049	0.0058	0.0063	0.0222	0.0011	0.0005	0.0054
Coll							
0.3008	0.1096	0.3645	0.1124	0.0517	0.0178	0.0018	0.0015
0.0011	0.0040	0.0047	0.0051	0.0182	0.0009	0.0004	0.0055
Local							
0.2941	0.1071	0.3562	0.1098	0.0505	0.0247	0.0024	0.0021
0.0016	0.0055	0.0065	0.0071	0.0252	0.0012	0.0006	0.0054

5.2 METEOROLOGY: TEMPERATURE AND RELATIVE HUMIDITY

STATE CLIMATE OFFICE OF NORTH CAROLINA
NC CRONOS Database
Data retrieval from Douglas International Airport (KCLT)
Charlotte, Mecklenburg County
Latitude: 35.2140111   Longitude: -80.9431258
Elevation: 748 ft.

Month	Hour	Number of Records Compiled	Average Temperature (F)	Average Relative Humidity (%)
7	0	31	75.5	77
7	1	31	75.1	78
7	2	31	74.2	81
7	3	31	73.3	84
7	4	31	72.9	85
7	5	31	73.1	85
7	6	31	75.8	79
7	7	31	79.4	71
7	8	31	82.5	65
7	9	31	85	59
7	10	31	86.8	54
7	11	31	88.7	50
7	12	31	89.7	48
7	13	31	90.4	47
7	14	31	91.2	45
7	15	31	90.3	46
7	16	31	89.1	48
7	17	31	87.4	52
7	18	31	84.8	57
7	19	31	81.7	63
7	20	31	79.6	69
7	21	31	79.1	69
7	22	31	76.9	74
7	23	31	76.3	76

Appendix B.4

Nonroad Mobile Sources
Emission Inventory Documentation

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List of Tables

1.0 INTRODUCTION AND SCOPE

Nonroad mobile sources are equipment that can move but are not licensed to use the public roads and highways. The nonroad mobile source category includes a diverse collection of equipment such as lawn mowers, chain saws, tractors, all terrain vehicles, forklifts and construction equipment. The majority of the emissions from this equipment are calculated using the NONROAD model developed by the United States Environmental Protection Agency (USEPA). This category also includes aircraft, railroad locomotives, and commercial marine vessels. No commercial marine vessels operate in Cabarrus, Gaston, Iredell, Lincoln, Mecklenburg, Rowan, or Union counties so no emissions for this category are reported.

For this redesignation demonstration and maintenance plan, emissions of oxides of nitrogen (NOx) and volatile organic compounds (VOC) were estimated for the base year of 2010 and future years of 2013, 2016, 2019, 2022, and 2025.

This document (Appendix B.4) discusses the nonroad mobile source emissions inventory development for the Charlotte-Gastonia-Rock Hill 1997 8-hour ozone nonattainment area. The Charlotte-Gastonia-Rock Hill 1997 8-hour ozone nonattainment area (referred to as the Metrolina Area) includes the North Carolina counties of Cabarrus, Gaston, Lincoln, Mecklenburg, Rowan, and Union; Coddle Creek and Davidson townships of Iredell County, North Carolina; and Rock Hill Metropolitan Planning Organization boundary in York County, South Carolina.

The South Carolina Department of Health and Environmental Control (SCDHEC) have developed a maintenance plan for the South Carolina portion of the nonattainment area. A copy of the SCDHEC redesignation demonstration and maintenance plan is available upon request.

2.0 OVERALL METHODOLOGY

2.1 SOURCE CATEGORY IDENTIFICATION

Nonroad 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). Nonroad mobile source emissions are estimated by the methodologies suggested in the USEPA 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);

from the USEPA's nonroad mobile model NONROAD2008a released July 6, 2009; and from the EDMS5.0 model developed by the USEPA and the Federal Aviation Administration (FAA).

2.2 EMISSION ESTIMATION APPROACH

For the majority of nonroad mobile source categories, emissions were estimated using the USEPA's NONROAD2008a model. Model runs were performed for each of the seven counties for each of the five years. The model runs were developed for a typical July weekday. The part of Iredell County that is in the nonattainment area had 32.5 percent of the county population in the year 2000. The emissions for the various source categories estimated by the NONROAD model for Iredell (with the exception of railroad equipment-see below) were multiplied by 0.325 to estimate the emissions for the nonroad portion. In emissions tables below an asterisk (*) is placed beside Iredell County as a reminder that the emissions are for part of the county.

Aircraft emissions for 2008 were obtained by downloading the USEPA developed airport emission estimates from the 2008 National Emission Inventory (NEI). Also downloaded from the NEI were North Carolina Division of Air Quality (NCDAQ) estimates of military aircraft emissions at civilian airports. In addition, military at civilian airport emissions were calculated for Mecklenburg County (a local program county) to replace what the USEPA had in the NEI. Estimates of emissions for ground support equipment for military aircraft at civilian airports were also made. Four small airports in Iredell County were found to be in the nonattainment townships by using map coordinates so only their emission estimates are reported for Iredell County rather than using an apportionment calculation from the county total.

Growth factors to estimate aircraft emissions for 2010, 2013. 2016, 2019, 2022, and 2025 were developed by the NCDAQ using predicted operations counts from the FAA's Terminal Area Forecast (TAF) model.

Railroad emissions for 2008 (Class I, II, III, and railyards) were downloaded from the 2008 NEI. This inventory was developed by the Eastern Regional Technical Advisory Committee (ERTAC) for the USEPA. Passenger railroad emissions were developed by the NCDAQ for 2008. Growth factors were based on projected railroad fuel use. Future emission reductions due to emission control measures were calculated based on future emission factors published in the USEPA document *Emission Factors for Locomotives*, EPA-420-F-09-025.

Iredell County has no rail yards or passenger railroad activity. Only a Class I railroad runs through the nonattainment portion of Iredell. Class I locomotive emissions were apportioned by determining the fraction of Class I railroad track in the two townships compared to the county wide Class I track (0.2751). Emissions from railroad equipment from the NONROAD model calculation (used for maintenance) were apportioned using the fraction of track in the nonattainment townships compared to all track in the county (0.2157). Lengths of track were determined using the "measure" tool in our Geographic Information System (GIS) software.

3.0 QUALITY ASSURANCE MEASURES

For the NONROAD model runs, the options files (files that display the variables used to setup a model run) and calculations were reviewed by a second person who did not perform the actual runs. The model results were also evaluated by comparing one county to another to see that the results were reasonable taking into consideration the differences between the counties.

Information about the quality assurance measures taken in developing the 2008 aircraft inventory may be found in the USEPA documentation about that project (*Documentation for Aircraft Component of the National Emissions Inventory Methodology*, ERG No.: 0245.03.402.001, Contract No.: EP-D-07-097). For military aircraft at civilian airports, the NCDAQ developed emission factors based on surveys of military aircraft operations at military airports in the State. These factors were derived from operations counts and emissions calculated using the Emission and Dispersion Modeling System version 5.1.2 (EDMS). Work was carefully reviewed. Growth factors were calculated using data provided by the Federal Aviation Administration.

Information about the quality assurance measures taken in developing the 2008 railroad inventory may be found in the USEPA documentation about that project (*Documentation for Locomotive Component of the National Emissions Inventory Methodology,* ERG No.: 0245.03.402.001, Contract No.: EP-D-07-097). Passenger railroad emissions for 2008 were developed for 2008 by the NCDAQ based on activity data from the North Carolina Department of Transportation. Work was carefully reviewed and passed the USEPA requirements for inclusion in the NEI.

4.0 EMISSIONS AND DETAILED METHODOLOGY

4.1 CATEGORIES FROM THE NONROAD MODEL

The USEPA included more than 80 different types of equipment in the NONROAD model. To facilitate analysis and reporting, the USEPA grouped the equipment types into eleven equipment categories. These include:

Agricultural equipment	Lawn and garden equipment, commercial
Commercial equipment	Logging equipment
Construction and mining equipment	Pleasure craft (recreational marine)
Industrial equipment	Railroad maintenance equipment
Lawn and garden equipment, residential	Recreational equipment

The eleventh category, aircraft ground support equipment, was not calculated with the NONROAD model because the method of calculation performed by the EDMS model was judged to be superior. Additionally, the emissions are estimated for five different engine types. These include: 2-stroke and 4-stroke spark ignition engines, diesel engines, liquid propane gas and compressed natural gas fueled engines.

The NONROAD2008a model version was used to estimate emissions for the maintenance plan. This latest version of the model was released to the public on July 6, 2009.

NONROAD2008a is the latest release of the USEPA NONROAD model that was first released in June 2000, and incorporates many revisions to improve the model's predictive ability. This model revision accounts for emission reductions from the Diesel Recreational Marine standards in the Locomotive Engines and Marine Compression-Ignition Engines Less Than 30 Liters per Cylinder final rule published in the Federal Register (FR) (73 FR 25098) and the Small Spark Ignition Engines and Spark Ignition Recreational Marine Engines final rule (73 FR 59034). There are a number of additional improvements including the ability to model the effects of ethanol blends on fuel tank and hose permeation losses.

The options files (wherein all the modeling variables are set) used in the NONROAD2008a model were tailored to reflect North Carolina specific information. Copies of the options input files are in Section 6.0 of this document. The model was run for a typical July weekday for the years 2010, 2013, 2016, 2019, 2022, and 2025. The seasonal file for the model was modified to place North Carolina in the Southeast states group rather than the Mid-Atlantic group. This change was made because the NCDAQ had reviewed temperature data for North Carolina compared to states in the Southeast and the Mid-Atlantic. The results of this comparison indicated that North Carolina temperatures are more in-line with the Southeast States. Future year estimates of fuel oxygen (due to Federal ethanol mandates) and fuel sulfur (due to the USEPA requirements) were incorporated. Default data was used for the remaining input files used in the NONROAD model.

For reporting purposes, the resulting emissions from the NONROAD2008a model were totaled for each equipment category by county. The results for most of the equipment categories by county indicate a reduction in emissions with time into the future years. These reduced emission projections are influenced by several factors, including expected future changes in engine standards, fuel specifications, scrappage of old equipment, and activity levels. These future engine standards and activity levels are accounted for in the model.

The summary of the model results expressed in tons emitted per typical July weekday are tabulated in Table 4-1 through Table 4-10. As mentioned previously, emissions shown for Iredell County are those for the nonattainment portion. They were determined by the fraction of the county population residing in the nonattainment area or by the fraction of railroad track in the nonattainment area in the case of railroad equipment.

Table 4- 1 Agricultural Equipment Emissions, tons/day

County	2010	2013	2016	2019	2022	2025
NOx Emissions (tons/day)						
Cabarrus	0.17	0.15	0.13	0.10	0.08	0.07
Gaston	0.08	0.07	0.06	0.05	0.04	0.03
Iredell*	0.11	0.10	0.09	0.07	0.06	0.05
Lincoln	0.15	0.13	0.11	0.09	0.07	0.06
Mecklenburg	0.04	0.04	0.03	0.03	0.02	0.02
Rowan	0.31	0.27	0.23	0.19	0.15	0.13
Union	0.69	0.61	0.52	0.43	0.35	0.28
Total	1.55	1.37	1.17	0.96	0.77	0.64
VOC Emissions (tons/day)						
Cabarrus	0.02	0.02	0.01	0.01	0.01	0.01
Gaston	0.01	0.01	0.01	0.01	0.01	0.00
Iredell*	0.01	0.01	0.01	0.01	0.01	0.01
Lincoln	0.02	0.01	0.01	0.01	0.01	0.01
Mecklenburg	0.00	0.00	0.00	0.00	0.00	0.00
Rowan	0.04	0.03	0.02	0.02	0.02	0.02
Union	0.08	0.07	0.06	0.05	0.04	0.04
Total	0.18	0.15	0.12	0.11	0.10	0.09

* Iredell County emissions for nonattainment area only

Table 4- 2 Commercial Equipment Emissions, tons/day

County	2010	2013	2016	2019	2022	2025
NOx Emissions (tons/day)						
Cabarrus	0.17	0.15	0.13	0.12	0.11	0.10
Gaston	0.19	0.17	0.15	0.14	0.13	0.12
Iredell*	0.07	0.06	0.05	0.05	0.05	0.04
Lincoln	0.07	0.06	0.05	0.05	0.04	0.04
Mecklenburg	2.22	1.97	1.73	1.58	1.46	1.38
Rowan	0.11	0.10	0.09	0.08	0.07	0.07
Union	0.24	0.21	0.19	0.17	0.16	0.15
Total	3.07	2.72	2.39	2.19	2.02	1.90
VOC Emissions (tons/day)						
Cabarrus	0.22	0.17	0.15	0.15	0.15	0.16
Gaston	0.25	0.19	0.16	0.16	0.16	0.17
Iredell*	0.09	0.07	0.06	0.06	0.06	0.07
Lincoln	0.09	0.07	0.06	0.06	0.06	0.06
Mecklenburg	2.83	2.17	1.87	1.85	1.90	1.97
Rowan	0.15	0.11	0.10	0.10	0.10	0.10
Union	0.32	0.25	0.21	0.21	0.22	0.23
Total	3.95	3.03	2.61	2.59	2.65	2.76

* Iredell County emissions for nonattainment area only

Table 4- 3 Construction and Mining Equipment Emissions, tons/day

County	2010	2013	2016	2019	2022	2025
NOx Emissions (tons/day)						
Cabarrus	1.43	1.20	0.92	0.70	0.56	0.47
Gaston	1.04	0.87	0.67	0.51	0.40	0.34
Iredell*	0.44	0.37	0.28	0.22	0.17	0.15
Lincoln	0.38	0.32	0.25	0.19	0.15	0.13
Mecklenburg	12.12	10.17	7.81	5.97	4.72	4.00
Rowan	0.45	0.37	0.29	0.22	0.17	0.15
Union	2.54	2.13	1.64	1.25	0.99	0.84
Total	18.40	15.43	11.86	9.06	7.16	6.08
VOC Emissions (tons/day)						
Cabarrus	0.20	0.17	0.15	0.14	0.13	0.12
Gaston	0.15	0.13	0.11	0.10	0.09	0.09
Iredell*	0.06	0.05	0.05	0.04	0.04	0.04
Lincoln	0.05	0.05	0.04	0.04	0.03	0.03
Mecklenburg	1.72	1.46	1.28	1.16	1.08	1.03
Rowan	0.06	0.05	0.05	0.04	0.04	0.04
Union	0.36	0.31	0.27	0.24	0.23	0.22
Total	2.60	2.22	1.95	1.76	1.64	1.57

* Iredell County emissions for nonattainment area only

Table 4- 4 Industrial Equipment Emissions, tons/day

County	2010	2013	2016	2019	2022	2025
NOx Emissions (tons/day)						
Cabarrus	0.38	0.25	0.18	0.15	0.14	0.14
Gaston	0.70	0.46	0.31	0.25	0.24	0.24
Iredell*	0.18	0.12	0.08	0.06	0.06	0.06
Lincoln	0.23	0.15	0.10	0.08	0.08	0.08
Mecklenburg	1.67	1.12	0.79	0.66	0.63	0.64
Rowan	0.54	0.35	0.24	0.19	0.18	0.18
Union	0.51	0.33	0.23	0.19	0.17	0.18
Total	4.21	2.78	1.93	1.58	1.50	1.52
VOC Emissions (tons/day)						
Cabarrus	0.08	0.04	0.03	0.02	0.02	0.02
Gaston	0.15	0.08	0.05	0.03	0.03	0.03
Iredell*	0.04	0.02	0.01	0.01	0.01	0.01
Lincoln	0.05	0.03	0.02	0.01	0.01	0.01
Mecklenburg	0.34	0.18	0.11	0.08	0.08	0.07
Rowan	0.11	0.06	0.04	0.03	0.02	0.02
Union	0.11	0.06	0.03	0.03	0.02	0.02
Total	0.88	0.47	0.29	0.21	0.19	0.18

* Iredell County emissions for nonattainment area only

Table 4- 5 Lawn and Garden Equipment (Commercial) Emissions, tons/day

County	2010	2013	2016	2019	2022	2025
NOx Emissions (tons/day)						
Cabarrus	0.23	0.19	0.17	0.17	0.17	0.17
Gaston	0.15	0.12	0.11	0.11	0.11	0.11
Iredell*	0.02	0.01	0.01	0.01	0.01	0.01
Lincoln	0.05	0.04	0.04	0.04	0.04	0.04
Mecklenburg	2.07	1.69	1.53	1.49	1.48	1.49
Rowan	0.05	0.04	0.04	0.04	0.04	0.04
Union	0.46	0.38	0.34	0.33	0.33	0.33
Total	3.03	2.47	2.24	2.19	2.18	2.19
VOC Emissions (tons/day)						
Cabarrus	0.79	0.68	0.64	0.66	0.69	0.72
Gaston	0.51	0.44	0.41	0.43	0.45	0.46
Iredell*	0.05	0.05	0.04	0.05	0.05	0.05
Lincoln	0.19	0.16	0.15	0.16	0.16	0.17
Mecklenburg	7.00	5.96	5.56	5.83	6.08	6.34
Rowan	0.19	0.16	0.15	0.16	0.16	0.17
Union	1.58	1.35	1.28	1.32	1.38	1.44
Total	10.31	8.80	8.23	8.61	8.97	9.35

* Iredell County emissions for nonattainment area only

Table 4- 6 Lawn and Garden Equipment (Residential) Emissions, tons/day

County	2010	2013	2016	2019	2022	2025
NOx Emissions (tons/day)						
Cabarrus	0.04	0.03	0.02	0.02	0.02	0.02
Gaston	0.05	0.04	0.03	0.03	0.03	0.03
Iredell*	0.01	0.01	0.01	0.01	0.01	0.01
Lincoln	0.02	0.01	0.01	0.01	0.01	0.01
Mecklenburg	0.21	0.17	0.14	0.13	0.13	0.13
Rowan	0.04	0.03	0.02	0.02	0.02	0.02
Union	0.03	0.03	0.02	0.02	0.02	0.02
Total	0.40	0.32	0.25	0.24	0.24	0.24
VOC Emissions (tons/day)						
Cabarrus	0.34	0.26	0.21	0.20	0.20	0.21
Gaston	0.46	0.35	0.28	0.26	0.26	0.27
Iredell*	0.11	0.08	0.07	0.06	0.06	0.07
Lincoln	0.17	0.13	0.10	0.10	0.10	0.10
Mecklenburg	1.84	1.40	1.12	1.03	1.05	1.09
Rowan	0.34	0.26	0.21	0.19	0.20	0.21
Union	0.31	0.24	0.19	0.18	0.18	0.19
Total	3.57	2.72	2.18	2.02	2.05	2.14

* Iredell County emissions for nonattainment area only

Table 4- 7 Logging Equipment Emissions, tons/day

County	2010	2013	2016	2019	2022	2025
NOx Emissions (tons/day)						
Cabarrus	0.01	0.00	0.00	0.00	0.00	0.00
Gaston	0.00	0.00	0.00	0.00	0.00	0.00
Iredell*	0.00	0.00	0.00	0.00	0.00	0.00
Lincoln	0.01	0.00	0.00	0.00	0.00	0.00
Mecklenburg	0.01	0.00	0.00	0.00	0.00	0.00
Rowan	0.02	0.01	0.01	0.00	0.00	0.00
Union	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.05	0.01	0.01	0.00	0.00	0.00
VOC Emissions (tons/day)						
Cabarrus	0.00	0.00	0.00	0.00	0.00	0.00
Gaston	0.00	0.00	0.00	0.00	0.00	0.00
Iredell*	0.00	0.00	0.00	0.00	0.00	0.00
Lincoln	0.00	0.00	0.00	0.00	0.00	0.00
Mecklenburg	0.00	0.00	0.00	0.00	0.00	0.01
Rowan	0.01	0.01	0.01	0.01	0.01	0.02
Union	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.01	0.01	0.01	0.01	0.01	0.03

* Iredell County emissions for nonattainment area only

Table 4- 8 Pleasure Craft Emissions, tons/day

County	2010	2013	2016	2019	2022	2025
NOx Emissions (tons/day)						
Cabarrus	0.00	0.00	0.00	0.00	0.00	0.00
Gaston	0.01	0.01	0.01	0.01	0.01	0.01
Iredell*	0.01	0.01	0.01	0.01	0.01	0.01
Lincoln	0.01	0.01	0.01	0.01	0.01	0.01
Mecklenburg	0.04	0.04	0.04	0.04	0.04	0.04
Rowan	0.02	0.02	0.02	0.02	0.02	0.02
Union	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.09	0.09	0.09	0.09	0.09	0.09
VOC Emissions (tons/day)						
Cabarrus	0.01	0.01	0.01	0.00	0.00	0.00
Gaston	0.09	0.07	0.06	0.04	0.03	0.03
Iredell*	0.08	0.06	0.05	0.04	0.03	0.03
Lincoln	0.10	0.08	0.06	0.05	0.04	0.03
Mecklenburg	0.28	0.22	0.17	0.13	0.10	0.09
Rowan	0.16	0.13	0.10	0.08	0.06	0.05
Union	0.03	0.02	0.02	0.01	0.01	0.01
Total	0.75	0.59	0.47	0.35	0.27	0.24

* Iredell County emissions for nonattainment area only

Table 4- 9 Railroad Equipment Emissions, tons/day

County	2010	2013	2016	2019	2022	2025
NOx Emissions (tons/day)						
Cabarrus	0.00	0.00	0.00	0.00	0.00	0.00
Gaston	0.00	0.00	0.00	0.00	0.00	0.00
Iredell*	0.00	0.00	0.00	0.00	0.00	0.00
Lincoln	0.00	0.00	0.00	0.00	0.00	0.00
Mecklenburg	0.00	0.00	0.00	0.00	0.00	0.00
Rowan	0.00	0.00	0.00	0.00	0.00	0.00
Union	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00
VOC Emissions (tons/day)						
Cabarrus	0.00	0.00	0.00	0.00	0.00	0.00
Gaston	0.00	0.00	0.00	0.00	0.00	0.00
Iredell*	0.00	0.00	0.00	0.00	0.00	0.00
Lincoln	0.00	0.00	0.00	0.00	0.00	0.00
Mecklenburg	0.00	0.00	0.00	0.00	0.00	0.00
Rowan	0.00	0.00	0.00	0.00	0.00	0.00
Union	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00

* Iredell County emissions for nonattainment area only

Table 4- 10 Recreational Equipment Emissions, tons/day

County	2010	2013	2016	2019	2022	2025
NOx Emissions (tons/day)						
Cabarrus	0.00	0.00	0.00	0.00	0.00	0.00
Gaston	0.01	0.01	0.01	0.01	0.01	0.01
Iredell*	0.01	0.01	0.01	0.01	0.01	0.01
Lincoln	0.01	0.01	0.01	0.01	0.01	0.01
Mecklenburg	0.05	0.05	0.05	0.05	0.05	0.05
Rowan	0.03	0.02	0.02	0.02	0.02	0.02
Union	0.01	0.01	0.01	0.01	0.01	0.01
Total	0.12	0.11	0.11	0.11	0.11	0.11
VOC Emissions (tons/day)						
Cabarrus	0.01	0.00	0.00	0.00	0.00	0.00
Gaston	0.26	0.23	0.19	0.16	0.14	0.14
Iredell*	0.16	0.14	0.12	0.10	0.09	0.09
Lincoln	0.24	0.22	0.19	0.15	0.14	0.13
Mecklenburg	1.23	1.10	0.93	0.76	0.69	0.65
Rowan	0.73	0.66	0.56	0.45	0.41	0.39
Union	0.25	0.22	0.19	0.15	0.14	0.13
Total	2.88	2.57	2.18	1.77	1.61	1.53

* Iredell County emissions for nonattainment area only

4.2 AIRCRAFT ENGINES AND AIRPORT GROUND SUPPORT

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 have little or no effect on ground level air pollutants.

The aircraft operations of interest are produced during 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. Associated with these emissions are emissions from ground support equipment (GSE) and auxiliary power units (APU).

Aircraft 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 and 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. Air taxis may also be used for unscheduled on-demand flights. General aviation includes 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. Military operations at civilian airports (as in the Metrolina area) are often associated with National Guard, Army Reserve, and Air Force Reserve training.

Emission estimates were developed by the USEPA for year 2008 for all airports in North Carolina as part of the National Emission Inventory. Emission calculations for commercial aircraft were made using the EDMS 5.1 model developed by the USEPA and the Federal Aviation Administration (FAA). Emissions for air taxi and general aviation (both subgrouped into piston engine and turbine engine categories) were made using emission factors developed by the EPA working with the FAA. More detail about this process is found in *Documentation for Aircraft Component of the National Emissions Inventory Methodology*, ERG No.: 0245.02.302.001, Contract No.: EP-D-07-097 prepared by Eastern Research Group under contract to E.H. Pechan for the USEPA.

For military operations at civilian airports, emissions were calculated using emission factors developed by the NCDAQ from surveys of military airports in North Carolina. Two US Army airports, two US Air Force airports, and one US Coast Guard airport responded to requests for information about flight operations by aircraft type (the US Marine Corps failed to provide information). From this information, emissions at the military airports were calculated and then emission factors were developed on a per operation basis for aircraft and for ground support equipment. Because fighter aircraft are believed to seldom operate at North Carolina's civilian airports (although they are a major factor at Seymour Johnson Airbase) they were excluded from the emission factor development. The emission factors were multiplied by military operations count estimates from the Terminal Area Forecast model to produce emissions.

Factors to project from 2008 to 2010, 2013, 2016, 2019, 2022, and 2025 were developed by the NCDAQ using activity projections from the FAA's Terminal Area Forecast (TAF) for North Carolina. The TAF estimates future activity at seven airports in the seven county area. Growth factors specific to these airports were developed. Composit projection factors were developed from these seven airports' estimates and applied to the other small airports in the seven Metrolina counties in North Carolina. See the section 5.1 below concerning aircraft growth factors for more detail.

The EDMS model calculates emissions from ground support equipment and emissions from auxiliary power units (APU) both associated with certain aircraft. Ground support equipment consists of equipment such as tractors used to tow airplanes to the gate or catering trucks that bring food to large airliners. APUs are typically smaller engines on aircraft that provide power for electricity or air conditioning when the main engines are shut off.

As previously mentioned, the emissions reported in Iredell County are those from four small airports in the two nonattainment townships.

Table 4- 11 Aircraft and Auxiliary Power Units Emissions, tons/day

County	2010	2013	2016	2019	2022	2025
NOx Emissions (tons/day)						
Cabarrus	0.02	0.01	0.01	0.01	0.01	0.01
Gaston	0.00	0.00	0.00	0.00	0.00	0.00
Iredell*	0.00	0.00	0.00	0.00	0.00	0.00
Lincoln	0.01	0.01	0.01	0.01	0.01	0.01
Mecklenburg	4.83	5.21	5.62	5.90	6.20	6.51
Rowan	0.02	0.02	0.02	0.02	0.02	0.02
Union	0.01	0.01	0.01	0.01	0.01	0.01
Total	4.89	5.26	5.67	5.95	6.25	6.56
VOC Emissions (tons/day)						
Cabarrus	0.02	0.02	0.02	0.02	0.02	0.02
Gaston	0.01	0.01	0.01	0.01	0.01	0.01
Iredell*	0.00	0.00	0.00	0.00	0.00	0.00
Lincoln	0.01	0.01	0.01	0.01	0.01	0.01
Mecklenburg	0.60	0.65	0.70	0.73	0.77	0.80
Rowan	0.05	0.05	0.05	0.05	0.05	0.05
Union	0.02	0.02	0.02	0.02	0.02	0.02
Total	0.71	0.76	0.81	0.84	0.88	0.91

* Iredell County emissions for nonattainment area only

Table 4- 12 Aircraft Ground Support Equipment Emissions, tons/day

County	2010	2013	2016	2019	2022	2025
NOx Emissions (tons/day)						
Cabarrus	0.00	0.00	0.00	0.00	0.00	0.00
Gaston	0.00	0.00	0.00	0.00	0.00	0.00
Iredell*	0.00	0.00	0.00	0.00	0.00	0.00
Lincoln	0.00	0.00	0.00	0.00	0.00	0.00
Mecklenburg	0.61	0.66	0.71	0.75	0.79	0.83
Rowan	0.00	0.00	0.00	0.00	0.00	0.00
Union	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.61	0.66	0.71	0.75	0.79	0.83
VOC Emissions (tons/day)						
Cabarrus	0.00	0.00	0.00	0.00	0.00	0.00
Gaston	0.00	0.00	0.00	0.00	0.00	0.00
Iredell*	0.00	0.00	0.00	0.00	0.00	0.00
Lincoln	0.00	0.00	0.00	0.00	0.00	0.00
Mecklenburg	0.20	0.22	0.24	0.25	0.26	0.28
Rowan	0.00	0.00	0.00	0.00	0.00	0.00
Union	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.20	0.22	0.24	0.25	0.26	0.28

* Iredell County emissions for nonattainment area only

4.3 RAILROAD LOCOMOTIVES

Railroad companies are categorized by size (Class I, Class II, or Class III) and passenger service (Amtrak and North Carolina Department of Transportation (NCDOT) Rail Division). Class I railroad companies are long haul operations, consisting of Norfolk Southern Corporation and CSX Corporation. Class II and Class III railroad companies are short lines serving localized markets. Amtrak and the NCDOT Rail Division provide passenger service.

Railroad locomotive emissions for classes I, II, and III plus rail yards were calculated for all of North Carolina for 2008 as part of the ERTAC inventory developed for the 2008 National Emission Inventory. Some of the details of the ERTAC work are based on proprietary information provided by the railroad companies. The calculation methodologies followed procedures acceptable to the USEPA. Additional detail can be found in *Documentation for Locomotive Component of the National Emissions Inventory Methodology,* ERG No.: 0245.03.402.001, Contract No.: EP-D-07-097.

Passenger railroad emissions were developed by the NCDAQ for 2008. This was done using information supplied by the North Carolina Dapartment of Transportation and emission factors from *Emission Factors for Locomotives*, EPA-420-F-09-025. These 2008 emissions were added to the 2008 NEI to supplement the ERTAC estimates for the USEPA. Information about track miles for passenger service for each applicable county were provided by NCDOT Rail Division. This was done for Amtrak routes and for the trains run by the NCDOT. Fuel usage and total miles for the NCDOT train were provided. Number of locomotives for each train was known. Assuming that the Amtrak locomotives had fuel usage like the NCDOT locomotive, fuel burned per year and emissions per year (applying the applicable emission factors) were calculated for each county traversed by passenger trains.

The 2008 emissions were adjusted by growth and control factors to the years 2010, 2013, 2016, 2019, 2022, and 2025. See section 5.2 for detailed information. Railroad emissions are shown in Table 4- 13 below:

Table 4- 13 Railroad Emissions, tons/day

County	2010	2013	2016	2019	2022	2025
NOx Emissions (tons/day)						
Cabarrus	0.42	0.40	0.36	0.32	0.29	0.25
Gaston	0.58	0.55	0.49	0.43	0.38	0.33
Iredell*	0.05	0.04	0.04	0.03	0.03	0.03
Lincoln	0.27	0.26	0.23	0.20	0.18	0.15
Mecklenburg	1.56	1.53	1.40	1.29	1.17	1.02
Rowan	0.93	0.90	0.82	0.75	0.67	0.58
Union	0.85	0.81	0.73	0.65	0.58	0.50
Total	4.66	4.49	4.07	3.67	3.30	2.86
VOC Emissions (tons/day)						
Cabarrus	0.02	0.02	0.02	0.01	0.01	0.01
Gaston	0.03	0.03	0.02	0.02	0.01	0.01
Iredell*	0.00	0.00	0.00	0.00	0.00	0.00
Lincoln	0.01	0.01	0.01	0.01	0.01	0.00
Mecklenburg	0.09	0.08	0.07	0.06	0.06	0.05
Rowan	0.06	0.05	0.04	0.04	0.03	0.03
Union	0.04	0.04	0.03	0.03	0.02	0.02
Total	0.25	0.23	0.19	0.17	0.14	0.12

* Iredell County emissions for nonattainment area only

4.4 COMBINED NONROAD EMISSIONS

Table 4- 14 Combined Nonroad Emissions, tons/day

County	2010	2013	2016	2019	2022	2025
NOx Emissions (tons/day)						
Cabarrus	2.87	2.38	1.92	1.59	1.38	1.23
Gaston	2.81	2.30	1.84	1.54	1.35	1.22
Iredell*	0.90	0.73	0.58	0.47	0.41	0.37
Lincoln	1.21	1.00	0.82	0.69	0.60	0.54
Mecklenburg	25.43	22.65	19.85	17.89	16.69	16.11
Rowan	2.52	2.13	1.80	1.55	1.36	1.23
Union	5.34	4.52	3.69	3.06	2.62	2.32
Total	41.08	35.71	30.50	26.79	24.41	23.02
VOC Emissions (tons/day)						
Cabarrus	1.71	1.39	1.24	1.21	1.23	1.27
Gaston	1.92	1.54	1.30	1.22	1.19	1.21
Iredell*	0.60	0.48	0.41	0.37	0.35	0.37
Lincoln	0.93	0.77	0.65	0.60	0.57	0.55
Mecklenburg	16.13	13.44	12.05	11.88	12.07	12.38
Rowan	1.90	1.57	1.33	1.17	1.10	1.10
Union	3.10	2.58	2.30	2.24	2.26	2.32
Total	26.29	21.77	19.28	18.69	18.77	19.20

* Iredell County emissions for nonattainment area only

5.0 PROJECTION AND CONTROL FACTORS

5.1 AIRCRAFT EMISSIONS GROWTH

Factors to grow aircraft emissions were produced by running the FAA's Terminal Area Forecast model to produce estimates of aircraft operations for 2008, 2010, 2013, 2016, 2019, 2022, and 2025. For each aircraft category, the 2008 operations estimate was divided into the operations estimate of later years to calculate the projection or growth factor. The 2008 emissions were then multiplied by the appropriate factor to get the future year projection. For the seven airports of the seven counties that appear in the TAF, growth factors unique to each of these airports were produced. For the rest of the airports in the seven counties composit growth factors for each aircraft category were produced from the combined TAF projections. Growth factors for the air carrier aircraft were used to project ground support equipment (GSE) since GSE is most commonly associated with these larger aircraft. The projection factors are shown in Table 5- 1 below.

Table 5-1 Aircraft Growth Factors

Airport	FIPS	Year	Growth Factor	SCC	SCC Description	Data Origin
AKH	37071	2010	1.000000	2265008005	GSE, Gasoline	EPA
AKH	37071	2010	1.000000	2267008005	GSE, LPG	EPA
AKH	37071	2010	1.000000	2268008005	GSE, CNG	EPA
AKH	37071	2010	1.000000	2270008005	GSE, Diesel	EPA
AKH	37071	2010	1.000000	2270008005	GSE, Military Diesel	NCDENR
AKH	37071	2010	1.000000	2275001000	Military	NCDENR
AKH	37071	2010	1.000000	2275020000	AirCarrier	EPA
AKH	37071	2010	1.000000	2275050011	Gen Aviation Piston	EPA
AKH	37071	2010	1.000000	2275050012	Gen Aviation Turbine	EPA
AKH	37071	2010	1.000000	2275060011	Air Taxi Piston	EPA
AKH	37071	2010	1.000000	2275060012	Air Taxi Turbine	EPA
AKH	37071	2010	1.000000	2275070000	APU	EPA
AKH	37071	2013	1.000000	2265008005	GSE, Gasoline	EPA
AKH	37071	2013	1.000000	2267008005	GSE, LPG	EPA
AKH	37071	2013	1.000000	2268008005	GSE, CNG	EPA
AKH	37071	2013	1.000000	2270008005	GSE, Diesel	EPA
AKH	37071	2013	1.000000	2270008005	GSE, Military Diesel	NCDENR
AKH	37071	2013	1.000000	2275001000	Military	NCDENR
AKH	37071	2013	1.000000	2275020000	AirCarrier	EPA
AKH	37071	2013	1.000000	2275050011	Gen Aviation Piston	EPA
AKH	37071	2013	1.000000	2275050012	Gen Aviation Turbine	EPA
AKH	37071	2013	1.000000	2275060011	Air Taxi Piston	EPA
AKH	37071	2013	1.000000	2275060012	Air Taxi Turbine	EPA
AKH	37071	2013	1.000000	2275070000	APU	EPA
AKH	37071	2016	1.000000	2265008005	GSE, Gasoline	EPA
AKH	37071	2016	1.000000	2267008005	GSE, LPG	EPA
AKH	37071	2016	1.000000	2268008005	GSE, CNG	EPA
AKH	37071	2016	1.000000	2270008005	GSE, Diesel	EPA
AKH	37071	2016	1.000000	2270008005	GSE, Military Diesel	NCDENR
AKH	37071	2016	1.000000	2275001000	Military	NCDENR
AKH	37071	2016	1.000000	2275020000	AirCarrier	EPA
AKH	37071	2016	1.000000	2275050011	Gen Aviation Piston	EPA
AKH	37071	2016	1.000000	2275050012	Gen Aviation Turbine	EPA
AKH	37071	2016	1.000000	2275060011	Air Taxi Piston	EPA
AKH	37071	2016	1.000000	2275060012	Air Taxi Turbine	EPA
AKH	37071	2016	1.000000	2275070000	APU	EPA
AKH	37071	2019	1.000000	2265008005	GSE, Gasoline	EPA

Airport	FIPS	Year	Growth Factor	SCC	SCC Description	Data Origin
AKH	37071	2019	1.000000	2267008005	GSE, LPG	EPA
AKH	37071	2019	1.000000	2268008005	GSE, CNG	EPA
AKH	37071	2019	1.000000	2270008005	GSE, Diesel	EPA
AKH	37071	2019	1.000000	2270008005	GSE, Military Diesel	NCDENR
AKH	37071	2019	1.000000	2275001000	Military	NCDENR
AKH	37071	2019	1.000000	2275020000	AirCarrier	EPA
AKH	37071	2019	1.000000	2275050011	Gen Aviation Piston	EPA
AKH	37071	2019	1.000000	2275050012	Gen Aviation Turbine	EPA
AKH	37071	2019	1.000000	2275060011	Air Taxi Piston	EPA
AKH	37071	2019	1.000000	2275060012	Air Taxi Turbine	EPA
AKH	37071	2019	1.000000	2275070000	APU	EPA
AKH	37071	2022	1.000000	2265008005	GSE, Gasoline	EPA
AKH	37071	2022	1.000000	2267008005	GSE, LPG	EPA
AKH	37071	2022	1.000000	2268008005	GSE, CNG	EPA
AKH	37071	2022	1.000000	2270008005	GSE, Diesel	EPA
AKH	37071	2022	1.000000	2270008005	GSE, Military Diesel	NCDENR
AKH	37071	2022	1.000000	2275001000	Military	NCDENR
AKH	37071	2022	1.000000	2275020000	AirCarrier	EPA
AKH	37071	2022	1.000000	2275050011	Gen Aviation Piston	EPA
AKH	37071	2022	1.000000	2275050012	Gen Aviation Turbine	EPA
AKH	37071	2022	1.000000	2275060011	Air Taxi Piston	EPA
AKH	37071	2022	1.000000	2275060012	Air Taxi Turbine	EPA
AKH	37071	2022	1.000000	2275070000	APU	EPA
AKH	37071	2025	1.000000	2265008005	GSE, Gasoline	EPA
AKH	37071	2025	1.000000	2267008005	GSE, LPG	EPA
AKH	37071	2025	1.000000	2268008005	GSE, CNG	EPA
AKH	37071	2025	1.000000	2270008005	GSE, Diesel	EPA
AKH	37071	2025	1.000000	2270008005	GSE, Military Diesel	NCDENR
AKH	37071	2025	1.000000	2275001000	Military	NCDENR
AKH	37071	2025	1.000000	2275020000	AirCarrier	EPA
AKH	37071	2025	1.000000	2275050011	Gen Aviation Piston	EPA
AKH	37071	2025	1.000000	2275050012	Gen Aviation Turbine	EPA
AKH	37071	2025	1.000000	2275060011	Air Taxi Piston	EPA
AKH	37071	2025	1.000000	2275060012	Air Taxi Turbine	EPA
AKH	37071	2025	1.000000	2275070000	APU	EPA
CLT	37119	2010	1.041185	2265008005	GSE, Gasoline	EPA
CLT	37119	2010	1.041185	2267008005	GSE, LPG	EPA
CLT	37119	2010	1.041185	2268008005	GSE, CNG	EPA
CLT	37119	2010	1.041185	2270008005	GSE, Diesel	EPA
CLT	37119	2010	0.924316	2270008005	GSE, Military Diesel	NCDENR
CLT	37119	2010	0.924316	2275001000	Military	NCDENR

Airport	FIPS	Year	Growth Factor	SCC	SCC Description	Data Origin
CLT	37119	2010	1.041185	2275020000	AirCarrier	EPA
CLT	37119	2010	0.728611	2275050011	Gen Aviation Piston	EPA
CLT	37119	2010	0.728611	2275050012	Gen Aviation Turbine	EPA
CLT	37119	2010	0.857281	2275060011	Air Taxi Piston	EPA
CLT	37119	2010	0.857281	2275060012	Air Taxi Turbine	EPA
CLT	37119	2010	1.041185	2275070000	APU	EPA
CLT	37119	2013	1.122693	2265008005	GSE, Gasoline	EPA
CLT	37119	2013	1.122693	2267008005	GSE, LPG	EPA
CLT	37119	2013	1.122693	2268008005	GSE, CNG	EPA
CLT	37119	2013	1.122693	2270008005	GSE, Diesel	EPA
CLT	37119	2013	1.035427	2270008005	GSE, Military Diesel	NCDENR
CLT	37119	2013	1.035427	2275001000	Military	NCDENR
CLT	37119	2013	1.122693	2275020000	AirCarrier	EPA
CLT	37119	2013	0.720522	2275050011	Gen Aviation Piston	EPA
CLT	37119	2013	0.720522	2275050012	Gen Aviation Turbine	EPA
CLT	37119	2013	0.975487	2275060011	Air Taxi Piston	EPA
CLT	37119	2013	0.975487	2275060012	Air Taxi Turbine	EPA
CLT	37119	2013	1.122693	2275070000	APU	EPA
CLT	37119	2016	1.210912	2265008005	GSE, Gasoline	EPA
CLT	37119	2016	1.210912	2267008005	GSE, LPG	EPA
CLT	37119	2016	1.210912	2268008005	GSE, CNG	EPA
CLT	37119	2016	1.210912	2270008005	GSE, Diesel	EPA
CLT	37119	2016	1.035427	2270008005	GSE, Military Diesel	NCDENR
CLT	37119	2016	1.035427	2275001000	Military	NCDENR
CLT	37119	2016	1.210912	2275020000	AirCarrier	EPA
CLT	37119	2016	0.724855	2275050011	Gen Aviation Piston	EPA
CLT	37119	2016	0.724855	2275050012	Gen Aviation Turbine	EPA
CLT	37119	2016	1.050957	2275060011	Air Taxi Piston	EPA
CLT	37119	2016	1.050957	2275060012	Air Taxi Turbine	EPA
CLT	37119	2016	1.210912	2275070000	APU	EPA
CLT	37119	2019	1.271418	2265008005	GSE, Gasoline	EPA
CLT	37119	2019	1.271418	2267008005	GSE, LPG	EPA
CLT	37119	2019	1.271418	2268008005	GSE, CNG	EPA
CLT	37119	2019	1.271418	2270008005	GSE, Diesel	EPA
CLT	37119	2019	1.035427	2270008005	GSE, Military Diesel	NCDENR
CLT	37119	2019	1.035427	2275001000	Military	NCDENR
CLT	37119	2019	1.271418	2275020000	AirCarrier	EPA
CLT	37119	2019	0.729217	2275050011	Gen Aviation Piston	EPA
CLT	37119	2019	0.729217	2275050012	Gen Aviation Turbine	EPA
CLT	37119	2019	1.111206	2275060011	Air Taxi Piston	EPA
CLT	37119	2019	1.111206	2275060012	Air Taxi Turbine	EPA

Airport	FIPS	Year	Growth Factor	SCC	SCC Description	Data Origin
CLT	37119	2019	1.271418	2275070000	APU	EPA
CLT	37119	2022	1.334947	2265008005	GSE, Gasoline	EPA
CLT	37119	2022	1.334947	2267008005	GSE, LPG	EPA
CLT	37119	2022	1.334947	2268008005	GSE, CNG	EPA
CLT	37119	2022	1.334947	2270008005	GSE, Diesel	EPA
CLT	37119	2022	1.035427	2270008005	GSE, Military Diesel	NCDENR
CLT	37119	2022	1.035427	2275001000	Military	NCDENR
CLT	37119	2022	1.334947	2275020000	AirCarrier	EPA
CLT	37119	2022	0.733580	2275050011	Gen Aviation Piston	EPA
CLT	37119	2022	0.733580	2275050012	Gen Aviation Turbine	EPA
CLT	37119	2022	1.174906	2275060011	Air Taxi Piston	EPA
CLT	37119	2022	1.174906	2275060012	Air Taxi Turbine	EPA
CLT	37119	2022	1.334947	2275070000	APU	EPA
CLT	37119	2025	1.401647	2265008005	GSE, Gasoline	EPA
CLT	37119	2025	1.401647	2267008005	GSE, LPG	EPA
CLT	37119	2025	1.401647	2268008005	GSE, CNG	EPA
CLT	37119	2025	1.401647	2270008005	GSE, Diesel	EPA
CLT	37119	2025	1.035427	2270008005	GSE, Military Diesel	NCDENR
CLT	37119	2025	1.035427	2275001000	Military	NCDENR
CLT	37119	2025	1.401647	2275020000	AirCarrier	EPA
CLT	37119	2025	0.737942	2275050011	Gen Aviation Piston	EPA
CLT	37119	2025	0.737942	2275050012	Gen Aviation Turbine	EPA
CLT	37119	2025	1.242269	2275060011	Air Taxi Piston	EPA
CLT	37119	2025	1.242269	2275060012	Air Taxi Turbine	EPA
CLT	37119	2025	1.401647	2275070000	APU	EPA
Composit	37xxx	2010	1.041757	2265008005	GSE, Gasoline	EPA
Composit	37xxx	2010	1.041757	2267008005	GSE, LPG	EPA
Composit	37xxx	2010	1.041757	2268008005	GSE, CNG	EPA
Composit	37xxx	2010	1.041757	2270008005	GSE, Diesel	EPA
Composit	37xxx	2010	0.968231	2270008005	GSE, Military Diesel	NCDENR
Composit	37xxx	2010	0.968231	2275001000	Military	NCDENR
Composit	37xxx	2010	1.041757	2275020000	AirCarrier	EPA
Composit	37xxx	2010	0.951384	2275050011	Gen Aviation Piston	EPA
Composit	37xxx	2010	0.951384	2275050012	Gen Aviation Turbine	EPA
Composit	37xxx	2010	0.847712	2275060011	Air Taxi Piston	EPA
Composit	37xxx	2010	0.847712	2275060012	Air Taxi Turbine	EPA
Composit	37xxx	2010	1.041757	2275070000	APU	EPA
Composit	37xxx	2013	1.122302	2265008005	GSE, Gasoline	EPA
Composit	37xxx	2013	1.122302	2267008005	GSE, LPG	EPA
Composit	37xxx	2013	1.122302	2268008005	GSE, CNG	EPA
Composit	37xxx	2013	1.122302	2270008005	GSE, Diesel	EPA

Airport	FIPS	Year	Growth Factor	SCC	SCC Description	Data Origin
Composit	37xxx	2013	0.987966	2270008005	GSE, Military Diesel	NCDENR
Composit	37xxx	2013	0.987966	2275001000	Military	NCDENR
Composit	37xxx	2013	1.122302	2275020000	AirCarrier	EPA
Composit	37xxx	2013	0.988505	2275050011	Gen Aviation Piston	EPA
Composit	37xxx	2013	0.988505	2275050012	Gen Aviation Turbine	EPA
Composit	37xxx	2013	0.943556	2275060011	Air Taxi Piston	EPA
Composit	37xxx	2013	0.943556	2275060012	Air Taxi Turbine	EPA
Composit	37xxx	2013	1.122302	2275070000	APU	EPA
Composit	37xxx	2016	1.210413	2265008005	GSE, Gasoline	EPA
Composit	37xxx	2016	1.210413	2267008005	GSE, LPG	EPA
Composit	37xxx	2016	1.210413	2268008005	GSE, CNG	EPA
Composit	37xxx	2016	1.210413	2270008005	GSE, Diesel	EPA
Composit	37xxx	2016	0.987966	2270008005	GSE, Military Diesel	NCDENR
Composit	37xxx	2016	0.987966	2275001000	Military	NCDENR
Composit	37xxx	2016	1.210413	2275020000	AirCarrier	EPA
Composit	37xxx	2016	0.993905	2275050011	Gen Aviation Piston	EPA
Composit	37xxx	2016	0.993905	2275050012	Gen Aviation Turbine	EPA
Composit	37xxx	2016	1.013513	2275060011	Air Taxi Piston	EPA
Composit	37xxx	2016	1.013513	2275060012	Air Taxi Turbine	EPA
Composit	37xxx	2016	1.210413	2275070000	APU	EPA
Composit	37xxx	2019	1.270845	2265008005	GSE, Gasoline	EPA
Composit	37xxx	2019	1.270845	2267008005	GSE, LPG	EPA
Composit	37xxx	2019	1.270845	2268008005	GSE, CNG	EPA
Composit	37xxx	2019	1.270845	2270008005	GSE, Diesel	EPA
Composit	37xxx	2019	0.987966	2270008005	GSE, Military Diesel	NCDENR
Composit	37xxx	2019	0.987966	2275001000	Military	NCDENR
Composit	37xxx	2019	1.270845	2275020000	AirCarrier	EPA
Composit	37xxx	2019	0.999467	2275050011	Gen Aviation Piston	EPA
Composit	37xxx	2019	0.999467	2275050012	Gen Aviation Turbine	EPA
Composit	37xxx	2019	1.069487	2275060011	Air Taxi Piston	EPA
Composit	37xxx	2019	1.069487	2275060012	Air Taxi Turbine	EPA
Composit	37xxx	2019	1.270845	2275070000	APU	EPA
Composit	37xxx	2022	1.334296	2265008005	GSE, Gasoline	EPA
Composit	37xxx	2022	1.334296	2267008005	GSE, LPG	EPA
Composit	37xxx	2022	1.334296	2268008005	GSE, CNG	EPA
Composit	37xxx	2022	1.334296	2270008005	GSE, Diesel	EPA
Composit	37xxx	2022	0.987966	2270008005	GSE, Military Diesel	NCDENR
Composit	37xxx	2022	0.987966	2275001000	Military	NCDENR
Composit	37xxx	2022	1.334296	2275020000	AirCarrier	EPA
Composit	37xxx	2022	1.005205	2275050011	Gen Aviation Piston	EPA
Composit	37xxx	2022	1.005205	2275050012	Gen Aviation Turbine	EPA

Airport	FIPS	Year	Growth Factor	SCC	SCC Description	Data Origin
Composit	37xxx	2022	1.128657	2275060011	Air Taxi Piston	EPA
Composit	37xxx	2022	1.128657	2275060012	Air Taxi Turbine	EPA
Composit	37xxx	2022	1.334296	2275070000	APU	EPA
Composit	37xxx	2025	1.400915	2265008005	GSE, Gasoline	EPA
Composit	37xxx	2025	1.400915	2267008005	GSE, LPG	EPA
Composit	37xxx	2025	1.400915	2268008005	GSE, CNG	EPA
Composit	37xxx	2025	1.400915	2270008005	GSE, Diesel	EPA
Composit	37xxx	2025	0.987966	2270008005	GSE, Military Diesel	NCDENR
Composit	37xxx	2025	0.987966	2275001000	Military	NCDENR
Composit	37xxx	2025	1.400915	2275020000	AirCarrier	EPA
Composit	37xxx	2025	1.011128	2275050011	Gen Aviation Piston	EPA
Composit	37xxx	2025	1.011128	2275050012	Gen Aviation Turbine	EPA
Composit	37xxx	2025	1.191219	2275060011	Air Taxi Piston	EPA
Composit	37xxx	2025	1.191219	2275060012	Air Taxi Turbine	EPA
Composit	37xxx	2025	1.400915	2275070000	APU	EPA
EQY	37179	2010	1.000000	2265008005	GSE, Gasoline	EPA
EQY	37179	2010	1.000000	2267008005	GSE, LPG	EPA
EQY	37179	2010	1.000000	2268008005	GSE, CNG	EPA
EQY	37179	2010	1.000000	2270008005	GSE, Diesel	EPA
EQY	37179	2010	1.000000	2270008005	GSE, Military Diesel	NCDENR
EQY	37179	2010	1.000000	2275001000	Military	NCDENR
EQY	37179	2010	1.000000	2275020000	AirCarrier	EPA
EQY	37179	2010	1.000000	2275050011	Gen Aviation Piston	EPA
EQY	37179	2010	1.000000	2275050012	Gen Aviation Turbine	EPA
EQY	37179	2010	1.000000	2275060011	Air Taxi Piston	EPA
EQY	37179	2010	1.000000	2275060012	Air Taxi Turbine	EPA
EQY	37179	2010	1.000000	2275070000	APU	EPA
EQY	37179	2013	1.000000	2265008005	GSE, Gasoline	EPA
EQY	37179	2013	1.000000	2267008005	GSE, LPG	EPA
EQY	37179	2013	1.000000	2268008005	GSE, CNG	EPA
EQY	37179	2013	1.000000	2270008005	GSE, Diesel	EPA
EQY	37179	2013	1.000000	2270008005	GSE, Military Diesel	NCDENR
EQY	37179	2013	1.000000	2275001000	Military	NCDENR
EQY	37179	2013	1.000000	2275020000	AirCarrier	EPA
EQY	37179	2013	1.000000	2275050011	Gen Aviation Piston	EPA
EQY	37179	2013	1.000000	2275050012	Gen Aviation Turbine	EPA
EQY	37179	2013	1.000000	2275060011	Air Taxi Piston	EPA
EQY	37179	2013	1.000000	2275060012	Air Taxi Turbine	EPA
EQY	37179	2013	1.000000	2275070000	APU	EPA
EQY	37179	2016	1.000000	2265008005	GSE, Gasoline	EPA
EQY	37179	2016	1.000000	2267008005	GSE, LPG	EPA

Airport	FIPS	Year	Growth Factor	SCC	SCC Description	Data Origin
EQY	37179	2016	1.000000	2268008005	GSE, CNG	EPA
EQY	37179	2016	1.000000	2270008005	GSE, Diesel	EPA
EQY	37179	2016	1.000000	2270008005	GSE, Military Diesel	NCDENR
EQY	37179	2016	1.000000	2275001000	Military	NCDENR
EQY	37179	2016	1.000000	2275020000	AirCarrier	EPA
EQY	37179	2016	1.000000	2275050011	Gen Aviation Piston	EPA
EQY	37179	2016	1.000000	2275050012	Gen Aviation Turbine	EPA
EQY	37179	2016	1.000000	2275060011	Air Taxi Piston	EPA
EQY	37179	2016	1.000000	2275060012	Air Taxi Turbine	EPA
EQY	37179	2016	1.000000	2275070000	APU	EPA
EQY	37179	2019	1.000000	2265008005	GSE, Gasoline	EPA
EQY	37179	2019	1.000000	2267008005	GSE, LPG	EPA
EQY	37179	2019	1.000000	2268008005	GSE, CNG	EPA
EQY	37179	2019	1.000000	2270008005	GSE, Diesel	EPA
EQY	37179	2019	1.000000	2270008005	GSE, Military Diesel	NCDENR
EQY	37179	2019	1.000000	2275001000	Military	NCDENR
EQY	37179	2019	1.000000	2275020000	AirCarrier	EPA
EQY	37179	2019	1.000000	2275050011	Gen Aviation Piston	EPA
EQY	37179	2019	1.000000	2275050012	Gen Aviation Turbine	EPA
EQY	37179	2019	1.000000	2275060011	Air Taxi Piston	EPA
EQY	37179	2019	1.000000	2275060012	Air Taxi Turbine	EPA
EQY	37179	2019	1.000000	2275070000	APU	EPA
EQY	37179	2022	1.000000	2265008005	GSE, Gasoline	EPA
EQY	37179	2022	1.000000	2267008005	GSE, LPG	EPA
EQY	37179	2022	1.000000	2268008005	GSE, CNG	EPA
EQY	37179	2022	1.000000	2270008005	GSE, Diesel	EPA
EQY	37179	2022	1.000000	2270008005	GSE, Military Diesel	NCDENR
EQY	37179	2022	1.000000	2275001000	Military	NCDENR
EQY	37179	2022	1.000000	2275020000	AirCarrier	EPA
EQY	37179	2022	1.000000	2275050011	Gen Aviation Piston	EPA
EQY	37179	2022	1.000000	2275050012	Gen Aviation Turbine	EPA
EQY	37179	2022	1.000000	2275060011	Air Taxi Piston	EPA
EQY	37179	2022	1.000000	2275060012	Air Taxi Turbine	EPA
EQY	37179	2022	1.000000	2275070000	APU	EPA
EQY	37179	2025	1.000000	2265008005	GSE, Gasoline	EPA
EQY	37179	2025	1.000000	2267008005	GSE, LPG	EPA
EQY	37179	2025	1.000000	2268008005	GSE, CNG	EPA
EQY	37179	2025	1.000000	2270008005	GSE, Diesel	EPA
EQY	37179	2025	1.000000	2270008005	GSE, Military Diesel	NCDENR
EQY	37179	2025	1.000000	2275001000	Military	NCDENR
EQY	37179	2025	1.000000	2275020000	AirCarrier	EPA

Airport	FIPS	Year	Growth Factor	SCC	SCC Description	Data Origin
EQY	37179	2025	1.000000	2275050011	Gen Aviation Piston	EPA
EQY	37179	2025	1.000000	2275050012	Gen Aviation Turbine	EPA
EQY	37179	2025	1.000000	2275060011	Air Taxi Piston	EPA
EQY	37179	2025	1.000000	2275060012	Air Taxi Turbine	EPA
EQY	37179	2025	1.000000	2275070000	APU	EPA
IPJ	37109	2010	1.000000	2265008005	GSE, Gasoline	EPA
IPJ	37109	2010	1.000000	2267008005	GSE, LPG	EPA
IPJ	37109	2010	1.000000	2268008005	GSE, CNG	EPA
IPJ	37109	2010	1.000000	2270008005	GSE, Diesel	EPA
IPJ	37109	2010	1.000000	2270008005	GSE, Military Diesel	NCDENR
IPJ	37109	2010	1.000000	2275001000	Military	NCDENR
IPJ	37109	2010	1.000000	2275020000	AirCarrier	EPA
IPJ	37109	2010	1.000000	2275050011	Gen Aviation Piston	EPA
IPJ	37109	2010	1.000000	2275050012	Gen Aviation Turbine	EPA
IPJ	37109	2010	1.000000	2275060011	Air Taxi Piston	EPA
IPJ	37109	2010	1.000000	2275060012	Air Taxi Turbine	EPA
IPJ	37109	2010	1.000000	2275070000	APU	EPA
IPJ	37109	2013	1.000000	2265008005	GSE, Gasoline	EPA
IPJ	37109	2013	1.000000	2267008005	GSE, LPG	EPA
IPJ	37109	2013	1.000000	2268008005	GSE, CNG	EPA
IPJ	37109	2013	1.000000	2270008005	GSE, Diesel	EPA
IPJ	37109	2013	1.000000	2270008005	GSE, Military Diesel	NCDENR
IPJ	37109	2013	1.000000	2275001000	Military	NCDENR
IPJ	37109	2013	1.000000	2275020000	AirCarrier	EPA
IPJ	37109	2013	1.000000	2275050011	Gen Aviation Piston	EPA
IPJ	37109	2013	1.000000	2275050012	Gen Aviation Turbine	EPA
IPJ	37109	2013	1.000000	2275060011	Air Taxi Piston	EPA
IPJ	37109	2013	1.000000	2275060012	Air Taxi Turbine	EPA
IPJ	37109	2013	1.000000	2275070000	APU	EPA
IPJ	37109	2016	1.000000	2265008005	GSE, Gasoline	EPA
IPJ	37109	2016	1.000000	2267008005	GSE, LPG	EPA
IPJ	37109	2016	1.000000	2268008005	GSE, CNG	EPA
IPJ	37109	2016	1.000000	2270008005	GSE, Diesel	EPA
IPJ	37109	2016	1.000000	2270008005	GSE, Military Diesel	NCDENR
IPJ	37109	2016	1.000000	2275001000	Military	NCDENR
IPJ	37109	2016	1.000000	2275020000	AirCarrier	EPA
IPJ	37109	2016	1.000000	2275050011	Gen Aviation Piston	EPA
IPJ	37109	2016	1.000000	2275050012	Gen Aviation Turbine	EPA
IPJ	37109	2016	1.000000	2275060011	Air Taxi Piston	EPA
IPJ	37109	2016	1.000000	2275060012	Air Taxi Turbine	EPA
IPJ	37109	2016	1.000000	2275070000	APU	EPA

Airport	FIPS	Year	Growth Factor	SCC	SCC Description	Data Origin
IPJ	37109	2019	1.000000	2265008005	GSE, Gasoline	EPA
IPJ	37109	2019	1.000000	2267008005	GSE, LPG	EPA
IPJ	37109	2019	1.000000	2268008005	GSE, CNG	EPA
IPJ	37109	2019	1.000000	2270008005	GSE, Diesel	EPA
IPJ	37109	2019	1.000000	2270008005	GSE, Military Diesel	NCDENR
IPJ	37109	2019	1.000000	2275001000	Military	NCDENR
IPJ	37109	2019	1.000000	2275020000	AirCarrier	EPA
IPJ	37109	2019	1.000000	2275050011	Gen Aviation Piston	EPA
IPJ	37109	2019	1.000000	2275050012	Gen Aviation Turbine	EPA
IPJ	37109	2019	1.000000	2275060011	Air Taxi Piston	EPA
IPJ	37109	2019	1.000000	2275060012	Air Taxi Turbine	EPA
IPJ	37109	2019	1.000000	2275070000	APU	EPA
IPJ	37109	2022	1.000000	2265008005	GSE, Gasoline	EPA
IPJ	37109	2022	1.000000	2267008005	GSE, LPG	EPA
IPJ	37109	2022	1.000000	2268008005	GSE, CNG	EPA
IPJ	37109	2022	1.000000	2270008005	GSE, Diesel	EPA
IPJ	37109	2022	1.000000	2270008005	GSE, Military Diesel	NCDENR
IPJ	37109	2022	1.000000	2275001000	Military	NCDENR
IPJ	37109	2022	1.000000	2275020000	AirCarrier	EPA
IPJ	37109	2022	1.000000	2275050011	Gen Aviation Piston	EPA
IPJ	37109	2022	1.000000	2275050012	Gen Aviation Turbine	EPA
IPJ	37109	2022	1.000000	2275060011	Air Taxi Piston	EPA
IPJ	37109	2022	1.000000	2275060012	Air Taxi Turbine	EPA
IPJ	37109	2022	1.000000	2275070000	APU	EPA
IPJ	37109	2025	1.000000	2265008005	GSE, Gasoline	EPA
IPJ	37109	2025	1.000000	2267008005	GSE, LPG	EPA
IPJ	37109	2025	1.000000	2268008005	GSE, CNG	EPA
IPJ	37109	2025	1.000000	2270008005	GSE, Diesel	EPA
IPJ	37109	2025	1.000000	2270008005	GSE, Military Diesel	NCDENR
IPJ	37109	2025	1.000000	2275001000	Military	NCDENR
IPJ	37109	2025	1.000000	2275020000	AirCarrier	EPA
IPJ	37109	2025	1.000000	2275050011	Gen Aviation Piston	EPA
IPJ	37109	2025	1.000000	2275050012	Gen Aviation Turbine	EPA
IPJ	37109	2025	1.000000	2275060011	Air Taxi Piston	EPA
IPJ	37109	2025	1.000000	2275060012	Air Taxi Turbine	EPA
IPJ	37109	2025	1.000000	2275070000	APU	EPA
JQF	37025	2010	1.507853	2265008005	GSE, Gasoline	EPA
JQF	37025	2010	1.507853	2267008005	GSE, LPG	EPA
JQF	37025	2010	1.507853	2268008005	GSE, CNG	EPA
JQF	37025	2010	1.507853	2270008005	GSE, Diesel	EPA
JQF	37025	2010	0.697789	2270008005	GSE, Military Diesel	NCDENR

Airport	FIPS	Year	Growth Factor	SCC	SCC Description	Data Origin
JQF	37025	2010	0.697789	2275001000	Military	NCDENR
JQF	37025	2010	1.507853	2275020000	AirCarrier	EPA
JQF	37025	2010	0.904710	2275050011	Gen Aviation Piston	EPA
JQF	37025	2010	0.904710	2275050012	Gen Aviation Turbine	EPA
JQF	37025	2010	0.546080	2275060011	Air Taxi Piston	EPA
JQF	37025	2010	0.546080	2275060012	Air Taxi Turbine	EPA
JQF	37025	2010	1.507853	2275070000	APU	EPA
JQF	37025	2013	0.803665	2265008005	GSE, Gasoline	EPA
JQF	37025	2013	0.803665	2267008005	GSE, LPG	EPA
JQF	37025	2013	0.803665	2268008005	GSE, CNG	EPA
JQF	37025	2013	0.803665	2270008005	GSE, Diesel	EPA
JQF	37025	2013	0.592138	2270008005	GSE, Military Diesel	NCDENR
JQF	37025	2013	0.592138	2275001000	Military	NCDENR
JQF	37025	2013	0.803665	2275020000	AirCarrier	EPA
JQF	37025	2013	1.101411	2275050011	Gen Aviation Piston	EPA
JQF	37025	2013	1.101411	2275050012	Gen Aviation Turbine	EPA
JQF	37025	2013	0.266215	2275060011	Air Taxi Piston	EPA
JQF	37025	2013	0.266215	2275060012	Air Taxi Turbine	EPA
JQF	37025	2013	0.803665	2275070000	APU	EPA
JQF	37025	2016	0.803665	2265008005	GSE, Gasoline	EPA
JQF	37025	2016	0.803665	2267008005	GSE, LPG	EPA
JQF	37025	2016	0.803665	2268008005	GSE, CNG	EPA
JQF	37025	2016	0.803665	2270008005	GSE, Diesel	EPA
JQF	37025	2016	0.592138	2270008005	GSE, Military Diesel	NCDENR
JQF	37025	2016	0.592138	2275001000	Military	NCDENR
JQF	37025	2016	0.803665	2275020000	AirCarrier	EPA
JQF	37025	2016	1.126855	2275050011	Gen Aviation Piston	EPA
JQF	37025	2016	1.126855	2275050012	Gen Aviation Turbine	EPA
JQF	37025	2016	0.277299	2275060011	Air Taxi Piston	EPA
JQF	37025	2016	0.277299	2275060012	Air Taxi Turbine	EPA
JQF	37025	2016	0.803665	2275070000	APU	EPA
JQF	37025	2019	0.803665	2265008005	GSE, Gasoline	EPA
JQF	37025	2019	0.803665	2267008005	GSE, LPG	EPA
JQF	37025	2019	0.803665	2268008005	GSE, CNG	EPA
JQF	37025	2019	0.803665	2270008005	GSE, Diesel	EPA
JQF	37025	2019	0.592138	2270008005	GSE, Military Diesel	NCDENR
JQF	37025	2019	0.592138	2275001000	Military	NCDENR
JQF	37025	2019	0.803665	2275020000	AirCarrier	EPA
JQF	37025	2019	1.153119	2275050011	Gen Aviation Piston	EPA
JQF	37025	2019	1.153119	2275050012	Gen Aviation Turbine	EPA
JQF	37025	2019	0.288896	2275060011	Air Taxi Piston	EPA

Airport	FIPS	Year	Growth Factor	SCC	SCC Description	Data Origin
JQF	37025	2019	0.288896	2275060012	Air Taxi Turbine	EPA
JQF	37025	2019	0.803665	2275070000	APU	EPA
JQF	37025	2022	0.803665	2265008005	GSE, Gasoline	EPA
JQF	37025	2022	0.803665	2267008005	GSE, LPG	EPA
JQF	37025	2022	0.803665	2268008005	GSE, CNG	EPA
JQF	37025	2022	0.803665	2270008005	GSE, Diesel	EPA
JQF	37025	2022	0.592138	2270008005	GSE, Military Diesel	NCDENR
JQF	37025	2022	0.592138	2275001000	Military	NCDENR
JQF	37025	2022	0.803665	2275020000	AirCarrier	EPA
JQF	37025	2022	1.180290	2275050011	Gen Aviation Piston	EPA
JQF	37025	2022	1.180290	2275050012	Gen Aviation Turbine	EPA
JQF	37025	2022	0.300903	2275060011	Air Taxi Piston	EPA
JQF	37025	2022	0.300903	2275060012	Air Taxi Turbine	EPA
JQF	37025	2022	0.803665	2275070000	APU	EPA
JQF	37025	2025	0.803665	2265008005	GSE, Gasoline	EPA
JQF	37025	2025	0.803665	2267008005	GSE, LPG	EPA
JQF	37025	2025	0.803665	2268008005	GSE, CNG	EPA
JQF	37025	2025	0.803665	2270008005	GSE, Diesel	EPA
JQF	37025	2025	0.592138	2270008005	GSE, Military Diesel	NCDENR
JQF	37025	2025	0.592138	2275001000	Military	NCDENR
JQF	37025	2025	0.803665	2275020000	AirCarrier	EPA
JQF	37025	2025	1.208420	2275050011	Gen Aviation Piston	EPA
JQF	37025	2025	1.208420	2275050012	Gen Aviation Turbine	EPA
JQF	37025	2025	0.313424	2275060011	Air Taxi Piston	EPA
JQF	37025	2025	0.313424	2275060012	Air Taxi Turbine	EPA
JQF	37025	2025	0.803665	2275070000	APU	EPA
RUQ	37159	2010	1.000000	2265008005	GSE, Gasoline	EPA
RUQ	37159	2010	1.000000	2267008005	GSE, LPG	EPA
RUQ	37159	2010	1.000000	2268008005	GSE, CNG	EPA
RUQ	37159	2010	1.000000	2270008005	GSE, Diesel	EPA
RUQ	37159	2010	1.000000	2270008005	GSE, Military Diesel	NCDENR
RUQ	37159	2010	1.000000	2275001000	Military	NCDENR
RUQ	37159	2010	1.000000	2275020000	AirCarrier	EPA
RUQ	37159	2010	1.000000	2275050011	Gen Aviation Piston	EPA
RUQ	37159	2010	1.000000	2275050012	Gen Aviation Turbine	EPA
RUQ	37159	2010	1.000000	2275060011	Air Taxi Piston	EPA
RUQ	37159	2010	1.000000	2275060012	Air Taxi Turbine	EPA
RUQ	37159	2010	1.000000	2275070000	APU	EPA
RUQ	37159	2013	1.000000	2265008005	GSE, Gasoline	EPA
RUQ	37159	2013	1.000000	2267008005	GSE, LPG	EPA
RUQ	37159	2013	1.000000	2268008005	GSE, CNG	EPA

Airport	FIPS	Year	Growth Factor	SCC	SCC Description	Data Origin
RUQ	37159	2013	1.000000	2270008005	GSE, Diesel	EPA
RUQ	37159	2013	1.000000	2270008005	GSE, Military Diesel	NCDENR
RUQ	37159	2013	1.000000	2275001000	Military	NCDENR
RUQ	37159	2013	1.000000	2275020000	AirCarrier	EPA
RUQ	37159	2013	1.000000	2275050011	Gen Aviation Piston	EPA
RUQ	37159	2013	1.000000	2275050012	Gen Aviation Turbine	EPA
RUQ	37159	2013	1.000000	2275060011	Air Taxi Piston	EPA
RUQ	37159	2013	1.000000	2275060012	Air Taxi Turbine	EPA
RUQ	37159	2013	1.000000	2275070000	APU	EPA
RUQ	37159	2016	1.000000	2265008005	GSE, Gasoline	EPA
RUQ	37159	2016	1.000000	2267008005	GSE, LPG	EPA
RUQ	37159	2016	1.000000	2268008005	GSE, CNG	EPA
RUQ	37159	2016	1.000000	2270008005	GSE, Diesel	EPA
RUQ	37159	2016	1.000000	2270008005	GSE, Military Diesel	NCDENR
RUQ	37159	2016	1.000000	2275001000	Military	NCDENR
RUQ	37159	2016	1.000000	2275020000	AirCarrier	EPA
RUQ	37159	2016	1.000000	2275050011	Gen Aviation Piston	EPA
RUQ	37159	2016	1.000000	2275050012	Gen Aviation Turbine	EPA
RUQ	37159	2016	1.000000	2275060011	Air Taxi Piston	EPA
RUQ	37159	2016	1.000000	2275060012	Air Taxi Turbine	EPA
RUQ	37159	2016	1.000000	2275070000	APU	EPA
RUQ	37159	2019	1.000000	2265008005	GSE, Gasoline	EPA
RUQ	37159	2019	1.000000	2267008005	GSE, LPG	EPA
RUQ	37159	2019	1.000000	2268008005	GSE, CNG	EPA
RUQ	37159	2019	1.000000	2270008005	GSE, Diesel	EPA
RUQ	37159	2019	1.000000	2270008005	GSE, Military Diesel	NCDENR
RUQ	37159	2019	1.000000	2275001000	Military	NCDENR
RUQ	37159	2019	1.000000	2275020000	AirCarrier	EPA
RUQ	37159	2019	1.000000	2275050011	Gen Aviation Piston	EPA
RUQ	37159	2019	1.000000	2275050012	Gen Aviation Turbine	EPA
RUQ	37159	2019	1.000000	2275060011	Air Taxi Piston	EPA
RUQ	37159	2019	1.000000	2275060012	Air Taxi Turbine	EPA
RUQ	37159	2019	1.000000	2275070000	APU	EPA
RUQ	37159	2022	1.000000	2265008005	GSE, Gasoline	EPA
RUQ	37159	2022	1.000000	2267008005	GSE, LPG	EPA
RUQ	37159	2022	1.000000	2268008005	GSE, CNG	EPA
RUQ	37159	2022	1.000000	2270008005	GSE, Diesel	EPA
RUQ	37159	2022	1.000000	2270008005	GSE, Military Diesel	NCDENR
RUQ	37159	2022	1.000000	2275001000	Military	NCDENR
RUQ	37159	2022	1.000000	2275020000	AirCarrier	EPA
RUQ	37159	2022	1.000000	2275050011	Gen Aviation Piston	EPA

Airport	FIPS	Year	Growth Factor	SCC	SCC Description	Data Origin
RUQ	37159	2022	1.000000	2275050012	Gen Aviation Turbine	EPA
RUQ	37159	2022	1.000000	2275060011	Air Taxi Piston	EPA
RUQ	37159	2022	1.000000	2275060012	Air Taxi Turbine	EPA
RUQ	37159	2022	1.000000	2275070000	APU	EPA
RUQ	37159	2025	1.000000	2265008005	GSE, Gasoline	EPA
RUQ	37159	2025	1.000000	2267008005	GSE, LPG	EPA
RUQ	37159	2025	1.000000	2268008005	GSE, CNG	EPA
RUQ	37159	2025	1.000000	2270008005	GSE, Diesel	EPA
RUQ	37159	2025	1.000000	2270008005	GSE, Military Diesel	NCDENR
RUQ	37159	2025	1.000000	2275001000	Military	NCDENR
RUQ	37159	2025	1.000000	2275020000	AirCarrier	EPA
RUQ	37159	2025	1.000000	2275050011	Gen Aviation Piston	EPA
RUQ	37159	2025	1.000000	2275050012	Gen Aviation Turbine	EPA
RUQ	37159	2025	1.000000	2275060011	Air Taxi Piston	EPA
RUQ	37159	2025	1.000000	2275060012	Air Taxi Turbine	EPA
RUQ	37159	2025	1.000000	2275070000	APU	EPA
SVH	37097	2010	1.000000	2265008005	GSE, Gasoline	EPA
SVH	37097	2010	1.000000	2267008005	GSE, LPG	EPA
SVH	37097	2010	1.000000	2268008005	GSE, CNG	EPA
SVH	37097	2010	1.000000	2270008005	GSE, Diesel	EPA
SVH	37097	2010	1.000000	2270008005	GSE, Military Diesel	NCDENR
SVH	37097	2010	1.000000	2275001000	Military	NCDENR
SVH	37097	2010	1.000000	2275020000	AirCarrier	EPA
SVH	37097	2010	1.000000	2275050011	Gen Aviation Piston	EPA
SVH	37097	2010	1.000000	2275050012	Gen Aviation Turbine	EPA
SVH	37097	2010	1.000000	2275060011	Air Taxi Piston	EPA
SVH	37097	2010	1.000000	2275060012	Air Taxi Turbine	EPA
SVH	37097	2010	1.000000	2275070000	APU	EPA
SVH	37097	2013	1.000000	2265008005	GSE, Gasoline	EPA
SVH	37097	2013	1.000000	2267008005	GSE, LPG	EPA
SVH	37097	2013	1.000000	2268008005	GSE, CNG	EPA
SVH	37097	2013	1.000000	2270008005	GSE, Diesel	EPA
SVH	37097	2013	1.000000	2270008005	GSE, Military Diesel	NCDENR
SVH	37097	2013	1.000000	2275001000	Military	NCDENR
SVH	37097	2013	1.000000	2275020000	AirCarrier	EPA
SVH	37097	2013	1.000000	2275050011	Gen Aviation Piston	EPA
SVH	37097	2013	1.000000	2275050012	Gen Aviation Turbine	EPA
SVH	37097	2013	1.000000	2275060011	Air Taxi Piston	EPA
SVH	37097	2013	1.000000	2275060012	Air Taxi Turbine	EPA
SVH	37097	2013	1.000000	2275070000	APU	EPA
SVH	37097	2016	1.000000	2265008005	GSE, Gasoline	EPA

Airport	FIPS	Year	Growth Factor	SCC	SCC Description	Data Origin
SVH	37097	2016	1.000000	2267008005	GSE, LPG	EPA
SVH	37097	2016	1.000000	2268008005	GSE, CNG	EPA
SVH	37097	2016	1.000000	2270008005	GSE, Diesel	EPA
SVH	37097	2016	1.000000	2270008005	GSE, Military Diesel	NCDENR
SVH	37097	2016	1.000000	2275001000	Military	NCDENR
SVH	37097	2016	1.000000	2275020000	AirCarrier	EPA
SVH	37097	2016	1.000000	2275050011	Gen Aviation Piston	EPA
SVH	37097	2016	1.000000	2275050012	Gen Aviation Turbine	EPA
SVH	37097	2016	1.000000	2275060011	Air Taxi Piston	EPA
SVH	37097	2016	1.000000	2275060012	Air Taxi Turbine	EPA
SVH	37097	2016	1.000000	2275070000	APU	EPA
SVH	37097	2019	1.000000	2265008005	GSE, Gasoline	EPA
SVH	37097	2019	1.000000	2267008005	GSE, LPG	EPA
SVH	37097	2019	1.000000	2268008005	GSE, CNG	EPA
SVH	37097	2019	1.000000	2270008005	GSE, Diesel	EPA
SVH	37097	2019	1.000000	2270008005	GSE, Military Diesel	NCDENR
SVH	37097	2019	1.000000	2275001000	Military	NCDENR
SVH	37097	2019	1.000000	2275020000	AirCarrier	EPA
SVH	37097	2019	1.000000	2275050011	Gen Aviation Piston	EPA
SVH	37097	2019	1.000000	2275050012	Gen Aviation Turbine	EPA
SVH	37097	2019	1.000000	2275060011	Air Taxi Piston	EPA
SVH	37097	2019	1.000000	2275060012	Air Taxi Turbine	EPA
SVH	37097	2019	1.000000	2275070000	APU	EPA
SVH	37097	2022	1.000000	2265008005	GSE, Gasoline	EPA
SVH	37097	2022	1.000000	2267008005	GSE, LPG	EPA
SVH	37097	2022	1.000000	2268008005	GSE, CNG	EPA
SVH	37097	2022	1.000000	2270008005	GSE, Diesel	EPA
SVH	37097	2022	1.000000	2270008005	GSE, Military Diesel	NCDENR
SVH	37097	2022	1.000000	2275001000	Military	NCDENR
SVH	37097	2022	1.000000	2275020000	AirCarrier	EPA
SVH	37097	2022	1.000000	2275050011	Gen Aviation Piston	EPA
SVH	37097	2022	1.000000	2275050012	Gen Aviation Turbine	EPA
SVH	37097	2022	1.000000	2275060011	Air Taxi Piston	EPA
SVH	37097	2022	1.000000	2275060012	Air Taxi Turbine	EPA
SVH	37097	2022	1.000000	2275070000	APU	EPA
SVH	37097	2025	1.000000	2265008005	GSE, Gasoline	EPA
SVH	37097	2025	1.000000	2267008005	GSE, LPG	EPA
SVH	37097	2025	1.000000	2268008005	GSE, CNG	EPA
SVH	37097	2025	1.000000	2270008005	GSE, Diesel	EPA
SVH	37097	2025	1.000000	2270008005	GSE, Military Diesel	NCDENR
SVH	37097	2025	1.000000	2275001000	Military	NCDENR

Airport	FIPS	Year	Growth Factor	SCC	SCC Description	Data Origin
SVH	37097	2025	1.000000	2275020000	AirCarrier	EPA
SVH	37097	2025	1.000000	2275050011	Gen Aviation Piston	EPA
SVH	37097	2025	1.000000	2275050012	Gen Aviation Turbine	EPA
SVH	37097	2025	1.000000	2275060011	Air Taxi Piston	EPA
SVH	37097	2025	1.000000	2275060012	Air Taxi Turbine	EPA
SVH	37097	2025	1.000000	2275070000	APU	EPA

5.2 RAILROAD EMISSIONS GROWTH AND CONTROL

Railroad growth factors were calculated using national fuel use estimates for freight and for intercity passenger service found on table 46 of the Energy Information Administration's *Annual Energy Outlook, 2011*. National level estimates of fuel used in 2008 were divided into estimates of fuel used in future years to get projection factors. Fuel estimates provided were for freight service and passenger service. The energy inputs and the calculated growth factors are provided in the following table:

Table 5-2 Railroad Growth Factors

SCC	Year	Pollutant	Fuel Trillion BTU	Growth Factor	Description
2285002006	2008	NOX	575.2400	1.0000	Locomotives: Class I Operations
2285002006	2010	NOX	528.5700	0.9189	Locomotives: Class I Operations
2285002006	2013	NOX	567.2900	0.9862	Locomotives: Class I Operations
2285002006	2016	NOX	581.7700	1.0114	Locomotives: Class I Operations
2285002006	2019	NOX	600.6400	1.0442	Locomotives: Class I Operations
2285002006	2022	NOX	623.1800	1.0833	Locomotives: Class I Operations
2285002006	2025	NOX	644.9944	1.1213	Locomotives: Class I Operations
2285002007	2008	NOX	575.2400	1.0000	Locomotives: Class II / III Operations
2285002007	2010	NOX	528.5700	0.9189	Locomotives: Class II / III Operations
2285002007	2013	NOX	567.2900	0.9862	Locomotives: Class II / III Operations
2285002007	2016	NOX	581.7700	1.0114	Locomotives: Class II / III Operations
2285002007	2019	NOX	600.6400	1.0442	Locomotives: Class II / III Operations
2285002007	2022	NOX	623.1800	1.0833	Locomotives: Class II / III Operations
2285002007	2025	NOX	644.9944	1.1213	Locomotives: Class II / III Operations
2285002008	2008	NOX	14.1200	1.0000	Locomotives: Passenger Trains (Amtrak)
2285002008	2010	NOX	14.2000	1.0057	Locomotives: Passenger Trains (Amtrak)
2285002008	2013	NOX	15.8400	1.1218	Locomotives: Passenger Trains (Amtrak)
2285002008	2016	NOX	16.5600	1.1728	Locomotives: Passenger Trains (Amtrak)

SCC	Year	Pollutant	Fuel Trillion BTU	Growth Factor	Description
2285002008	2019	NOX	17.1400	1.2139	Locomotives: Passenger Trains (Amtrak)
2285002008	2022	NOX	17.4000	1.2323	Locomotives: Passenger Trains (Amtrak)
2285002008	2025	NOX	17.7276	1.2555	Locomotives: Passenger Trains (Amtrak)
28500201	2008	NOX	575.2400	1.0000	Yard Locomotives
28500201	2010	NOX	528.5700	0.9189	Yard Locomotives
28500201	2013	NOX	567.2900	0.9862	Yard Locomotives
28500201	2016	NOX	581.7700	1.0114	Yard Locomotives
28500201	2019	NOX	600.6400	1.0442	Yard Locomotives
28500201	2022	NOX	623.1800	1.0833	Yard Locomotives
28500201	2025	NOX	644.9944	1.1213	Yard Locomotives
2285002006	2008	VOC	575.2400	1.0000	Locomotives: Class I Operations
2285002006	2010	VOC	528.5700	0.9189	Locomotives: Class I Operations
2285002006	2013	VOC	567.2900	0.9862	Locomotives: Class I Operations
2285002006	2016	VOC	581.7700	1.0114	Locomotives: Class I Operations
2285002006	2019	VOC	600.6400	1.0442	Locomotives: Class I Operations
2285002006	2022	VOC	623.1800	1.0833	Locomotives: Class I Operations
2285002006	2025	VOC	644.9944	1.1213	Locomotives: Class I Operations
2285002007	2008	VOC	575.2400	1.0000	Locomotives: Class II / III Operations
2285002007	2010	VOC	528.5700	0.9189	Locomotives: Class II / III Operations
2285002007	2013	VOC	567.2900	0.9862	Locomotives: Class II / III Operations
2285002007	2016	VOC	581.7700	1.0114	Locomotives: Class II / III Operations
2285002007	2019	VOC	600.6400	1.0442	Locomotives: Class II / III Operations
2285002007	2022	VOC	623.1800	1.0833	Locomotives: Class II / III Operations
2285002007	2025	VOC	644.9944	1.1213	Locomotives: Class II / III Operations
2285002008	2008	VOC	14.1200	1.0000	Locomotives: Passenger Trains (Amtrak)
2285002008	2010	VOC	14.2000	1.0057	Locomotives: Passenger Trains (Amtrak)
2285002008	2013	VOC	15.8400	1.1218	Locomotives: Passenger Trains (Amtrak)
2285002008	2016	VOC	16.5600	1.1728	Locomotives: Passenger Trains (Amtrak)
2285002008	2019	VOC	17.1400	1.2139	Locomotives: Passenger Trains (Amtrak)
2285002008	2022	VOC	17.4000	1.2323	Locomotives: Passenger Trains (Amtrak)
2285002008	2025	VOC	17.7276	1.2555	Locomotives: Passenger Trains (Amtrak)
28500201	2008	VOC	575.2400	1.0000	Yard Locomotives
28500201	2010	VOC	528.5700	0.9189	Yard Locomotives
28500201	2013	VOC	567.2900	0.9862	Yard Locomotives
28500201	2016	VOC	581.7700	1.0114	Yard Locomotives
28500201	2019	VOC	600.6400	1.0442	Yard Locomotives
28500201	2022	VOC	623.1800	1.0833	Yard Locomotives
28500201	2025	VOC	644.9944	1.1213	Yard Locomotives

Control factors shown in the following table were calculated by using recommended emission factors for NOX and hydrocarbons (virtually the same as VOC) from *Emission Factors for Locomotives*, EPA-420-F-09-025. The control factors were calculated by dividing base year emission factors into the future year emission factors. Improving control factors are due to requirements for reduced emissions from new and rebuilt locomotive diesel engines. Future emissions were calculated by multiplying the base year emissions (2008) by the associated growth factor and by the associated control factor.

Table 5-3 Railroad Control Factors

SCC	Year	Pollutant	Emission Factor g/gal	Control Factor	Description
2285002006	2008	NOX	169	1.0000	Locomotives: Class I Operations
2285002006	2010	NOX	157	0.9290	Locomotives: Class I Operations
2285002006	2013	NOX	139	0.8225	Locomotives: Class I Operations
2285002006	2016	NOX	121	0.7160	Locomotives: Class I Operations
2285002006	2019	NOX	103	0.6095	Locomotives: Class I Operations
2285002006	2022	NOX	89	0.5266	Locomotives: Class I Operations
2285002006	2025	NOX	74	0.4379	Locomotives: Class I Operations
2285002007	2008	NOX	242	1.0000	Locomotives: Class II / III Operations
2285002007	2010	NOX	242	1.0000	Locomotives: Class II / III Operations
2285002007	2013	NOX	242	1.0000	Locomotives: Class II / III Operations
2285002007	2016	NOX	239	0.9876	Locomotives: Class II / III Operations
2285002007	2019	NOX	233	0.9628	Locomotives: Class II / III Operations
2285002007	2022	NOX	225	0.9298	Locomotives: Class II / III Operations
2285002007	2025	NOX	217	0.8967	Locomotives: Class II / III Operations
2285002008	2008	NOX	214	1.0000	Locomotives: Passenger Trains (Amtrak)
2285002008	2010	NOX	183	0.8551	Locomotives: Passenger Trains (Amtrak)
2285002008	2013	NOX	147	0.6869	Locomotives: Passenger Trains (Amtrak)
2285002008	2016	NOX	119	0.5561	Locomotives: Passenger Trains (Amtrak)
2285002008	2019	NOX	98	0.4579	Locomotives: Passenger Trains (Amtrak)
2285002008	2022	NOX	83	0.3879	Locomotives: Passenger Trains (Amtrak)
2285002008	2025	NOX	68	0.3178	Locomotives: Passenger Trains (Amtrak)
28500201	2008	NOX	243	1.0000	Yard Locomotives
28500201	2010	NOX	236	0.9712	Yard Locomotives
28500201	2013	NOX	225	0.9259	Yard Locomotives
28500201	2016	NOX	208	0.8560	Yard Locomotives
28500201	2019	NOX	200	0.8230	Yard Locomotives
28500201	2022	NOX	177	0.7284	Yard Locomotives
28500201	2025	NOX	150	0.6173	Yard Locomotives
2285002006	2008	VOC	9	1.0000	Locomotives: Class I Operations

SCC	Year	Pollutant	Emission Factor g/gal	Control Factor	Description
2285002006	2010	VOC	8.3	0.9222	Locomotives: Class I Operations
2285002006	2013	VOC	6.5	0.7222	Locomotives: Class I Operations
2285002006	2016	VOC	5.1	0.5667	Locomotives: Class I Operations
2285002006	2019	VOC	3.9	0.4333	Locomotives: Class I Operations
2285002006	2022	VOC	3.2	0.3556	Locomotives: Class I Operations
2285002006	2025	VOC	2.6	0.2889	Locomotives: Class I Operations
2285002007	2008	VOC	11.7	1.0000	Locomotives: Class II / III Operations
2285002007	2010	VOC	11.7	1.0000	Locomotives: Class II / III Operations
2285002007	2013	VOC	11.7	1.0000	Locomotives: Class II / III Operations
2285002007	2016	VOC	11.7	1.0000	Locomotives: Class II / III Operations
2285002007	2019	VOC	11.7	1.0000	Locomotives: Class II / III Operations
2285002007	2022	VOC	11.7	1.0000	Locomotives: Class II / III Operations
2285002007	2025	VOC	11.7	1.0000	Locomotives: Class II / III Operations
2285002008	2008	VOC	9.3	1.0000	Locomotives: Passenger Trains (Amtrak)
2285002008	2010	VOC	8.6	0.9247	Locomotives: Passenger Trains (Amtrak)
2285002008	2013	VOC	6.9	0.7419	Locomotives: Passenger Trains (Amtrak)
2285002008	2016	VOC	5.2	0.5591	Locomotives: Passenger Trains (Amtrak)
2285002008	2019	VOC	3.5	0.3763	Locomotives: Passenger Trains (Amtrak)
2285002008	2022	VOC	2.7	0.2903	Locomotives: Passenger Trains (Amtrak)
2285002008	2025	VOC	2	0.2151	Locomotives: Passenger Trains (Amtrak)
28500201	2008	VOC	14.5	1.0000	Yard Locomotives
28500201	2010	VOC	14.1	0.9724	Yard Locomotives
28500201	2013	VOC	13.3	0.9172	Yard Locomotives
28500201	2016	VOC	12	0.8276	Yard Locomotives
28500201	2019	VOC	11.4	0.7862	Yard Locomotives
28500201	2022	VOC	9.8	0.6759	Yard Locomotives
28500201	2025	VOC	8	0.5517	Yard Locomotives

6.0 NONROAD2008a OPTION FILES

For all years modeled with NONROAD2008a, the gasoline Reid Vapor Pressure (RVP) of 7.8 psi was used in Mecklenburg and Gaston counties and 9.0 psi was used in the remaining five counties. These values reflect current Federal requirements. The results are displayed in Table 4-1 through Table 4-10.

Note that the option files were prepared to also examine the affects of gasoline RVP. Specifically, the RVP of 7.8 psi in Mecklenburg and Gaston counties was relaxed to 9.0 psi as for the five other counties in the area for the years 2013 and future. The results of this analysis are not presented here because they are not part of this redesignation request.

6.1 2010 OPTION FILES

```
Written by Nonroad interface at 10/5/2012 11:38:30 AM
This is the options file for the NONROAD program.
The data is sperated into "packets" bases on common
information.  Each packet is specified by an
identifier and a terminator. Any notes or descriptions
can be placed between the data packets.

9/2005 epa: Add growth & tech years to PERIOD packet
  and Counties & Retrofit files to RUNFILES packet.

------------------------------------------------------

                  PERIOD PACKET

This is the packet that defines the period for
which emissions are to be estimated.  The order of the
records matter.  The selection of certain parameters
will cause some of the record that follow to be ignored.
The order of the records is as follows:

1  - Char 10  - Period type for this simulation.
                  Valid responses are: ANNUAL, SEASONAL, and MONTHLY
2  - Char 10  - Type of inventory produced.
                  Valid responses are: TYPICAL DAY and PERIOD TOTAL
3  - Integer  - year of episode (4 digit year)
4  - Char 10  - Month of episode (use complete name of month)
5  - Char 10  - Type of day
                  Valid responses are: WEEKDAY and WEEKEND
------------------------------------------------------
/PERIOD/
Period type         : Monthly
Summation type      : Typical day
Year of episode     : 2010
Season of year      :
Month of year       : July
Weekday or weekend : Weekday
Year of growth calc:
Year of tech sel    :
/END/

------------------------------------------------------

                  OPTIONS PACKET

This is the packet that defines some of the user
options that drive the model.  Most parameters are
used to make episode specific emission factor
adjustments. The order of the records is fixed.
The order is as follows.
```

```
1  -  Char 80  - First title on reports
2  -  Char 80  - Second title on reports
3  -  Real 10  - Fuel RVP of gasoline for this simulation
4  -  Real 10  - Oxygen weight percent of gasoline for simulation
5  -  Real 10  - Percent sulfur for gasoline
6  -  Real 10  - Percent sulfur for diesel
7  -  Real 10  - Percent sulfur for LPG/CNG
8  -  Real 10  - Minimum daily temperature (deg. F)
9  -  Real 10  - maximum daily temperature (deg. F)
10 -  Real 10  - Representative average daily temperature (deg. F)
11 -  Char 10  - Flag to determine if region is high altitude
                     Valid responses are: HIGH and LOW
12 -  Char 10  - Flag to determine if RFG adjustments are made
                     Valid responses are: YES and NO
-------------------------------------------------------
/OPTIONS/
Title 1            : METROLINA 2010,  FIVE COUNTIES
Title 2            : RVP 9, TYPICAL JULY DAY
Fuel RVP for gas   : 9.0
Oxygen Weight %    : 2.8618
Gas sulfur %       : 0.003
Diesel sulfur %    : 0.0165
Marine Dsl sulfur %: 0.0319
CNG/LPG sulfur %   : 0.003
Minimum temper. (F): 70.6
Maximum temper. (F): 90.1
Average temper. (F): 80.3
Altitude of region : LOW
EtOH Blend % Mkt   : 83
EtOH Vol %         : 10
/END/

-------------------------------------------------------
                  REGION PACKET

This is the packet that defines the region for which
emissions are to be estimated.

The first record tells the type of region and
allocation to perform.

Valid responses are:
US TOTAL   -  emissions are for entire USA without state
              breakout.

50STATE    -  emissions are for all 50 states
              and Washington D.C., by state.

STATE      -  emissions are for a select group of states
              and are state-level estimates

COUNTY     -  emissions are for a select group of counties
              and are county level estimates.  If necessary,
              allocation from state to county will be performed.

SUBCOUNTY  -  emissions are for the specified sub counties
```

```
              and are subcounty level estimates.  If necessary,
              county to subcounty allocation will be performed.

The remaining records define the regions to be included.
The type of data which must be specified depends on the
region level.

US TOTAL   -  Nothing needs to be specified.  The FIPS
              code 00000 is used automatically.

50STATE    -  Nothing needs to be specified.  The FIPS
              code 00000 is used automatically.

STATE      -  state FIPS codes

COUNTY     -  state or county FIPS codes.  State FIPS
              code means include all counties in the
              state.

SUBCOUNTY  -  county FIPS code and subregion code.
------------------------------------------------------
/REGION/
Region Level        : COUNTY
Cabarrus County NC : 37025
Iredell County NC  : 37097
Lincoln County NC  : 37109
Rowan County NC    : 37159
Union County NC    : 37179
/END/

or use -
Region Level        : STATE
Michigan            : 26000
------------------------------------------------------

                  SOURCE CATEGORY PACKET

This packet is used to tell the model which source
categories are to be processed.  It is optional.
If used, only those source categories list will
appear in the output data file.  If the packet is
not found, the model will process all source
categories in the population files.
------------------------------------------------------


Diesel Only -
                   :2270000000
                   :2282020000
                   :2285002015
Spark Ignition Only -
                   :2260000000
                   :2265000000
                   :2267000000
                   :2268000000
                   :2282005010
                   :2282005015
```

```
                   :2282010005
                   :2285004015
                   :2285006015
------------------------------------------------------
 This is the packet that lists the names of output files
 and some of the input data files read by the model.  If
 a drive:\path\ is not given, the location of the
 NONROAD.EXE file itself is assumed.  You will probably
 want to change the names of the Output and Message files
 to match that of the OPTion file, e.g., MICH-97.OPT,
 MICH-97.OUT, MICH-97.MSG, and if used MICH-97.AMS.
------------------------------------------------------
/RUNFILES/
ALLOC XREF         : data\allocate\allocate.xrf
ACTIVITY           : data\activity\activity.dat
EXH TECHNOLOGY     : data\tech\tech-exh.dat
EVP TECHNOLOGY     : data\tech\tech-evp.dat
SEASONALITY        : data\season\season.dat
REGIONS            : data\season\season.dat
MESSAGE            : c:\nonroad\outputs\mtr2010a.msg
OUTPUT DATA        : c:\nonroad\outputs\mtr2010a.out
EPS2 AMS           :
US COUNTIES FIPS   : data\allocate\fips.dat
RETROFIT           :
/END/

------------------------------------------------------
This is the packet that defines the equipment population
files read by the model.
------------------------------------------------------
/POP FILES/
Population File    : c:\nonroad\data\pop\nc.pop
/END/

POPULATION FILE    : c:\nonroad\data\POP\MI.POP


------------------------------------------------------
This is the packet that defines the growth files
files read by the model.
------------------------------------------------------
/GROWTH FILES/
National defaults  : data\growth\nation.grw
/END/


/ALLOC FILES/
Air trans. empl.   :c:\nonroad\data\allocate\nc_airtr.alo
Undergrnd coal prod:c:\nonroad\data\allocate\nc_coal.alo
Construction cost  :c:\nonroad\data\allocate\nc_const.alo
Harvested acres    :c:\nonroad\data\allocate\nc_farms.alo
Golf course estab. :c:\nonroad\data\allocate\nc_golf.alo
Wholesale estab.   :c:\nonroad\data\allocate\nc_holsl.alo
Family housing     :c:\nonroad\data\allocate\nc_house.alo
Logging employees  :c:\nonroad\data\allocate\nc_loggn.alo
Landscaping empl.  :c:\nonroad\data\allocate\nc_lscap.alo
Manufacturing empl.:c:\nonroad\data\allocate\nc_mnfg.alo
```

```
Oil & gas employees:c:\nonroad\data\allocate\nc_oil.alo
Census population  :c:\nonroad\data\allocate\nc_pop.alo
Allocation File    :c:\nonroad\data\allocate\nc_rail.alo
RV Park establish. :c:\nonroad\data\allocate\nc_rvprk.alo
Snowblowers comm.  :c:\nonroad\data\allocate\nc_sbc.alo
Snowblowers res.   :c:\nonroad\data\allocate\nc_sbr.alo
Snowmobiles        :c:\nonroad\data\allocate\nc_snowm.alo
Rec marine inboard :c:\nonroad\data\allocate\nc_wib.alo
Rec marine outboard:c:\nonroad\data\allocate\nc_wob.alo
/END/
------------------------------------------------------
This is the packet that defines the emssions factors
files read by the model.
------------------------------------------------------
/EMFAC FILES/
THC exhaust        : data\emsfac\exhthc.emf
CO exhaust         : data\emsfac\exhco.emf
NOX exhaust        : data\emsfac\exhnox.emf
PM exhaust         : data\emsfac\exhpm.emf
BSFC               : data\emsfac\bsfc.emf
Crankcase          : data\emsfac\crank.emf
Spillage           : data\emsfac\spillage.emf
Diurnal            : data\emsfac\evdiu.emf
Tank Perm          : data\emsfac\evtank.emf
Non-RM Hose Perm   : data\emsfac\evhose.emf
RM Fill Neck Perm  : data\emsfac\evneck.emf
RM Supply/Return   : data\emsfac\evsupret.emf
RM Vent Perm       : data\emsfac\evvent.emf
Hot Soaks          : data\emsfac\evhotsk.emf
RuningLoss         : data\emsfac\evrunls.emf
/END/

------------------------------------------------------
This is the packet that defines the deterioration factors
files read by the model.
------------------------------------------------------
/DETERIORATE FILES/
THC exhaust        : data\detfac\exhthc.det
CO exhaust         : data\detfac\exhco.det
NOX exhaust        : data\detfac\exhnox.det
PM exhaust         : data\detfac\exhpm.det
Diurnal            : data\detfac\evdiu.det
Tank Perm          : data\detfac\evtank.det
Non-RM Hose Perm   : data\detfac\evhose.det
RM Fill Neck Perm  : data\detfac\evneck.det
RM Supply/Return   : data\detfac\evsupret.det
RM Vent Perm       : data\detfac\evvent.det
Hot Soaks          : data\detfac\evhotsk.det
RuningLoss         : data\detfac\evrunls.det
/END/

Optional Packets - Add initial slash "/" to activate

/STAGE II/
Control Factor     : 0.0
/END/
Enter percent control: 95 = 95% control = 0.05 x uncontrolled
```

```
Default should be zero control.

/MODELYEAR OUT/
EXHAUST BMY OUT    :
EVAP BMY OUT       :
/END/

SI REPORT/
SI report file-CSV :OUTPUTS\NRPOLLUT.CSV
/END/

/DAILY FILES/
DAILY TEMPS/RVP    :
/END/

PM Base Sulfur
 cols 1-10: dsl tech type;
 11-20: base sulfur wt%; or '1.0' means no-adjust (cert= in-use)
/PM BASE SULFUR/
T2        0.0350    0.02247
T3        0.2000    0.02247
T3B       0.0500    0.02247
T4A       0.0500    0.02247
T4B       0.0015    0.02247
T4        0.0015    0.30
T4N       0.0015    0.30
T2M       0.0350    0.02247
T3M       1.0       0.02247
T4M       1.0       0.02247
/END/
```

```
Written by Nonroad interface at 10/5/2012 1:44:32 PM
This is the options file for the NONROAD program.
The data is sperated into "packets" bases on common
information.  Each packet is specified by an
identifier and a terminator. Any notes or descriptions
can be placed between the data packets.

9/2005 epa: Add growth & tech years to PERIOD packet
  and Counties & Retrofit files to RUNFILES packet.

------------------------------------------------------

                  PERIOD PACKET

This is the packet that defines the period for
which emissions are to be estimated.  The order of the
records matter.  The selection of certain parameters
will cause some of the record that follow to be ignored.
The order of the records is as follows:
```

```
1  - Char 10  - Period type for this simulation.
                  Valid responses are: ANNUAL, SEASONAL, and MONTHLY
2  - Char 10  - Type of inventory produced.
                  Valid responses are: TYPICAL DAY and PERIOD TOTAL
3  - Integer  - year of episode (4 digit year)
4  - Char 10  - Month of episode (use complete name of month)
5  - Char 10  - Type of day
                  Valid responses are: WEEKDAY and WEEKEND
------------------------------------------------------
/PERIOD/
Period type        : Monthly
Summation type     : Typical day
Year of episode    : 2010
Season of year     :
Month of year      : July
Weekday or weekend : Weekday
Year of growth calc:
Year of tech sel   :
/END/

------------------------------------------------------

                  OPTIONS PACKET

This is the packet that defines some of the user
options that drive the model.  Most parameters are
used to make episode specific emission factor
adjustments. The order of the records is fixed.
The order is as follows.

1  -  Char 80  - First title on reports
2  -  Char 80  - Second title on reports
3  -  Real 10  - Fuel RVP of gasoline for this simulation
4  -  Real 10  - Oxygen weight percent of gasoline for simulation
5  -  Real 10  - Percent sulfur for gasoline
6  -  Real 10  - Percent sulfur for diesel
7  -  Real 10  - Percent sulfur for LPG/CNG
8  -  Real 10  - Minimum daily temperature (deg. F)
9  -  Real 10  - maximum daily temperature (deg. F)
10 -  Real 10  - Representative average daily temperature (deg. F)
11 -  Char 10  - Flag to determine if region is high altitude
                      Valid responses are: HIGH and LOW
12 -  Char 10  - Flag to determine if RFG adjustments are made
                      Valid responses are: YES and NO
------------------------------------------------------
/OPTIONS/
Title 1            : METROLINA 2010, Meck & Gaston
Title 2            : RVP 9, TYPICAL JULY DAY
Fuel RVP for gas   : 7.8
Oxygen Weight %    : 2.8618
Gas sulfur %       : 0.003
Diesel sulfur %    : 0.0165
Marine Dsl sulfur %: 0.0319
CNG/LPG sulfur %   : 0.003
Minimum temper. (F): 70.6
Maximum temper. (F): 90.1
```

```
Average temper. (F): 80.3
Altitude of region : LOW
EtOH Blend % Mkt   : 83
EtOH Vol %         : 10
/END/

------------------------------------------------------
                  REGION PACKET

This is the packet that defines the region for which
emissions are to be estimated.

The first record tells the type of region and
allocation to perform.

Valid responses are:
US TOTAL   -  emissions are for entire USA without state
              breakout.

50STATE    -  emissions are for all 50 states
              and Washington D.C., by state.

STATE      -  emissions are for a select group of states
              and are state-level estimates

COUNTY     -  emissions are for a select group of counties
              and are county level estimates.  If necessary,
              allocation from state to county will be performed.

SUBCOUNTY  -  emissions are for the specified sub counties
              and are subcounty level estimates.  If necessary,
              county to subcounty allocation will be performed.

The remaining records define the regions to be included.
The type of data which must be specified depends on the
region level.

US TOTAL   -  Nothing needs to be specified.  The FIPS
              code 00000 is used automatically.

50STATE    -  Nothing needs to be specified.  The FIPS
              code 00000 is used automatically.

STATE      -  state FIPS codes

COUNTY     -  state or county FIPS codes.  State FIPS
              code means include all counties in the
              state.

SUBCOUNTY  -  county FIPS code and subregion code.
------------------------------------------------------
/REGION/
Region Level       : COUNTY
Gaston County NC   : 37071
Mecklenburg Coun NC: 37119
/END/
```

```
or use -
Region Level       : STATE
Michigan           : 26000
------------------------------------------------------

                  SOURCE CATEGORY PACKET

This packet is used to tell the model which source
categories are to be processed.  It is optional.
If used, only those source categories list will
appear in the output data file.  If the packet is
not found, the model will process all source
categories in the population files.
------------------------------------------------------


Diesel Only -
                   :2270000000
                   :2282020000
                   :2285002015
Spark Ignition Only -
                   :2260000000
                   :2265000000
                   :2267000000
                   :2268000000
                   :2282005010
                   :2282005015
                   :2282010005
                   :2285004015
                   :2285006015
------------------------------------------------------
 This is the packet that lists the names of output files
 and some of the input data files read by the model.  If
 a drive:\path\ is not given, the location of the
 NONROAD.EXE file itself is assumed.  You will probably
 want to change the names of the Output and Message files
 to match that of the OPTion file, e.g., MICH-97.OPT,
 MICH-97.OUT, MICH-97.MSG, and if used MICH-97.AMS.
------------------------------------------------------
/RUNFILES/
ALLOC XREF         : data\allocate\allocate.xrf
ACTIVITY           : data\activity\activity.dat
EXH TECHNOLOGY     : data\tech\tech-exh.dat
EVP TECHNOLOGY     : data\tech\tech-evp.dat
SEASONALITY        : data\season\season.dat
REGIONS            : data\season\season.dat
MESSAGE            : c:\nonroad\outputs\mtr2010b.msg
OUTPUT DATA        : c:\nonroad\outputs\mtr2010b.out
EPS2 AMS           :
US COUNTIES FIPS   : data\allocate\fips.dat
RETROFIT           :
/END/

------------------------------------------------------
This is the packet that defines the equipment population
files read by the model.
------------------------------------------------------
```

```
/POP FILES/
Population File    : c:\nonroad\data\pop\nc.pop
/END/

POPULATION FILE    : c:\nonroad\data\POP\MI.POP


------------------------------------------------------
This is the packet that defines the growth files
files read by the model.
------------------------------------------------------
/GROWTH FILES/
National defaults  : data\growth\nation.grw
/END/


/ALLOC FILES/
Air trans. empl.   :c:\nonroad\data\allocate\nc_airtr.alo
Undergrnd coal prod:c:\nonroad\data\allocate\nc_coal.alo
Construction cost  :c:\nonroad\data\allocate\nc_const.alo
Harvested acres    :c:\nonroad\data\allocate\nc_farms.alo
Golf course estab. :c:\nonroad\data\allocate\nc_golf.alo
Wholesale estab.   :c:\nonroad\data\allocate\nc_holsl.alo
Family housing     :c:\nonroad\data\allocate\nc_house.alo
Logging employees  :c:\nonroad\data\allocate\nc_loggn.alo
Landscaping empl.  :c:\nonroad\data\allocate\nc_lscap.alo
Manufacturing empl.:c:\nonroad\data\allocate\nc_mnfg.alo
Oil & gas employees:c:\nonroad\data\allocate\nc_oil.alo
Census population  :c:\nonroad\data\allocate\nc_pop.alo
Allocation File    :c:\nonroad\data\allocate\nc_rail.alo
RV Park establish. :c:\nonroad\data\allocate\nc_rvprk.alo
Snowblowers comm.  :c:\nonroad\data\allocate\nc_sbc.alo
Snowblowers res.   :c:\nonroad\data\allocate\nc_sbr.alo
Snowmobiles        :c:\nonroad\data\allocate\nc_snowm.alo
Rec marine inboard :c:\nonroad\data\allocate\nc_wib.alo
Rec marine outboard:c:\nonroad\data\allocate\nc_wob.alo
/END/
------------------------------------------------------
This is the packet that defines the emssions factors
files read by the model.
------------------------------------------------------
/EMFAC FILES/
THC exhaust        : data\emsfac\exhthc.emf
CO exhaust         : data\emsfac\exhco.emf
NOX exhaust        : data\emsfac\exhnox.emf
PM exhaust         : data\emsfac\exhpm.emf
BSFC               : data\emsfac\bsfc.emf
Crankcase          : data\emsfac\crank.emf
Spillage           : data\emsfac\spillage.emf
Diurnal            : data\emsfac\evdiu.emf
Tank Perm          : data\emsfac\evtank.emf
Non-RM Hose Perm   : data\emsfac\evhose.emf
RM Fill Neck Perm  : data\emsfac\evneck.emf
RM Supply/Return   : data\emsfac\evsupret.emf
RM Vent Perm       : data\emsfac\evvent.emf
Hot Soaks          : data\emsfac\evhotsk.emf
RuningLoss         : data\emsfac\evrunls.emf
```

```
/END/

-------------------------------------------------------
This is the packet that defines the deterioration factors
files read by the model.
-------------------------------------------------------
/DETERIORATE FILES/
THC exhaust        : data\detfac\exhthc.det
CO exhaust         : data\detfac\exhco.det
NOX exhaust        : data\detfac\exhnox.det
PM exhaust         : data\detfac\exhpm.det
Diurnal            : data\detfac\evdiu.det
Tank Perm          : data\detfac\evtank.det
Non-RM Hose Perm   : data\detfac\evhose.det
RM Fill Neck Perm  : data\detfac\evneck.det
RM Supply/Return   : data\detfac\evsupret.det
RM Vent Perm       : data\detfac\evvent.det
Hot Soaks          : data\detfac\evhotsk.det
RuningLoss         : data\detfac\evrunls.det
/END/

Optional Packets - Add initial slash "/" to activate

/STAGE II/
Control Factor     : 0.0
/END/
Enter percent control: 95 = 95% control = 0.05 x uncontrolled
Default should be zero control.

/MODELYEAR OUT/
EXHAUST BMY OUT    :
EVAP BMY OUT       :
/END/

SI REPORT/
SI report file-CSV :OUTPUTS\NRPOLLUT.CSV
/END/

/DAILY FILES/
DAILY TEMPS/RVP    :
/END/

PM Base Sulfur
 cols 1-10: dsl tech type;
 11-20: base sulfur wt%; or '1.0' means no-adjust (cert= in-use)
/PM BASE SULFUR/
T2        0.0350    0.02247
T3        0.2000    0.02247
T3B       0.0500    0.02247
T4A       0.0500    0.02247
T4B       0.0015    0.02247
T4        0.0015    0.30
T4N       0.0015    0.30
T2M       0.0350    0.02247
T3M       1.0       0.02247
T4M       1.0       0.02247
/END/
```

6.2 2013 OPTION FILES

```
Written by Nonroad interface at 11/6/2012 5:51:58 PM
This is the options file for the NONROAD program.
The data is sperated into "packets" bases on common
information.  Each packet is specified by an
identifier and a terminator. Any notes or descriptions
can be placed between the data packets.

9/2005 epa: Add growth & tech years to PERIOD packet
  and Counties & Retrofit files to RUNFILES packet.

------------------------------------------------------

                  PERIOD PACKET

This is the packet that defines the period for
which emissions are to be estimated.  The order of the
records matter.  The selection of certain parameters
will cause some of the record that follow to be ignored.
The order of the records is as follows:

1  - Char 10  - Period type for this simulation.
                  Valid responses are: ANNUAL, SEASONAL, and MONTHLY
2  - Char 10  - Type of inventory produced.
                  Valid responses are: TYPICAL DAY and PERIOD TOTAL
3  - Integer  - year of episode (4 digit year)
4  - Char 10  - Month of episode (use complete name of month)
5  - Char 10  - Type of day
                  Valid responses are: WEEKDAY and WEEKEND
------------------------------------------------------
/PERIOD/
Period type        : Monthly
Summation type     : Typical day
Year of episode    : 2013
Season of year     :
Month of year      : July
Weekday or weekend : Weekday
Year of growth calc:
Year of tech sel   :
/END/

------------------------------------------------------

                  OPTIONS PACKET

This is the packet that defines some of the user
options that drive the model.  Most parameters are
used to make episode specific emission factor
adjustments. The order of the records is fixed.
The order is as follows.
```

```
1  -  Char 80  - First title on reports
2  -  Char 80  - Second title on reports
3  -  Real 10  - Fuel RVP of gasoline for this simulation
4  -  Real 10  - Oxygen weight percent of gasoline for simulation
5  -  Real 10  - Percent sulfur for gasoline
6  -  Real 10  - Percent sulfur for diesel
7  -  Real 10  - Percent sulfur for LPG/CNG
8  -  Real 10  - Minimum daily temperature (deg. F)
9  -  Real 10  - maximum daily temperature (deg. F)
10 -  Real 10  - Representative average daily temperature (deg. F)
11 -  Char 10  - Flag to determine if region is high altitude
                      Valid responses are: HIGH and LOW
12 -  Char 10  - Flag to determine if RFG adjustments are made
                      Valid responses are: YES and NO
------------------------------------------------------
/OPTIONS/
Title 1            : METROLINA 2013, Gaston Mecklenburg
Title 2            : RVP 7.8, TYPICAL JULY DAY
Fuel RVP for gas   : 7.8
Oxygen Weight %    : 3.2756
Gas sulfur %       : 0.003
Diesel sulfur %    : 0.0032
Marine Dsl sulfur %: 0.0044
CNG/LPG sulfur %   : 0.003
Minimum temper. (F): 70.6
Maximum temper. (F): 90.1
Average temper. (F): 80.3
Altitude of region : LOW
EtOH Blend % Mkt   : 95
EtOH Vol %         : 10
/END/

------------------------------------------------------
                  REGION PACKET

This is the packet that defines the region for which
emissions are to be estimated.

The first record tells the type of region and
allocation to perform.

Valid responses are:
US TOTAL   -  emissions are for entire USA without state
              breakout.

50STATE    -  emissions are for all 50 states
              and Washington D.C., by state.

STATE      -  emissions are for a select group of states
              and are state-level estimates

COUNTY     -  emissions are for a select group of counties
              and are county level estimates.  If necessary,
              allocation from state to county will be performed.

SUBCOUNTY  -  emissions are for the specified sub counties
              and are subcounty level estimates.  If necessary,
```

```
              county to subcounty allocation will be performed.

The remaining records define the regions to be included.
The type of data which must be specified depends on the
region level.

US TOTAL   -  Nothing needs to be specified.  The FIPS
              code 00000 is used automatically.

50STATE    -  Nothing needs to be specified.  The FIPS
              code 00000 is used automatically.

STATE      -  state FIPS codes

COUNTY     -  state or county FIPS codes.  State FIPS
              code means include all counties in the
              state.

SUBCOUNTY  -  county FIPS code and subregion code.
-------------------------------------------------------
/REGION/
Region Level       : COUNTY
Gaston County NC   : 37071
Mecklenburg Coun NC: 37119
/END/

or use -
Region Level       : STATE
Michigan           : 26000
-------------------------------------------------------

                  SOURCE CATEGORY PACKET

This packet is used to tell the model which source
categories are to be processed.  It is optional.
If used, only those source categories list will
appear in the output data file.  If the packet is
not found, the model will process all source
categories in the population files.
-------------------------------------------------------


Diesel Only -
                   :2270000000
                   :2282020000
                   :2285002015
Spark Ignition Only -
                   :2260000000
                   :2265000000
                   :2267000000
                   :2268000000
                   :2282005010
                   :2282005015
                   :2282010005
                   :2285004015
                   :2285006015
-------------------------------------------------------
```

```
 This is the packet that lists the names of output files
 and some of the input data files read by the model.  If
 a drive:\path\ is not given, the location of the
 NONROAD.EXE file itself is assumed.  You will probably
 want to change the names of the Output and Message files
 to match that of the OPTion file, e.g., MICH-97.OPT,
 MICH-97.OUT, MICH-97.MSG, and if used MICH-97.AMS.
------------------------------------------------------
/RUNFILES/
ALLOC XREF          : data\allocate\allocate.xrf
ACTIVITY            : data\activity\activity.dat
EXH TECHNOLOGY      : data\tech\tech-exh.dat
EVP TECHNOLOGY      : data\tech\tech-evp.dat
SEASONALITY         : data\season\season.dat
REGIONS             : data\season\season.dat
MESSAGE             : c:\nonroad\outputs\mtr2013b.msg
OUTPUT DATA         : c:\nonroad\outputs\mtr2013b.out
EPS2 AMS            :
US COUNTIES FIPS    : data\allocate\fips.dat
RETROFIT            :
/END/

------------------------------------------------------
This is the packet that defines the equipment population
files read by the model.
------------------------------------------------------
/POP FILES/
Population File     : c:\nonroad\data\pop\nc.pop
/END/

POPULATION FILE     : c:\nonroad\data\POP\MI.POP


------------------------------------------------------
This is the packet that defines the growth files
files read by the model.
------------------------------------------------------
/GROWTH FILES/
National defaults   : data\growth\nation.grw
/END/


/ALLOC FILES/
Air trans. empl.    :c:\nonroad\data\allocate\nc_airtr.alo
Undergrnd coal prod:c:\nonroad\data\allocate\nc_coal.alo
Construction cost   :c:\nonroad\data\allocate\nc_const.alo
Harvested acres     :c:\nonroad\data\allocate\nc_farms.alo
Golf course estab. :c:\nonroad\data\allocate\nc_golf.alo
Wholesale estab.    :c:\nonroad\data\allocate\nc_holsl.alo
Family housing      :c:\nonroad\data\allocate\nc_house.alo
Logging employees   :c:\nonroad\data\allocate\nc_loggn.alo
Landscaping empl.   :c:\nonroad\data\allocate\nc_lscap.alo
Manufacturing empl.:c:\nonroad\data\allocate\nc_mnfg.alo
Oil & gas employees:c:\nonroad\data\allocate\nc_oil.alo
Census population   :c:\nonroad\data\allocate\nc_pop.alo
Allocation File     :c:\nonroad\data\allocate\nc_rail.alo
RV Park establish. :c:\nonroad\data\allocate\nc_rvprk.alo
```

```
Snowblowers comm.  :c:\nonroad\data\allocate\nc_sbc.alo
Snowblowers res.   :c:\nonroad\data\allocate\nc_sbr.alo
Snowmobiles        :c:\nonroad\data\allocate\nc_snowm.alo
Rec marine inboard :c:\nonroad\data\allocate\nc_wib.alo
Rec marine outboard:c:\nonroad\data\allocate\nc_wob.alo
/END/
------------------------------------------------------
This is the packet that defines the emssions factors
files read by the model.
------------------------------------------------------
/EMFAC FILES/
THC exhaust        : data\emsfac\exhthc.emf
CO exhaust         : data\emsfac\exhco.emf
NOX exhaust        : data\emsfac\exhnox.emf
PM exhaust         : data\emsfac\exhpm.emf
BSFC               : data\emsfac\bsfc.emf
Crankcase          : data\emsfac\crank.emf
Spillage           : data\emsfac\spillage.emf
Diurnal            : data\emsfac\evdiu.emf
Tank Perm          : data\emsfac\evtank.emf
Non-RM Hose Perm   : data\emsfac\evhose.emf
RM Fill Neck Perm  : data\emsfac\evneck.emf
RM Supply/Return   : data\emsfac\evsupret.emf
RM Vent Perm       : data\emsfac\evvent.emf
Hot Soaks          : data\emsfac\evhotsk.emf
RuningLoss         : data\emsfac\evrunls.emf
/END/

------------------------------------------------------
This is the packet that defines the deterioration factors
files read by the model.
------------------------------------------------------
/DETERIORATE FILES/
THC exhaust        : data\detfac\exhthc.det
CO exhaust         : data\detfac\exhco.det
NOX exhaust        : data\detfac\exhnox.det
PM exhaust         : data\detfac\exhpm.det
Diurnal            : data\detfac\evdiu.det
Tank Perm          : data\detfac\evtank.det
Non-RM Hose Perm   : data\detfac\evhose.det
RM Fill Neck Perm  : data\detfac\evneck.det
RM Supply/Return   : data\detfac\evsupret.det
RM Vent Perm       : data\detfac\evvent.det
Hot Soaks          : data\detfac\evhotsk.det
RuningLoss         : data\detfac\evrunls.det
/END/

Optional Packets - Add initial slash "/" to activate

/STAGE II/
Control Factor     : 0.0
/END/
Enter percent control: 95 = 95% control = 0.05 x uncontrolled
Default should be zero control.

/MODELYEAR OUT/
EXHAUST BMY OUT    :
```

```
EVAP BMY OUT       :
/END/

SI REPORT/
SI report file-CSV :OUTPUTS\NRPOLLUT.CSV
/END/

/DAILY FILES/
DAILY TEMPS/RVP    :
/END/

PM Base Sulfur
 cols 1-10: dsl tech type;
 11-20: base sulfur wt%; or '1.0' means no-adjust (cert= in-use)
/PM BASE SULFUR/
T2        0.0350    0.02247
T3        0.2000    0.02247
T3B       0.0500    0.02247
T4A       0.0500    0.02247
T4B       0.0015    0.02247
T4        0.0015    0.30
T4N       0.0015    0.30
T2M       0.0350    0.02247
T3M       1.0       0.02247
T4M       1.0       0.02247
/END/
```

```
Written by Nonroad interface at 10/2/2012 4:33:24 PM
This is the options file for the NONROAD program.
The data is sperated into "packets" bases on common
information.  Each packet is specified by an
identifier and a terminator. Any notes or descriptions
can be placed between the data packets.

9/2005 epa: Add growth & tech years to PERIOD packet
  and Counties & Retrofit files to RUNFILES packet.

------------------------------------------------------

                  PERIOD PACKET

This is the packet that defines the period for
which emissions are to be estimated.  The order of the
records matter.  The selection of certain parameters
will cause some of the record that follow to be ignored.
The order of the records is as follows:

1  - Char 10  - Period type for this simulation.
                  Valid responses are: ANNUAL, SEASONAL, and MONTHLY
2  - Char 10  - Type of inventory produced.
                  Valid responses are: TYPICAL DAY and PERIOD TOTAL
3  - Integer  - year of episode (4 digit year)
4  - Char 10  - Month of episode (use complete name of month)
```

```
5  - Char 10  - Type of day
                  Valid responses are: WEEKDAY and WEEKEND
------------------------------------------------------
/PERIOD/
Period type        : Monthly
Summation type     : Typical day
Year of episode    : 2013
Season of year     :
Month of year      : July
Weekday or weekend : Weekday
Year of growth calc:
Year of tech sel   :
/END/

------------------------------------------------------

                  OPTIONS PACKET

This is the packet that defines some of the user
options that drive the model.  Most parameters are
used to make episode specific emission factor
adjustments. The order of the records is fixed.
The order is as follows.

1  -  Char 80  - First title on reports
2  -  Char 80  - Second title on reports
3  -  Real 10  - Fuel RVP of gasoline for this simulation
4  -  Real 10  - Oxygen weight percent of gasoline for simulation
5  -  Real 10  - Percent sulfur for gasoline
6  -  Real 10  - Percent sulfur for diesel
7  -  Real 10  - Percent sulfur for LPG/CNG
8  -  Real 10  - Minimum daily temperature (deg. F)
9  -  Real 10  - maximum daily temperature (deg. F)
10 -  Real 10  - Representative average daily temperature (deg. F)
11 -  Char 10  - Flag to determine if region is high altitude
                      Valid responses are: HIGH and LOW
12 -  Char 10  - Flag to determine if RFG adjustments are made
                      Valid responses are: YES and NO
------------------------------------------------------
/OPTIONS/
Title 1            : METROLINA 2013, ALL COUNTIES
Title 2            : RVP 9, TYPICAL JULY DAY
Fuel RVP for gas   : 9.0
Oxygen Weight %    : 3.2756
Gas sulfur %       : 0.003
Diesel sulfur %    : 0.0032
Marine Dsl sulfur %: 0.0044
CNG/LPG sulfur %   : 0.003
Minimum temper. (F): 70.6
Maximum temper. (F): 90.1
Average temper. (F): 80.3
Altitude of region : LOW
EtOH Blend % Mkt   : 95
EtOH Vol %         : 10
/END/

------------------------------------------------------
```

```
                  REGION PACKET

This is the packet that defines the region for which
emissions are to be estimated.

The first record tells the type of region and
allocation to perform.

Valid responses are:
US TOTAL   -  emissions are for entire USA without state
              breakout.

50STATE    -  emissions are for all 50 states
              and Washington D.C., by state.

STATE      -  emissions are for a select group of states
              and are state-level estimates

COUNTY     -  emissions are for a select group of counties
              and are county level estimates.  If necessary,
              allocation from state to county will be performed.

SUBCOUNTY  -  emissions are for the specified sub counties
              and are subcounty level estimates.  If necessary,
              county to subcounty allocation will be performed.

The remaining records define the regions to be included.
The type of data which must be specified depends on the
region level.

US TOTAL   -  Nothing needs to be specified.  The FIPS
              code 00000 is used automatically.

50STATE    -  Nothing needs to be specified.  The FIPS
              code 00000 is used automatically.

STATE      -  state FIPS codes

COUNTY     -  state or county FIPS codes.  State FIPS
              code means include all counties in the
              state.

SUBCOUNTY  -  county FIPS code and subregion code.
------------------------------------------------------
/REGION/
Region Level       : COUNTY
Cabarrus County NC : 37025
Gaston County NC   : 37071
Iredell County NC  : 37097
Lincoln County NC  : 37109
Mecklenburg Coun NC: 37119
Rowan County NC    : 37159
Union County NC    : 37179
/END/

or use -
Region Level       : STATE
```

```
Michigan           : 26000
-------------------------------------------------------

                  SOURCE CATEGORY PACKET

This packet is used to tell the model which source
categories are to be processed.  It is optional.
If used, only those source categories list will
appear in the output data file.  If the packet is
not found, the model will process all source
categories in the population files.
-------------------------------------------------------


Diesel Only -
                   :2270000000
                   :2282020000
                   :2285002015
Spark Ignition Only -
                   :2260000000
                   :2265000000
                   :2267000000
                   :2268000000
                   :2282005010
                   :2282005015
                   :2282010005
                   :2285004015
                   :2285006015
-------------------------------------------------------
 This is the packet that lists the names of output files
 and some of the input data files read by the model.  If
 a drive:\path\ is not given, the location of the
 NONROAD.EXE file itself is assumed.  You will probably
 want to change the names of the Output and Message files
 to match that of the OPTion file, e.g., MICH-97.OPT,
 MICH-97.OUT, MICH-97.MSG, and if used MICH-97.AMS.
-------------------------------------------------------
/RUNFILES/
ALLOC XREF         : data\allocate\allocate.xrf
ACTIVITY           : data\activity\activity.dat
EXH TECHNOLOGY     : data\tech\tech-exh.dat
EVP TECHNOLOGY     : data\tech\tech-evp.dat
SEASONALITY        : data\season\season.dat
REGIONS            : data\season\season.dat
MESSAGE            : c:\nonroad\outputs\mtrl2013.msg
OUTPUT DATA        : c:\nonroad\outputs\mtrl2013.out
EPS2 AMS           :
US COUNTIES FIPS   : data\allocate\fips.dat
RETROFIT           :
/END/

-------------------------------------------------------
This is the packet that defines the equipment population
files read by the model.
-------------------------------------------------------
/POP FILES/
Population File    : c:\nonroad\data\pop\nc.pop
```

```
/END/

POPULATION FILE    : c:\nonroad\data\POP\MI.POP


------------------------------------------------------
This is the packet that defines the growth files
files read by the model.
------------------------------------------------------
/GROWTH FILES/
National defaults  : data\growth\nation.grw
/END/


/ALLOC FILES/
Air trans. empl.   :c:\nonroad\data\allocate\nc_airtr.alo
Undergrnd coal prod:c:\nonroad\data\allocate\nc_coal.alo
Construction cost  :c:\nonroad\data\allocate\nc_const.alo
Harvested acres    :c:\nonroad\data\allocate\nc_farms.alo
Golf course estab. :c:\nonroad\data\allocate\nc_golf.alo
Wholesale estab.   :c:\nonroad\data\allocate\nc_holsl.alo
Family housing     :c:\nonroad\data\allocate\nc_house.alo
Logging employees  :c:\nonroad\data\allocate\nc_loggn.alo
Landscaping empl.  :c:\nonroad\data\allocate\nc_lscap.alo
Manufacturing empl.:c:\nonroad\data\allocate\nc_mnfg.alo
Oil & gas employees:c:\nonroad\data\allocate\nc_oil.alo
Census population  :c:\nonroad\data\allocate\nc_pop.alo
Allocation File    :c:\nonroad\data\allocate\nc_rail.alo
RV Park establish. :c:\nonroad\data\allocate\nc_rvprk.alo
Snowblowers comm.  :c:\nonroad\data\allocate\nc_sbc.alo
Snowblowers res.   :c:\nonroad\data\allocate\nc_sbr.alo
Snowmobiles        :c:\nonroad\data\allocate\nc_snowm.alo
Rec marine inboard :c:\nonroad\data\allocate\nc_wib.alo
Rec marine outboard:c:\nonroad\data\allocate\nc_wob.alo
/END/
------------------------------------------------------
This is the packet that defines the emssions factors
files read by the model.
------------------------------------------------------
/EMFAC FILES/
THC exhaust        : data\emsfac\exhthc.emf
CO exhaust         : data\emsfac\exhco.emf
NOX exhaust        : data\emsfac\exhnox.emf
PM exhaust         : data\emsfac\exhpm.emf
BSFC               : data\emsfac\bsfc.emf
Crankcase          : data\emsfac\crank.emf
Spillage           : data\emsfac\spillage.emf
Diurnal            : data\emsfac\evdiu.emf
Tank Perm          : data\emsfac\evtank.emf
Non-RM Hose Perm   : data\emsfac\evhose.emf
RM Fill Neck Perm  : data\emsfac\evneck.emf
RM Supply/Return   : data\emsfac\evsupret.emf
RM Vent Perm       : data\emsfac\evvent.emf
Hot Soaks          : data\emsfac\evhotsk.emf
RuningLoss         : data\emsfac\evrunls.emf
/END/
```

```
-------------------------------------------------------
This is the packet that defines the deterioration factors
files read by the model.
-------------------------------------------------------
/DETERIORATE FILES/
THC exhaust        : data\detfac\exhthc.det
CO exhaust         : data\detfac\exhco.det
NOX exhaust        : data\detfac\exhnox.det
PM exhaust         : data\detfac\exhpm.det
Diurnal            : data\detfac\evdiu.det
Tank Perm          : data\detfac\evtank.det
Non-RM Hose Perm   : data\detfac\evhose.det
RM Fill Neck Perm  : data\detfac\evneck.det
RM Supply/Return   : data\detfac\evsupret.det
RM Vent Perm       : data\detfac\evvent.det
Hot Soaks          : data\detfac\evhotsk.det
RuningLoss         : data\detfac\evrunls.det
/END/

Optional Packets - Add initial slash "/" to activate

/STAGE II/
Control Factor     : 0.0
/END/
Enter percent control: 95 = 95% control = 0.05 x uncontrolled
Default should be zero control.

/MODELYEAR OUT/
EXHAUST BMY OUT    :
EVAP BMY OUT       :
/END/

SI REPORT/
SI report file-CSV :OUTPUTS\NRPOLLUT.CSV
/END/

/DAILY FILES/
DAILY TEMPS/RVP    :
/END/

PM Base Sulfur
 cols 1-10: dsl tech type;
 11-20: base sulfur wt%; or '1.0' means no-adjust (cert= in-use)
/PM BASE SULFUR/
T2        0.0350    0.02247
T3        0.2000    0.02247
T3B       0.0500    0.02247
T4A       0.0500    0.02247
T4B       0.0015    0.02247
T4        0.0015    0.30
T4N       0.0015    0.30
T2M       0.0350    0.02247
T3M       1.0       0.02247
T4M       1.0       0.02247
/END/
```

6.3 2016 OPTION FILES

```
Written by Nonroad interface at 11/6/2012 5:59:30 PM
This is the options file for the NONROAD program.
The data is sperated into "packets" bases on common
information.  Each packet is specified by an
identifier and a terminator. Any notes or descriptions
can be placed between the data packets.

9/2005 epa: Add growth & tech years to PERIOD packet
  and Counties & Retrofit files to RUNFILES packet.

------------------------------------------------------

                  PERIOD PACKET

This is the packet that defines the period for
which emissions are to be estimated.  The order of the
records matter.  The selection of certain parameters
will cause some of the record that follow to be ignored.
The order of the records is as follows:

1  - Char 10  - Period type for this simulation.
                  Valid responses are: ANNUAL, SEASONAL, and MONTHLY
2  - Char 10  - Type of inventory produced.
                  Valid responses are: TYPICAL DAY and PERIOD TOTAL
3  - Integer  - year of episode (4 digit year)
4  - Char 10  - Month of episode (use complete name of month)
5  - Char 10  - Type of day
                  Valid responses are: WEEKDAY and WEEKEND
------------------------------------------------------
/PERIOD/
Period type        : Monthly
Summation type     : Typical day
Year of episode    : 2016
Season of year     :
Month of year      : July
Weekday or weekend : Weekday
Year of growth calc:
Year of tech sel   :
/END/

------------------------------------------------------

                  OPTIONS PACKET

This is the packet that defines some of the user
options that drive the model.  Most parameters are
used to make episode specific emission factor
adjustments. The order of the records is fixed.
The order is as follows.

1  -  Char 80  - First title on reports
```

```
2  -  Char 80  - Second title on reports
3  -  Real 10  - Fuel RVP of gasoline for this simulation
4  -  Real 10  - Oxygen weight percent of gasoline for simulation
5  -  Real 10  - Percent sulfur for gasoline
6  -  Real 10  - Percent sulfur for diesel
7  -  Real 10  - Percent sulfur for LPG/CNG
8  -  Real 10  - Minimum daily temperature (deg. F)
9  -  Real 10  - maximum daily temperature (deg. F)
10 -  Real 10  - Representative average daily temperature (deg. F)
11 -  Char 10  - Flag to determine if region is high altitude
                      Valid responses are: HIGH and LOW
12 -  Char 10  - Flag to determine if RFG adjustments are made
                      Valid responses are: YES and NO
------------------------------------------------------
/OPTIONS/
Title 1            : METROLINA 2016, GASTON MECKLENBURG
Title 2            : RVP 7.8, TYPICAL JULY DAY
Fuel RVP for gas   : 7.8
Oxygen Weight %    : 3.3101
Gas sulfur %       : 0.003
Diesel sulfur %    : 0.0011
Marine Dsl sulfur %: 0.0056
CNG/LPG sulfur %   : 0.003
Minimum temper. (F): 70.6
Maximum temper. (F): 90.1
Average temper. (F): 80.3
Altitude of region : LOW
EtOH Blend % Mkt   : 96
EtOH Vol %         : 10
/END/

------------------------------------------------------
                  REGION PACKET

This is the packet that defines the region for which
emissions are to be estimated.

The first record tells the type of region and
allocation to perform.

Valid responses are:
US TOTAL   -  emissions are for entire USA without state
              breakout.

50STATE    -  emissions are for all 50 states
              and Washington D.C., by state.

STATE      -  emissions are for a select group of states
              and are state-level estimates

COUNTY     -  emissions are for a select group of counties
              and are county level estimates.  If necessary,
              allocation from state to county will be performed.

SUBCOUNTY  -  emissions are for the specified sub counties
              and are subcounty level estimates.  If necessary,
              county to subcounty allocation will be performed.
```

```
The remaining records define the regions to be included.
The type of data which must be specified depends on the
region level.

US TOTAL   -  Nothing needs to be specified.  The FIPS
              code 00000 is used automatically.

50STATE    -  Nothing needs to be specified.  The FIPS
              code 00000 is used automatically.

STATE      -  state FIPS codes

COUNTY     -  state or county FIPS codes.  State FIPS
              code means include all counties in the
              state.

SUBCOUNTY  -  county FIPS code and subregion code.
------------------------------------------------------
/REGION/
Region Level       : COUNTY
Gaston County NC   : 37071
Mecklenburg Coun NC: 37119
/END/

or use -
Region Level       : STATE
Michigan           : 26000
------------------------------------------------------

                  SOURCE CATEGORY PACKET

This packet is used to tell the model which source
categories are to be processed.  It is optional.
If used, only those source categories list will
appear in the output data file.  If the packet is
not found, the model will process all source
categories in the population files.
------------------------------------------------------


Diesel Only -
                   :2270000000
                   :2282020000
                   :2285002015
Spark Ignition Only -
                   :2260000000
                   :2265000000
                   :2267000000
                   :2268000000
                   :2282005010
                   :2282005015
                   :2282010005
                   :2285004015
                   :2285006015
------------------------------------------------------
 This is the packet that lists the names of output files
```

```
 and some of the input data files read by the model.  If
 a drive:\path\ is not given, the location of the
 NONROAD.EXE file itself is assumed.  You will probably
 want to change the names of the Output and Message files
 to match that of the OPTion file, e.g., MICH-97.OPT,
 MICH-97.OUT, MICH-97.MSG, and if used MICH-97.AMS.
------------------------------------------------------
/RUNFILES/
ALLOC XREF          : data\allocate\allocate.xrf
ACTIVITY            : data\activity\activity.dat
EXH TECHNOLOGY      : data\tech\tech-exh.dat
EVP TECHNOLOGY      : data\tech\tech-evp.dat
SEASONALITY         : data\season\season.dat
REGIONS             : data\season\season.dat
MESSAGE             : c:\nonroad\outputs\mtr2016b.msg
OUTPUT DATA         : c:\nonroad\outputs\mtr2016b.out
EPS2 AMS            :
US COUNTIES FIPS    : data\allocate\fips.dat
RETROFIT            :
/END/

------------------------------------------------------
This is the packet that defines the equipment population
files read by the model.
------------------------------------------------------
/POP FILES/
Population File     : c:\nonroad\data\pop\nc.pop
/END/

POPULATION FILE     : c:\nonroad\data\POP\MI.POP


------------------------------------------------------
This is the packet that defines the growth files
files read by the model.
------------------------------------------------------
/GROWTH FILES/
National defaults   : data\growth\nation.grw
/END/


/ALLOC FILES/
Air trans. empl.    :c:\nonroad\data\allocate\nc_airtr.alo
Undergrnd coal prod:c:\nonroad\data\allocate\nc_coal.alo
Construction cost   :c:\nonroad\data\allocate\nc_const.alo
Harvested acres     :c:\nonroad\data\allocate\nc_farms.alo
Golf course estab.  :c:\nonroad\data\allocate\nc_golf.alo
Wholesale estab.    :c:\nonroad\data\allocate\nc_holsl.alo
Family housing      :c:\nonroad\data\allocate\nc_house.alo
Logging employees   :c:\nonroad\data\allocate\nc_loggn.alo
Landscaping empl.   :c:\nonroad\data\allocate\nc_lscap.alo
Manufacturing empl.:c:\nonroad\data\allocate\nc_mnfg.alo
Oil & gas employees:c:\nonroad\data\allocate\nc_oil.alo
Census population   :c:\nonroad\data\allocate\nc_pop.alo
Allocation File     :c:\nonroad\data\allocate\nc_rail.alo
RV Park establish.  :c:\nonroad\data\allocate\nc_rvprk.alo
Snowblowers comm.   :c:\nonroad\data\allocate\nc_sbc.alo
```

```
Snowblowers res.   :c:\nonroad\data\allocate\nc_sbr.alo
Snowmobiles        :c:\nonroad\data\allocate\nc_snowm.alo
Rec marine inboard :c:\nonroad\data\allocate\nc_wib.alo
Rec marine outboard:c:\nonroad\data\allocate\nc_wob.alo
/END/
------------------------------------------------------
This is the packet that defines the emssions factors
files read by the model.
------------------------------------------------------
/EMFAC FILES/
THC exhaust        : data\emsfac\exhthc.emf
CO exhaust         : data\emsfac\exhco.emf
NOX exhaust        : data\emsfac\exhnox.emf
PM exhaust         : data\emsfac\exhpm.emf
BSFC               : data\emsfac\bsfc.emf
Crankcase          : data\emsfac\crank.emf
Spillage           : data\emsfac\spillage.emf
Diurnal            : data\emsfac\evdiu.emf
Tank Perm          : data\emsfac\evtank.emf
Non-RM Hose Perm   : data\emsfac\evhose.emf
RM Fill Neck Perm  : data\emsfac\evneck.emf
RM Supply/Return   : data\emsfac\evsupret.emf
RM Vent Perm       : data\emsfac\evvent.emf
Hot Soaks          : data\emsfac\evhotsk.emf
RuningLoss         : data\emsfac\evrunls.emf
/END/

------------------------------------------------------
This is the packet that defines the deterioration factors
files read by the model.
------------------------------------------------------
/DETERIORATE FILES/
THC exhaust        : data\detfac\exhthc.det
CO exhaust         : data\detfac\exhco.det
NOX exhaust        : data\detfac\exhnox.det
PM exhaust         : data\detfac\exhpm.det
Diurnal            : data\detfac\evdiu.det
Tank Perm          : data\detfac\evtank.det
Non-RM Hose Perm   : data\detfac\evhose.det
RM Fill Neck Perm  : data\detfac\evneck.det
RM Supply/Return   : data\detfac\evsupret.det
RM Vent Perm       : data\detfac\evvent.det
Hot Soaks          : data\detfac\evhotsk.det
RuningLoss         : data\detfac\evrunls.det
/END/

Optional Packets - Add initial slash "/" to activate

/STAGE II/
Control Factor     : 0.0
/END/
Enter percent control: 95 = 95% control = 0.05 x uncontrolled
Default should be zero control.

/MODELYEAR OUT/
EXHAUST BMY OUT    :
EVAP BMY OUT       :
```

```
/END/

SI REPORT/
SI report file-CSV :OUTPUTS\NRPOLLUT.CSV
/END/

/DAILY FILES/
DAILY TEMPS/RVP    :
/END/

PM Base Sulfur
 cols 1-10: dsl tech type;
 11-20: base sulfur wt%; or '1.0' means no-adjust (cert= in-use)
/PM BASE SULFUR/
T2        0.0350    0.02247
T3        0.2000    0.02247
T3B       0.0500    0.02247
T4A       0.0500    0.02247
T4B       0.0015    0.02247
T4        0.0015    0.30
T4N       0.0015    0.30
T2M       0.0350    0.02247
T3M       1.0       0.02247
T4M       1.0       0.02247
/END/




Written by Nonroad interface at 10/3/2012 10:07:00 AM
This is the options file for the NONROAD program.
The data is sperated into "packets" bases on common
information.  Each packet is specified by an
identifier and a terminator. Any notes or descriptions
can be placed between the data packets.

9/2005 epa: Add growth & tech years to PERIOD packet
  and Counties & Retrofit files to RUNFILES packet.

-------------------------------------------------------

                  PERIOD PACKET

This is the packet that defines the period for
which emissions are to be estimated.  The order of the
records matter.  The selection of certain parameters
will cause some of the record that follow to be ignored.
The order of the records is as follows:

1  - Char 10  - Period type for this simulation.
                  Valid responses are: ANNUAL, SEASONAL, and MONTHLY
2  - Char 10  - Type of inventory produced.
                  Valid responses are: TYPICAL DAY and PERIOD TOTAL
3  - Integer  - year of episode (4 digit year)
4  - Char 10  - Month of episode (use complete name of month)
5  - Char 10  - Type of day
                  Valid responses are: WEEKDAY and WEEKEND
```

```
------------------------------------------------------
/PERIOD/
Period type        : Monthly
Summation type     : Typical day
Year of episode    : 2016
Season of year     :
Month of year      : July
Weekday or weekend : Weekday
Year of growth calc:
Year of tech sel   :
/END/

------------------------------------------------------

                  OPTIONS PACKET

This is the packet that defines some of the user
options that drive the model.  Most parameters are
used to make episode specific emission factor
adjustments. The order of the records is fixed.
The order is as follows.

1  -  Char 80  - First title on reports
2  -  Char 80  - Second title on reports
3  -  Real 10  - Fuel RVP of gasoline for this simulation
4  -  Real 10  - Oxygen weight percent of gasoline for simulation
5  -  Real 10  - Percent sulfur for gasoline
6  -  Real 10  - Percent sulfur for diesel
7  -  Real 10  - Percent sulfur for LPG/CNG
8  -  Real 10  - Minimum daily temperature (deg. F)
9  -  Real 10  - maximum daily temperature (deg. F)
10 -  Real 10  - Representative average daily temperature (deg. F)
11 -  Char 10  - Flag to determine if region is high altitude
                      Valid responses are: HIGH and LOW
12 -  Char 10  - Flag to determine if RFG adjustments are made
                      Valid responses are: YES and NO
------------------------------------------------------
/OPTIONS/
Title 1            : METROLINA 2016, ALL COUNTIES
Title 2            : RVP 9, TYPICAL JULY DAY
Fuel RVP for gas   : 9.0
Oxygen Weight %    : 3.3101
Gas sulfur %       : 0.003
Diesel sulfur %    : 0.0011
Marine Dsl sulfur %: 0.0056
CNG/LPG sulfur %   : 0.003
Minimum temper. (F): 70.6
Maximum temper. (F): 90.1
Average temper. (F): 80.3
Altitude of region : LOW
EtOH Blend % Mkt   : 96
EtOH Vol %         : 10
/END/

------------------------------------------------------
                  REGION PACKET
```

```
This is the packet that defines the region for which
emissions are to be estimated.

The first record tells the type of region and
allocation to perform.

Valid responses are:
US TOTAL   -  emissions are for entire USA without state
              breakout.

50STATE    -  emissions are for all 50 states
              and Washington D.C., by state.

STATE      -  emissions are for a select group of states
              and are state-level estimates

COUNTY     -  emissions are for a select group of counties
              and are county level estimates.  If necessary,
              allocation from state to county will be performed.

SUBCOUNTY  -  emissions are for the specified sub counties
              and are subcounty level estimates.  If necessary,
              county to subcounty allocation will be performed.

The remaining records define the regions to be included.
The type of data which must be specified depends on the
region level.

US TOTAL   -  Nothing needs to be specified.  The FIPS
              code 00000 is used automatically.

50STATE    -  Nothing needs to be specified.  The FIPS
              code 00000 is used automatically.

STATE      -  state FIPS codes

COUNTY     -  state or county FIPS codes.  State FIPS
              code means include all counties in the
              state.

SUBCOUNTY  -  county FIPS code and subregion code.
------------------------------------------------------
/REGION/
Region Level       : COUNTY
Cabarrus County NC : 37025
Gaston County NC   : 37071
Iredell County NC  : 37097
Lincoln County NC  : 37109
Mecklenburg Coun NC: 37119
Rowan County NC    : 37159
Union County NC    : 37179
/END/

or use -
Region Level       : STATE
Michigan           : 26000
------------------------------------------------------
```

```
                  SOURCE CATEGORY PACKET

This packet is used to tell the model which source
categories are to be processed.  It is optional.
If used, only those source categories list will
appear in the output data file.  If the packet is
not found, the model will process all source
categories in the population files.
------------------------------------------------------


Diesel Only -
                   :2270000000
                   :2282020000
                   :2285002015
Spark Ignition Only -
                   :2260000000
                   :2265000000
                   :2267000000
                   :2268000000
                   :2282005010
                   :2282005015
                   :2282010005
                   :2285004015
                   :2285006015
------------------------------------------------------
 This is the packet that lists the names of output files
 and some of the input data files read by the model.  If
 a drive:\path\ is not given, the location of the
 NONROAD.EXE file itself is assumed.  You will probably
 want to change the names of the Output and Message files
 to match that of the OPTion file, e.g., MICH-97.OPT,
 MICH-97.OUT, MICH-97.MSG, and if used MICH-97.AMS.
------------------------------------------------------
/RUNFILES/
ALLOC XREF         : data\allocate\allocate.xrf
ACTIVITY           : data\activity\activity.dat
EXH TECHNOLOGY     : data\tech\tech-exh.dat
EVP TECHNOLOGY     : data\tech\tech-evp.dat
SEASONALITY        : data\season\season.dat
REGIONS            : data\season\season.dat
MESSAGE            : c:\nonroad\outputs\mtrl2016.msg
OUTPUT DATA        : c:\nonroad\outputs\mtrl2016.out
EPS2 AMS           :
US COUNTIES FIPS   : data\allocate\fips.dat
RETROFIT           :
/END/

------------------------------------------------------
This is the packet that defines the equipment population
files read by the model.
------------------------------------------------------
/POP FILES/
Population File    : c:\nonroad\data\pop\nc.pop
/END/
```

```
POPULATION FILE    : c:\nonroad\data\POP\MI.POP


------------------------------------------------------
This is the packet that defines the growth files
files read by the model.
------------------------------------------------------
/GROWTH FILES/
National defaults  : data\growth\nation.grw
/END/


/ALLOC FILES/
Air trans. empl.   :c:\nonroad\data\allocate\nc_airtr.alo
Undergrnd coal prod:c:\nonroad\data\allocate\nc_coal.alo
Construction cost  :c:\nonroad\data\allocate\nc_const.alo
Harvested acres    :c:\nonroad\data\allocate\nc_farms.alo
Golf course estab. :c:\nonroad\data\allocate\nc_golf.alo
Wholesale estab.   :c:\nonroad\data\allocate\nc_holsl.alo
Family housing     :c:\nonroad\data\allocate\nc_house.alo
Logging employees  :c:\nonroad\data\allocate\nc_loggn.alo
Landscaping empl.  :c:\nonroad\data\allocate\nc_lscap.alo
Manufacturing empl.:c:\nonroad\data\allocate\nc_mnfg.alo
Oil & gas employees:c:\nonroad\data\allocate\nc_oil.alo
Census population  :c:\nonroad\data\allocate\nc_pop.alo
Allocation File    :c:\nonroad\data\allocate\nc_rail.alo
RV Park establish. :c:\nonroad\data\allocate\nc_rvprk.alo
Snowblowers comm.  :c:\nonroad\data\allocate\nc_sbc.alo
Snowblowers res.   :c:\nonroad\data\allocate\nc_sbr.alo
Snowmobiles        :c:\nonroad\data\allocate\nc_snowm.alo
Rec marine inboard :c:\nonroad\data\allocate\nc_wib.alo
Rec marine outboard:c:\nonroad\data\allocate\nc_wob.alo
/END/
------------------------------------------------------
This is the packet that defines the emssions factors
files read by the model.
------------------------------------------------------
/EMFAC FILES/
THC exhaust        : data\emsfac\exhthc.emf
CO exhaust         : data\emsfac\exhco.emf
NOX exhaust        : data\emsfac\exhnox.emf
PM exhaust         : data\emsfac\exhpm.emf
BSFC               : data\emsfac\bsfc.emf
Crankcase          : data\emsfac\crank.emf
Spillage           : data\emsfac\spillage.emf
Diurnal            : data\emsfac\evdiu.emf
Tank Perm          : data\emsfac\evtank.emf
Non-RM Hose Perm   : data\emsfac\evhose.emf
RM Fill Neck Perm  : data\emsfac\evneck.emf
RM Supply/Return   : data\emsfac\evsupret.emf
RM Vent Perm       : data\emsfac\evvent.emf
Hot Soaks          : data\emsfac\evhotsk.emf
RuningLoss         : data\emsfac\evrunls.emf
/END/

------------------------------------------------------
This is the packet that defines the deterioration factors
```

```
files read by the model.
-----------------------------------------------------
/DETERIORATE FILES/
THC exhaust         : data\detfac\exhthc.det
CO exhaust          : data\detfac\exhco.det
NOX exhaust         : data\detfac\exhnox.det
PM exhaust          : data\detfac\exhpm.det
Diurnal             : data\detfac\evdiu.det
Tank Perm           : data\detfac\evtank.det
Non-RM Hose Perm    : data\detfac\evhose.det
RM Fill Neck Perm   : data\detfac\evneck.det
RM Supply/Return    : data\detfac\evsupret.det
RM Vent Perm        : data\detfac\evvent.det
Hot Soaks           : data\detfac\evhotsk.det
RuningLoss          : data\detfac\evrunls.det
/END/

Optional Packets - Add initial slash "/" to activate

/STAGE II/
Control Factor      : 0.0
/END/
Enter percent control: 95 = 95% control = 0.05 x uncontrolled
Default should be zero control.

/MODELYEAR OUT/
EXHAUST BMY OUT     :
EVAP BMY OUT        :
/END/

SI REPORT/
SI report file-CSV :OUTPUTS\NRPOLLUT.CSV
/END/

/DAILY FILES/
DAILY TEMPS/RVP     :
/END/

PM Base Sulfur
 cols 1-10: dsl tech type;
 11-20: base sulfur wt%; or '1.0' means no-adjust (cert= in-use)
/PM BASE SULFUR/
T2        0.0350    0.02247
T3        0.2000    0.02247
T3B       0.0500    0.02247
T4A       0.0500    0.02247
T4B       0.0015    0.02247
T4        0.0015    0.30
T4N       0.0015    0.30
T2M       0.0350    0.02247
T3M       1.0       0.02247
T4M       1.0       0.02247
/END/
```

6.4 2019 OPTION FILES

```
Written by Nonroad interface at 11/6/2012 6:16:29 PM
This is the options file for the NONROAD program.
The data is sperated into "packets" bases on common
information.  Each packet is specified by an
identifier and a terminator. Any notes or descriptions
can be placed between the data packets.

9/2005 epa: Add growth & tech years to PERIOD packet
  and Counties & Retrofit files to RUNFILES packet.

------------------------------------------------------

                  PERIOD PACKET

This is the packet that defines the period for
which emissions are to be estimated.  The order of the
records matter.  The selection of certain parameters
will cause some of the record that follow to be ignored.
The order of the records is as follows:

1  - Char 10  - Period type for this simulation.
                  Valid responses are: ANNUAL, SEASONAL, and MONTHLY
2  - Char 10  - Type of inventory produced.
                  Valid responses are: TYPICAL DAY and PERIOD TOTAL
3  - Integer  - year of episode (4 digit year)
4  - Char 10  - Month of episode (use complete name of month)
5  - Char 10  - Type of day
                  Valid responses are: WEEKDAY and WEEKEND
------------------------------------------------------
/PERIOD/
Period type        : Monthly
Summation type     : Typical day
Year of episode    : 2019
Season of year     :
Month of year      : July
Weekday or weekend : Weekday
Year of growth calc:
Year of tech sel   :
/END/

------------------------------------------------------

                  OPTIONS PACKET

This is the packet that defines some of the user
options that drive the model.  Most parameters are
used to make episode specific emission factor
adjustments. The order of the records is fixed.
The order is as follows.

1  -  Char 80  - First title on reports
2  -  Char 80  - Second title on reports
3  -  Real 10  - Fuel RVP of gasoline for this simulation
4  -  Real 10  - Oxygen weight percent of gasoline for simulation
```

```
5  -  Real 10  - Percent sulfur for gasoline
6  -  Real 10  - Percent sulfur for diesel
7  -  Real 10  - Percent sulfur for LPG/CNG
8  -  Real 10  - Minimum daily temperature (deg. F)
9  -  Real 10  - maximum daily temperature (deg. F)
10 -  Real 10  - Representative average daily temperature (deg. F)
11 -  Char 10  - Flag to determine if region is high altitude
                      Valid responses are: HIGH and LOW
12 -  Char 10  - Flag to determine if RFG adjustments are made
                      Valid responses are: YES and NO
------------------------------------------------------
/OPTIONS/
Title 1            : METROLINA 2019, Gaston Mecklenburg
Title 2            : RVP 7.8, TYPICAL JULY DAY
Fuel RVP for gas   : 7.8
Oxygen Weight %    : 3.3446
Gas sulfur %       : 0.003
Diesel sulfur %    : 0.0011
Marine Dsl sulfur %: 0.0055
CNG/LPG sulfur %   : 0.003
Minimum temper. (F): 70.6
Maximum temper. (F): 90.1
Average temper. (F): 80.3
Altitude of region : LOW
EtOH Blend % Mkt   : 97
EtOH Vol %         : 10
/END/

------------------------------------------------------
                  REGION PACKET

This is the packet that defines the region for which
emissions are to be estimated.

The first record tells the type of region and
allocation to perform.

Valid responses are:
US TOTAL   -  emissions are for entire USA without state
              breakout.

50STATE    -  emissions are for all 50 states
              and Washington D.C., by state.

STATE      -  emissions are for a select group of states
              and are state-level estimates

COUNTY     -  emissions are for a select group of counties
              and are county level estimates.  If necessary,
              allocation from state to county will be performed.

SUBCOUNTY  -  emissions are for the specified sub counties
              and are subcounty level estimates.  If necessary,
              county to subcounty allocation will be performed.

The remaining records define the regions to be included.
The type of data which must be specified depends on the
```

```
region level.

US TOTAL   -  Nothing needs to be specified.  The FIPS
              code 00000 is used automatically.

50STATE    -  Nothing needs to be specified.  The FIPS
              code 00000 is used automatically.

STATE      -  state FIPS codes

COUNTY     -  state or county FIPS codes.  State FIPS
              code means include all counties in the
              state.

SUBCOUNTY  -  county FIPS code and subregion code.
------------------------------------------------------
/REGION/
Region Level       : COUNTY
Gaston County NC   : 37071
Mecklenburg Coun NC: 37119
/END/

or use -
Region Level       : STATE
Michigan           : 26000
------------------------------------------------------

                  SOURCE CATEGORY PACKET

This packet is used to tell the model which source
categories are to be processed.  It is optional.
If used, only those source categories list will
appear in the output data file.  If the packet is
not found, the model will process all source
categories in the population files.
------------------------------------------------------


Diesel Only -
                   :2270000000
                   :2282020000
                   :2285002015
Spark Ignition Only -
                   :2260000000
                   :2265000000
                   :2267000000
                   :2268000000
                   :2282005010
                   :2282005015
                   :2282010005
                   :2285004015
                   :2285006015
------------------------------------------------------
 This is the packet that lists the names of output files
 and some of the input data files read by the model.  If
 a drive:\path\ is not given, the location of the
 NONROAD.EXE file itself is assumed.  You will probably
```

```
 want to change the names of the Output and Message files
 to match that of the OPTion file, e.g., MICH-97.OPT,
 MICH-97.OUT, MICH-97.MSG, and if used MICH-97.AMS.
------------------------------------------------------
/RUNFILES/
ALLOC XREF          : data\allocate\allocate.xrf
ACTIVITY            : data\activity\activity.dat
EXH TECHNOLOGY      : data\tech\tech-exh.dat
EVP TECHNOLOGY      : data\tech\tech-evp.dat
SEASONALITY         : data\season\season.dat
REGIONS             : data\season\season.dat
MESSAGE             : c:\nonroad\outputs\mtr2019b.msg
OUTPUT DATA         : c:\nonroad\outputs\mtr2019b.out
EPS2 AMS            :
US COUNTIES FIPS    : data\allocate\fips.dat
RETROFIT            :
/END/

------------------------------------------------------
This is the packet that defines the equipment population
files read by the model.
------------------------------------------------------
/POP FILES/
Population File     : c:\nonroad\data\pop\nc.pop
/END/

POPULATION FILE     : c:\nonroad\data\POP\MI.POP


------------------------------------------------------
This is the packet that defines the growth files
files read by the model.
------------------------------------------------------
/GROWTH FILES/
National defaults   : data\growth\nation.grw
/END/


/ALLOC FILES/
Air trans. empl.    :c:\nonroad\data\allocate\nc_airtr.alo
Undergrnd coal prod:c:\nonroad\data\allocate\nc_coal.alo
Construction cost   :c:\nonroad\data\allocate\nc_const.alo
Harvested acres     :c:\nonroad\data\allocate\nc_farms.alo
Golf course estab. :c:\nonroad\data\allocate\nc_golf.alo
Wholesale estab.    :c:\nonroad\data\allocate\nc_holsl.alo
Family housing      :c:\nonroad\data\allocate\nc_house.alo
Logging employees   :c:\nonroad\data\allocate\nc_loggn.alo
Landscaping empl.   :c:\nonroad\data\allocate\nc_lscap.alo
Manufacturing empl.:c:\nonroad\data\allocate\nc_mnfg.alo
Oil & gas employees:c:\nonroad\data\allocate\nc_oil.alo
Census population   :c:\nonroad\data\allocate\nc_pop.alo
Allocation File     :c:\nonroad\data\allocate\nc_rail.alo
RV Park establish. :c:\nonroad\data\allocate\nc_rvprk.alo
Snowblowers comm.   :c:\nonroad\data\allocate\nc_sbc.alo
Snowblowers res.    :c:\nonroad\data\allocate\nc_sbr.alo
Snowmobiles         :c:\nonroad\data\allocate\nc_snowm.alo
Rec marine inboard :c:\nonroad\data\allocate\nc_wib.alo
```

```
Rec marine outboard:c:\nonroad\data\allocate\nc_wob.alo
/END/
------------------------------------------------------
This is the packet that defines the emssions factors
files read by the model.
------------------------------------------------------
/EMFAC FILES/
THC exhaust        : data\emsfac\exhthc.emf
CO exhaust         : data\emsfac\exhco.emf
NOX exhaust        : data\emsfac\exhnox.emf
PM exhaust         : data\emsfac\exhpm.emf
BSFC               : data\emsfac\bsfc.emf
Crankcase          : data\emsfac\crank.emf
Spillage           : data\emsfac\spillage.emf
Diurnal            : data\emsfac\evdiu.emf
Tank Perm          : data\emsfac\evtank.emf
Non-RM Hose Perm   : data\emsfac\evhose.emf
RM Fill Neck Perm  : data\emsfac\evneck.emf
RM Supply/Return   : data\emsfac\evsupret.emf
RM Vent Perm       : data\emsfac\evvent.emf
Hot Soaks          : data\emsfac\evhotsk.emf
RuningLoss         : data\emsfac\evrunls.emf
/END/

------------------------------------------------------
This is the packet that defines the deterioration factors
files read by the model.
------------------------------------------------------
/DETERIORATE FILES/
THC exhaust        : data\detfac\exhthc.det
CO exhaust         : data\detfac\exhco.det
NOX exhaust        : data\detfac\exhnox.det
PM exhaust         : data\detfac\exhpm.det
Diurnal            : data\detfac\evdiu.det
Tank Perm          : data\detfac\evtank.det
Non-RM Hose Perm   : data\detfac\evhose.det
RM Fill Neck Perm  : data\detfac\evneck.det
RM Supply/Return   : data\detfac\evsupret.det
RM Vent Perm       : data\detfac\evvent.det
Hot Soaks          : data\detfac\evhotsk.det
RuningLoss         : data\detfac\evrunls.det
/END/

Optional Packets - Add initial slash "/" to activate

/STAGE II/
Control Factor     : 0.0
/END/
Enter percent control: 95 = 95% control = 0.05 x uncontrolled
Default should be zero control.

/MODELYEAR OUT/
EXHAUST BMY OUT    :
EVAP BMY OUT       :
/END/

SI REPORT/
```

```
SI report file-CSV :OUTPUTS\NRPOLLUT.CSV
/END/

/DAILY FILES/
DAILY TEMPS/RVP    :
/END/

PM Base Sulfur
 cols 1-10: dsl tech type;
 11-20: base sulfur wt%; or '1.0' means no-adjust (cert= in-use)
/PM BASE SULFUR/
T2        0.0350    0.02247
T3        0.2000    0.02247
T3B       0.0500    0.02247
T4A       0.0500    0.02247
T4B       0.0015    0.02247
T4        0.0015    0.30
T4N       0.0015    0.30
T2M       0.0350    0.02247
T3M       1.0       0.02247
T4M       1.0       0.02247
/END/




Written by Nonroad interface at 10/3/2012 11:37:24 AM
This is the options file for the NONROAD program.
The data is sperated into "packets" bases on common
information.  Each packet is specified by an
identifier and a terminator. Any notes or descriptions
can be placed between the data packets.

9/2005 epa: Add growth & tech years to PERIOD packet
  and Counties & Retrofit files to RUNFILES packet.

-------------------------------------------------------

                  PERIOD PACKET

This is the packet that defines the period for
which emissions are to be estimated.  The order of the
records matter.  The selection of certain parameters
will cause some of the record that follow to be ignored.
The order of the records is as follows:

1  - Char 10  - Period type for this simulation.
                  Valid responses are: ANNUAL, SEASONAL, and MONTHLY
2  - Char 10  - Type of inventory produced.
                  Valid responses are: TYPICAL DAY and PERIOD TOTAL
3  - Integer  - year of episode (4 digit year)
4  - Char 10  - Month of episode (use complete name of month)
5  - Char 10  - Type of day
                  Valid responses are: WEEKDAY and WEEKEND
-------------------------------------------------------
/PERIOD/
Period type        : Monthly
```

```
Summation type     : Typical day
Year of episode    : 2019
Season of year     :
Month of year      : July
Weekday or weekend : Weekday
Year of growth calc:
Year of tech sel   :
/END/

-------------------------------------------------------

                  OPTIONS PACKET

This is the packet that defines some of the user
options that drive the model.  Most parameters are
used to make episode specific emission factor
adjustments. The order of the records is fixed.
The order is as follows.

1  -  Char 80  - First title on reports
2  -  Char 80  - Second title on reports
3  -  Real 10  - Fuel RVP of gasoline for this simulation
4  -  Real 10  - Oxygen weight percent of gasoline for simulation
5  -  Real 10  - Percent sulfur for gasoline
6  -  Real 10  - Percent sulfur for diesel
7  -  Real 10  - Percent sulfur for LPG/CNG
8  -  Real 10  - Minimum daily temperature (deg. F)
9  -  Real 10  - maximum daily temperature (deg. F)
10 -  Real 10  - Representative average daily temperature (deg. F)
11 -  Char 10  - Flag to determine if region is high altitude
                      Valid responses are: HIGH and LOW
12 -  Char 10  - Flag to determine if RFG adjustments are made
                      Valid responses are: YES and NO
-------------------------------------------------------
/OPTIONS/
Title 1            : METROLINA 2019, ALL COUNTIES
Title 2            : RVP 9, TYPICAL JULY DAY
Fuel RVP for gas   : 9.0
Oxygen Weight %    : 3.3446
Gas sulfur %       : 0.003
Diesel sulfur %    : 0.0011
Marine Dsl sulfur %: 0.0055
CNG/LPG sulfur %   : 0.003
Minimum temper. (F): 70.6
Maximum temper. (F): 90.1
Average temper. (F): 80.3
Altitude of region : LOW
EtOH Blend % Mkt   : 97
EtOH Vol %         : 10
/END/

-------------------------------------------------------
                  REGION PACKET

This is the packet that defines the region for which
emissions are to be estimated.
```

```
The first record tells the type of region and
allocation to perform.

Valid responses are:
US TOTAL   -  emissions are for entire USA without state
              breakout.

50STATE    -  emissions are for all 50 states
              and Washington D.C., by state.

STATE      -  emissions are for a select group of states
              and are state-level estimates

COUNTY     -  emissions are for a select group of counties
              and are county level estimates.  If necessary,
              allocation from state to county will be performed.

SUBCOUNTY  -  emissions are for the specified sub counties
              and are subcounty level estimates.  If necessary,
              county to subcounty allocation will be performed.

The remaining records define the regions to be included.
The type of data which must be specified depends on the
region level.

US TOTAL   -  Nothing needs to be specified.  The FIPS
              code 00000 is used automatically.

50STATE    -  Nothing needs to be specified.  The FIPS
              code 00000 is used automatically.

STATE      -  state FIPS codes

COUNTY     -  state or county FIPS codes.  State FIPS
              code means include all counties in the
              state.

SUBCOUNTY  -  county FIPS code and subregion code.
------------------------------------------------------
/REGION/
Region Level       : COUNTY
Cabarrus County NC : 37025
Gaston County NC   : 37071
Iredell County NC  : 37097
Lincoln County NC  : 37109
Mecklenburg Coun NC: 37119
Rowan County NC    : 37159
Union County NC    : 37179
/END/

or use -
Region Level       : STATE
Michigan           : 26000
------------------------------------------------------

                  SOURCE CATEGORY PACKET
```

```
This packet is used to tell the model which source
categories are to be processed.  It is optional.
If used, only those source categories list will
appear in the output data file.  If the packet is
not found, the model will process all source
categories in the population files.
------------------------------------------------------


Diesel Only -
                   :2270000000
                   :2282020000
                   :2285002015
Spark Ignition Only -
                   :2260000000
                   :2265000000
                   :2267000000
                   :2268000000
                   :2282005010
                   :2282005015
                   :2282010005
                   :2285004015
                   :2285006015
------------------------------------------------------
 This is the packet that lists the names of output files
 and some of the input data files read by the model.  If
 a drive:\path\ is not given, the location of the
 NONROAD.EXE file itself is assumed.  You will probably
 want to change the names of the Output and Message files
 to match that of the OPTion file, e.g., MICH-97.OPT,
 MICH-97.OUT, MICH-97.MSG, and if used MICH-97.AMS.
------------------------------------------------------
/RUNFILES/
ALLOC XREF         : data\allocate\allocate.xrf
ACTIVITY           : data\activity\activity.dat
EXH TECHNOLOGY     : data\tech\tech-exh.dat
EVP TECHNOLOGY     : data\tech\tech-evp.dat
SEASONALITY        : data\season\season.dat
REGIONS            : data\season\season.dat
MESSAGE            : c:\nonroad\outputs\mtrl2019.msg
OUTPUT DATA        : c:\nonroad\outputs\mtrl2019.out
EPS2 AMS           :
US COUNTIES FIPS   : data\allocate\fips.dat
RETROFIT           :
/END/

------------------------------------------------------
This is the packet that defines the equipment population
files read by the model.
------------------------------------------------------
/POP FILES/
Population File    : c:\nonroad\data\pop\nc.pop
/END/

POPULATION FILE    : c:\nonroad\data\POP\MI.POP
```

```
-------------------------------------------------------
This is the packet that defines the growth files
files read by the model.
-------------------------------------------------------
/GROWTH FILES/
National defaults  : data\growth\nation.grw
/END/


/ALLOC FILES/
Air trans. empl.   :c:\nonroad\data\allocate\nc_airtr.alo
Undergrnd coal prod:c:\nonroad\data\allocate\nc_coal.alo
Construction cost  :c:\nonroad\data\allocate\nc_const.alo
Harvested acres    :c:\nonroad\data\allocate\nc_farms.alo
Golf course estab. :c:\nonroad\data\allocate\nc_golf.alo
Wholesale estab.   :c:\nonroad\data\allocate\nc_holsl.alo
Family housing     :c:\nonroad\data\allocate\nc_house.alo
Logging employees  :c:\nonroad\data\allocate\nc_loggn.alo
Landscaping empl.  :c:\nonroad\data\allocate\nc_lscap.alo
Manufacturing empl.:c:\nonroad\data\allocate\nc_mnfg.alo
Oil & gas employees:c:\nonroad\data\allocate\nc_oil.alo
Census population  :c:\nonroad\data\allocate\nc_pop.alo
Allocation File    :c:\nonroad\data\allocate\nc_rail.alo
RV Park establish. :c:\nonroad\data\allocate\nc_rvprk.alo
Snowblowers comm.  :c:\nonroad\data\allocate\nc_sbc.alo
Snowblowers res.   :c:\nonroad\data\allocate\nc_sbr.alo
Snowmobiles        :c:\nonroad\data\allocate\nc_snowm.alo
Rec marine inboard :c:\nonroad\data\allocate\nc_wib.alo
Rec marine outboard:c:\nonroad\data\allocate\nc_wob.alo
/END/
-------------------------------------------------------
This is the packet that defines the emssions factors
files read by the model.
-------------------------------------------------------
/EMFAC FILES/
THC exhaust        : data\emsfac\exhthc.emf
CO exhaust         : data\emsfac\exhco.emf
NOX exhaust        : data\emsfac\exhnox.emf
PM exhaust         : data\emsfac\exhpm.emf
BSFC               : data\emsfac\bsfc.emf
Crankcase          : data\emsfac\crank.emf
Spillage           : data\emsfac\spillage.emf
Diurnal            : data\emsfac\evdiu.emf
Tank Perm          : data\emsfac\evtank.emf
Non-RM Hose Perm   : data\emsfac\evhose.emf
RM Fill Neck Perm  : data\emsfac\evneck.emf
RM Supply/Return   : data\emsfac\evsupret.emf
RM Vent Perm       : data\emsfac\evvent.emf
Hot Soaks          : data\emsfac\evhotsk.emf
RuningLoss         : data\emsfac\evrunls.emf
/END/

-------------------------------------------------------
This is the packet that defines the deterioration factors
files read by the model.
-------------------------------------------------------
/DETERIORATE FILES/
```

```
THC exhaust         : data\detfac\exhthc.det
CO exhaust          : data\detfac\exhco.det
NOX exhaust         : data\detfac\exhnox.det
PM exhaust          : data\detfac\exhpm.det
Diurnal             : data\detfac\evdiu.det
Tank Perm           : data\detfac\evtank.det
Non-RM Hose Perm    : data\detfac\evhose.det
RM Fill Neck Perm   : data\detfac\evneck.det
RM Supply/Return    : data\detfac\evsupret.det
RM Vent Perm        : data\detfac\evvent.det
Hot Soaks           : data\detfac\evhotsk.det
RuningLoss          : data\detfac\evrunls.det
/END/

Optional Packets - Add initial slash "/" to activate

/STAGE II/
Control Factor      : 0.0
/END/
Enter percent control: 95 = 95% control = 0.05 x uncontrolled
Default should be zero control.

/MODELYEAR OUT/
EXHAUST BMY OUT     :
EVAP BMY OUT        :
/END/

SI REPORT/
SI report file-CSV :OUTPUTS\NRPOLLUT.CSV
/END/

/DAILY FILES/
DAILY TEMPS/RVP     :
/END/

PM Base Sulfur
 cols 1-10: dsl tech type;
 11-20: base sulfur wt%; or '1.0' means no-adjust (cert= in-use)
/PM BASE SULFUR/
T2        0.0350    0.02247
T3        0.2000    0.02247
T3B       0.0500    0.02247
T4A       0.0500    0.02247
T4B       0.0015    0.02247
T4        0.0015    0.30
T4N       0.0015    0.30
T2M       0.0350    0.02247
T3M       1.0       0.02247
T4M       1.0       0.02247
/END/
```

6.5 2022 OPTION FILES

```
Written by Nonroad interface at 11/7/2012 10:40:51 AM
This is the options file for the NONROAD program.
The data is sperated into "packets" bases on common
information.  Each packet is specified by an
identifier and a terminator. Any notes or descriptions
can be placed between the data packets.

9/2005 epa: Add growth & tech years to PERIOD packet
  and Counties & Retrofit files to RUNFILES packet.

------------------------------------------------------

                  PERIOD PACKET

This is the packet that defines the period for
which emissions are to be estimated.  The order of the
records matter.  The selection of certain parameters
will cause some of the record that follow to be ignored.
The order of the records is as follows:

1  - Char 10  - Period type for this simulation.
                  Valid responses are: ANNUAL, SEASONAL, and MONTHLY
2  - Char 10  - Type of inventory produced.
                  Valid responses are: TYPICAL DAY and PERIOD TOTAL
3  - Integer  - year of episode (4 digit year)
4  - Char 10  - Month of episode (use complete name of month)
5  - Char 10  - Type of day
                  Valid responses are: WEEKDAY and WEEKEND
------------------------------------------------------
/PERIOD/
Period type        : Monthly
Summation type     : Typical day
Year of episode    : 2022
Season of year     :
Month of year      : July
Weekday or weekend : Weekday
Year of growth calc:
Year of tech sel   :
/END/

------------------------------------------------------

                  OPTIONS PACKET

This is the packet that defines some of the user
options that drive the model.  Most parameters are
used to make episode specific emission factor
adjustments. The order of the records is fixed.
The order is as follows.

1  -  Char 80  - First title on reports
2  -  Char 80  - Second title on reports
3  -  Real 10  - Fuel RVP of gasoline for this simulation
4  -  Real 10  - Oxygen weight percent of gasoline for simulation
```

```
5  -  Real 10  - Percent sulfur for gasoline
6  -  Real 10  - Percent sulfur for diesel
7  -  Real 10  - Percent sulfur for LPG/CNG
8  -  Real 10  - Minimum daily temperature (deg. F)
9  -  Real 10  - maximum daily temperature (deg. F)
10 -  Real 10  - Representative average daily temperature (deg. F)
11 -  Char 10  - Flag to determine if region is high altitude
                      Valid responses are: HIGH and LOW
12 -  Char 10  - Flag to determine if RFG adjustments are made
                      Valid responses are: YES and NO
------------------------------------------------------
/OPTIONS/
Title 1            : METROLINA 2022 , GASTON MECKLENBURG
Title 2            : RVP 7.8, TYPICAL JULY DAY
Fuel RVP for gas   : 7.8
Oxygen Weight %    : 3.3446
Gas sulfur %       : 0.003
Diesel sulfur %    : 0.0011
Marine Dsl sulfur %: 0.0055
CNG/LPG sulfur %   : 0.003
Minimum temper. (F): 70.6
Maximum temper. (F): 90.1
Average temper. (F): 80.3
Altitude of region : LOW
EtOH Blend % Mkt   : 97
EtOH Vol %         : 10
/END/

------------------------------------------------------
                  REGION PACKET

This is the packet that defines the region for which
emissions are to be estimated.

The first record tells the type of region and
allocation to perform.

Valid responses are:
US TOTAL   -  emissions are for entire USA without state
              breakout.

50STATE    -  emissions are for all 50 states
              and Washington D.C., by state.

STATE      -  emissions are for a select group of states
              and are state-level estimates

COUNTY     -  emissions are for a select group of counties
              and are county level estimates.  If necessary,
              allocation from state to county will be performed.

SUBCOUNTY  -  emissions are for the specified sub counties
              and are subcounty level estimates.  If necessary,
              county to subcounty allocation will be performed.

The remaining records define the regions to be included.
The type of data which must be specified depends on the
```

```
region level.

US TOTAL   -  Nothing needs to be specified.  The FIPS
              code 00000 is used automatically.

50STATE    -  Nothing needs to be specified.  The FIPS
              code 00000 is used automatically.

STATE      -  state FIPS codes

COUNTY     -  state or county FIPS codes.  State FIPS
              code means include all counties in the
              state.

SUBCOUNTY  -  county FIPS code and subregion code.
------------------------------------------------------
/REGION/
Region Level       : COUNTY
Gaston County NC   : 37071
Mecklenburg Coun NC: 37119
/END/

or use -
Region Level       : STATE
Michigan           : 26000
------------------------------------------------------

                  SOURCE CATEGORY PACKET

This packet is used to tell the model which source
categories are to be processed.  It is optional.
If used, only those source categories list will
appear in the output data file.  If the packet is
not found, the model will process all source
categories in the population files.
------------------------------------------------------


Diesel Only -
                   :2270000000
                   :2282020000
                   :2285002015
Spark Ignition Only -
                   :2260000000
                   :2265000000
                   :2267000000
                   :2268000000
                   :2282005010
                   :2282005015
                   :2282010005
                   :2285004015
                   :2285006015
------------------------------------------------------
 This is the packet that lists the names of output files
 and some of the input data files read by the model.  If
 a drive:\path\ is not given, the location of the
 NONROAD.EXE file itself is assumed.  You will probably
```

```
 want to change the names of the Output and Message files
 to match that of the OPTion file, e.g., MICH-97.OPT,
 MICH-97.OUT, MICH-97.MSG, and if used MICH-97.AMS.
------------------------------------------------------
/RUNFILES/
ALLOC XREF          : data\allocate\allocate.xrf
ACTIVITY            : data\activity\activity.dat
EXH TECHNOLOGY      : data\tech\tech-exh.dat
EVP TECHNOLOGY      : data\tech\tech-evp.dat
SEASONALITY         : data\season\season.dat
REGIONS             : data\season\season.dat
MESSAGE             : c:\nonroad\outputs\mtr2022b.msg
OUTPUT DATA         : c:\nonroad\outputs\mtr2022b.out
EPS2 AMS            :
US COUNTIES FIPS    : data\allocate\fips.dat
RETROFIT            :
/END/

------------------------------------------------------
This is the packet that defines the equipment population
files read by the model.
------------------------------------------------------
/POP FILES/
Population File     : c:\nonroad\data\pop\nc.pop
/END/

POPULATION FILE     : c:\nonroad\data\POP\MI.POP


------------------------------------------------------
This is the packet that defines the growth files
files read by the model.
------------------------------------------------------
/GROWTH FILES/
National defaults   : data\growth\nation.grw
/END/


/ALLOC FILES/
Air trans. empl.    :c:\nonroad\data\allocate\nc_airtr.alo
Undergrnd coal prod:c:\nonroad\data\allocate\nc_coal.alo
Construction cost   :c:\nonroad\data\allocate\nc_const.alo
Harvested acres     :c:\nonroad\data\allocate\nc_farms.alo
Golf course estab. :c:\nonroad\data\allocate\nc_golf.alo
Wholesale estab.    :c:\nonroad\data\allocate\nc_holsl.alo
Family housing      :c:\nonroad\data\allocate\nc_house.alo
Logging employees   :c:\nonroad\data\allocate\nc_loggn.alo
Landscaping empl.   :c:\nonroad\data\allocate\nc_lscap.alo
Manufacturing empl.:c:\nonroad\data\allocate\nc_mnfg.alo
Oil & gas employees:c:\nonroad\data\allocate\nc_oil.alo
Census population   :c:\nonroad\data\allocate\nc_pop.alo
Allocation File     :c:\nonroad\data\allocate\nc_rail.alo
RV Park establish. :c:\nonroad\data\allocate\nc_rvprk.alo
Snowblowers comm.   :c:\nonroad\data\allocate\nc_sbc.alo
Snowblowers res.    :c:\nonroad\data\allocate\nc_sbr.alo
Snowmobiles         :c:\nonroad\data\allocate\nc_snowm.alo
Rec marine inboard :c:\nonroad\data\allocate\nc_wib.alo
```

```
Rec marine outboard:c:\nonroad\data\allocate\nc_wob.alo
/END/
------------------------------------------------------
This is the packet that defines the emssions factors
files read by the model.
------------------------------------------------------
/EMFAC FILES/
THC exhaust         : data\emsfac\exhthc.emf
CO exhaust          : data\emsfac\exhco.emf
NOX exhaust         : data\emsfac\exhnox.emf
PM exhaust          : data\emsfac\exhpm.emf
BSFC                : data\emsfac\bsfc.emf
Crankcase           : data\emsfac\crank.emf
Spillage            : data\emsfac\spillage.emf
Diurnal             : data\emsfac\evdiu.emf
Tank Perm           : data\emsfac\evtank.emf
Non-RM Hose Perm    : data\emsfac\evhose.emf
RM Fill Neck Perm   : data\emsfac\evneck.emf
RM Supply/Return    : data\emsfac\evsupret.emf
RM Vent Perm        : data\emsfac\evvent.emf
Hot Soaks           : data\emsfac\evhotsk.emf
RuningLoss          : data\emsfac\evrunls.emf
/END/

------------------------------------------------------
This is the packet that defines the deterioration factors
files read by the model.
------------------------------------------------------
/DETERIORATE FILES/
THC exhaust         : data\detfac\exhthc.det
CO exhaust          : data\detfac\exhco.det
NOX exhaust         : data\detfac\exhnox.det
PM exhaust          : data\detfac\exhpm.det
Diurnal             : data\detfac\evdiu.det
Tank Perm           : data\detfac\evtank.det
Non-RM Hose Perm    : data\detfac\evhose.det
RM Fill Neck Perm   : data\detfac\evneck.det
RM Supply/Return    : data\detfac\evsupret.det
RM Vent Perm        : data\detfac\evvent.det
Hot Soaks           : data\detfac\evhotsk.det
RuningLoss          : data\detfac\evrunls.det
/END/

Optional Packets - Add initial slash "/" to activate

/STAGE II/
Control Factor      : 0.0
/END/
Enter percent control: 95 = 95% control = 0.05 x uncontrolled
Default should be zero control.

/MODELYEAR OUT/
EXHAUST BMY OUT     :
EVAP BMY OUT        :
/END/

SI REPORT/
```

```
SI report file-CSV :OUTPUTS\NRPOLLUT.CSV
/END/

/DAILY FILES/
DAILY TEMPS/RVP    :
/END/

PM Base Sulfur
 cols 1-10: dsl tech type;
 11-20: base sulfur wt%; or '1.0' means no-adjust (cert= in-use)
/PM BASE SULFUR/
T2        0.0350    0.02247
T3        0.2000    0.02247
T3B       0.0500    0.02247
T4A       0.0500    0.02247
T4B       0.0015    0.02247
T4        0.0015    0.30
T4N       0.0015    0.30
T2M       0.0350    0.02247
T3M       1.0       0.02247
T4M       1.0       0.02247
/END/




Written by Nonroad interface at 10/3/2012 12:16:45 PM
This is the options file for the NONROAD program.
The data is sperated into "packets" bases on common
information.  Each packet is specified by an
identifier and a terminator. Any notes or descriptions
can be placed between the data packets.

9/2005 epa: Add growth & tech years to PERIOD packet
  and Counties & Retrofit files to RUNFILES packet.

------------------------------------------------------

                  PERIOD PACKET

This is the packet that defines the period for
which emissions are to be estimated.  The order of the
records matter.  The selection of certain parameters
will cause some of the record that follow to be ignored.
The order of the records is as follows:

1  - Char 10  - Period type for this simulation.
                  Valid responses are: ANNUAL, SEASONAL, and MONTHLY
2  - Char 10  - Type of inventory produced.
                  Valid responses are: TYPICAL DAY and PERIOD TOTAL
3  - Integer  - year of episode (4 digit year)
4  - Char 10  - Month of episode (use complete name of month)
5  - Char 10  - Type of day
                  Valid responses are: WEEKDAY and WEEKEND
------------------------------------------------------
/PERIOD/
Period type        : Monthly
```

```
Summation type     : Typical day
Year of episode    : 2022
Season of year     :
Month of year      : July
Weekday or weekend : Weekday
Year of growth calc:
Year of tech sel   :
/END/

------------------------------------------------------

                  OPTIONS PACKET

This is the packet that defines some of the user
options that drive the model.  Most parameters are
used to make episode specific emission factor
adjustments. The order of the records is fixed.
The order is as follows.

1  -  Char 80  - First title on reports
2  -  Char 80  - Second title on reports
3  -  Real 10  - Fuel RVP of gasoline for this simulation
4  -  Real 10  - Oxygen weight percent of gasoline for simulation
5  -  Real 10  - Percent sulfur for gasoline
6  -  Real 10  - Percent sulfur for diesel
7  -  Real 10  - Percent sulfur for LPG/CNG
8  -  Real 10  - Minimum daily temperature (deg. F)
9  -  Real 10  - maximum daily temperature (deg. F)
10 -  Real 10  - Representative average daily temperature (deg. F)
11 -  Char 10  - Flag to determine if region is high altitude
                      Valid responses are: HIGH and LOW
12 -  Char 10  - Flag to determine if RFG adjustments are made
                      Valid responses are: YES and NO
------------------------------------------------------
/OPTIONS/
Title 1            : METROLINA 2022 ALL COUNTIES
Title 2            : RVP 9, TYPICAL JULY DAY
Fuel RVP for gas   : 9.0
Oxygen Weight %    : 3.3446
Gas sulfur %       : 0.003
Diesel sulfur %    : 0.0011
Marine Dsl sulfur %: 0.0055
CNG/LPG sulfur %   : 0.003
Minimum temper. (F): 70.6
Maximum temper. (F): 90.1
Average temper. (F): 80.3
Altitude of region : LOW
EtOH Blend % Mkt   : 97
EtOH Vol %         : 10
/END/

------------------------------------------------------
                  REGION PACKET

This is the packet that defines the region for which
emissions are to be estimated.
```

```
The first record tells the type of region and
allocation to perform.

Valid responses are:
US TOTAL   -  emissions are for entire USA without state
              breakout.

50STATE    -  emissions are for all 50 states
              and Washington D.C., by state.

STATE      -  emissions are for a select group of states
              and are state-level estimates

COUNTY     -  emissions are for a select group of counties
              and are county level estimates.  If necessary,
              allocation from state to county will be performed.

SUBCOUNTY  -  emissions are for the specified sub counties
              and are subcounty level estimates.  If necessary,
              county to subcounty allocation will be performed.

The remaining records define the regions to be included.
The type of data which must be specified depends on the
region level.

US TOTAL   -  Nothing needs to be specified.  The FIPS
              code 00000 is used automatically.

50STATE    -  Nothing needs to be specified.  The FIPS
              code 00000 is used automatically.

STATE      -  state FIPS codes

COUNTY     -  state or county FIPS codes.  State FIPS
              code means include all counties in the
              state.

SUBCOUNTY  -  county FIPS code and subregion code.
------------------------------------------------------
/REGION/
Region Level       : COUNTY
Cabarrus County NC : 37025
Gaston County NC   : 37071
Iredell County NC  : 37097
Lincoln County NC  : 37109
Mecklenburg Coun NC: 37119
Rowan County NC    : 37159
Union County NC    : 37179
/END/

or use -
Region Level       : STATE
Michigan           : 26000
------------------------------------------------------

                  SOURCE CATEGORY PACKET
```

```
This packet is used to tell the model which source
categories are to be processed.  It is optional.
If used, only those source categories list will
appear in the output data file.  If the packet is
not found, the model will process all source
categories in the population files.
------------------------------------------------------


Diesel Only -
                   :2270000000
                   :2282020000
                   :2285002015
Spark Ignition Only -
                   :2260000000
                   :2265000000
                   :2267000000
                   :2268000000
                   :2282005010
                   :2282005015
                   :2282010005
                   :2285004015
                   :2285006015
------------------------------------------------------
 This is the packet that lists the names of output files
 and some of the input data files read by the model.  If
 a drive:\path\ is not given, the location of the
 NONROAD.EXE file itself is assumed.  You will probably
 want to change the names of the Output and Message files
 to match that of the OPTion file, e.g., MICH-97.OPT,
 MICH-97.OUT, MICH-97.MSG, and if used MICH-97.AMS.
------------------------------------------------------
/RUNFILES/
ALLOC XREF         : data\allocate\allocate.xrf
ACTIVITY           : data\activity\activity.dat
EXH TECHNOLOGY     : data\tech\tech-exh.dat
EVP TECHNOLOGY     : data\tech\tech-evp.dat
SEASONALITY        : data\season\season.dat
REGIONS            : data\season\season.dat
MESSAGE            : c:\nonroad\outputs\mtrl2022.msg
OUTPUT DATA        : c:\nonroad\outputs\mtrl2022.out
EPS2 AMS           :
US COUNTIES FIPS   : data\allocate\fips.dat
RETROFIT           :
/END/

------------------------------------------------------
This is the packet that defines the equipment population
files read by the model.
------------------------------------------------------
/POP FILES/
Population File    : c:\nonroad\data\pop\nc.pop
/END/

POPULATION FILE    : c:\nonroad\data\POP\MI.POP
```

```
------------------------------------------------------
This is the packet that defines the growth files
files read by the model.
------------------------------------------------------
/GROWTH FILES/
National defaults  : data\growth\nation.grw
/END/


/ALLOC FILES/
Air trans. empl.   :c:\nonroad\data\allocate\nc_airtr.alo
Undergrnd coal prod:c:\nonroad\data\allocate\nc_coal.alo
Construction cost  :c:\nonroad\data\allocate\nc_const.alo
Harvested acres    :c:\nonroad\data\allocate\nc_farms.alo
Golf course estab. :c:\nonroad\data\allocate\nc_golf.alo
Wholesale estab.   :c:\nonroad\data\allocate\nc_holsl.alo
Family housing     :c:\nonroad\data\allocate\nc_house.alo
Logging employees  :c:\nonroad\data\allocate\nc_loggn.alo
Landscaping empl.  :c:\nonroad\data\allocate\nc_lscap.alo
Manufacturing empl.:c:\nonroad\data\allocate\nc_mnfg.alo
Oil & gas employees:c:\nonroad\data\allocate\nc_oil.alo
Census population  :c:\nonroad\data\allocate\nc_pop.alo
Allocation File    :c:\nonroad\data\allocate\nc_rail.alo
RV Park establish. :c:\nonroad\data\allocate\nc_rvprk.alo
Snowblowers comm.  :c:\nonroad\data\allocate\nc_sbc.alo
Snowblowers res.   :c:\nonroad\data\allocate\nc_sbr.alo
Snowmobiles        :c:\nonroad\data\allocate\nc_snowm.alo
Rec marine inboard :c:\nonroad\data\allocate\nc_wib.alo
Rec marine outboard:c:\nonroad\data\allocate\nc_wob.alo
/END/
------------------------------------------------------
This is the packet that defines the emssions factors
files read by the model.
------------------------------------------------------
/EMFAC FILES/
THC exhaust        : data\emsfac\exhthc.emf
CO exhaust         : data\emsfac\exhco.emf
NOX exhaust        : data\emsfac\exhnox.emf
PM exhaust         : data\emsfac\exhpm.emf
BSFC               : data\emsfac\bsfc.emf
Crankcase          : data\emsfac\crank.emf
Spillage           : data\emsfac\spillage.emf
Diurnal            : data\emsfac\evdiu.emf
Tank Perm          : data\emsfac\evtank.emf
Non-RM Hose Perm   : data\emsfac\evhose.emf
RM Fill Neck Perm  : data\emsfac\evneck.emf
RM Supply/Return   : data\emsfac\evsupret.emf
RM Vent Perm       : data\emsfac\evvent.emf
Hot Soaks          : data\emsfac\evhotsk.emf
RuningLoss         : data\emsfac\evrunls.emf
/END/

------------------------------------------------------
This is the packet that defines the deterioration factors
files read by the model.
------------------------------------------------------
/DETERIORATE FILES/
```

```
THC exhaust        : data\detfac\exhthc.det
CO exhaust         : data\detfac\exhco.det
NOX exhaust        : data\detfac\exhnox.det
PM exhaust         : data\detfac\exhpm.det
Diurnal            : data\detfac\evdiu.det
Tank Perm          : data\detfac\evtank.det
Non-RM Hose Perm   : data\detfac\evhose.det
RM Fill Neck Perm  : data\detfac\evneck.det
RM Supply/Return   : data\detfac\evsupret.det
RM Vent Perm       : data\detfac\evvent.det
Hot Soaks          : data\detfac\evhotsk.det
RuningLoss         : data\detfac\evrunls.det
/END/

Optional Packets - Add initial slash "/" to activate

/STAGE II/
Control Factor     : 0.0
/END/
Enter percent control: 95 = 95% control = 0.05 x uncontrolled
Default should be zero control.

/MODELYEAR OUT/
EXHAUST BMY OUT    :
EVAP BMY OUT       :
/END/

SI REPORT/
SI report file-CSV :OUTPUTS\NRPOLLUT.CSV
/END/

/DAILY FILES/
DAILY TEMPS/RVP    :
/END/

PM Base Sulfur
 cols 1-10: dsl tech type;
 11-20: base sulfur wt%; or '1.0' means no-adjust (cert= in-use)
/PM BASE SULFUR/
T2        0.0350    0.02247
T3        0.2000    0.02247
T3B       0.0500    0.02247
T4A       0.0500    0.02247
T4B       0.0015    0.02247
T4        0.0015    0.30
T4N       0.0015    0.30
T2M       0.0350    0.02247
T3M       1.0       0.02247
T4M       1.0       0.02247
/END/
```

6.6 2025 OPTION FILES

```
Written by Nonroad interface at 11/7/2012 10:57:25 AM
This is the options file for the NONROAD program.
The data is sperated into "packets" bases on common
information.  Each packet is specified by an
identifier and a terminator. Any notes or descriptions
can be placed between the data packets.

9/2005 epa: Add growth & tech years to PERIOD packet
  and Counties & Retrofit files to RUNFILES packet.

------------------------------------------------------

                  PERIOD PACKET

This is the packet that defines the period for
which emissions are to be estimated.  The order of the
records matter.  The selection of certain parameters
will cause some of the record that follow to be ignored.
The order of the records is as follows:

1  - Char 10  - Period type for this simulation.
                  Valid responses are: ANNUAL, SEASONAL, and MONTHLY
2  - Char 10  - Type of inventory produced.
                  Valid responses are: TYPICAL DAY and PERIOD TOTAL
3  - Integer  - year of episode (4 digit year)
4  - Char 10  - Month of episode (use complete name of month)
5  - Char 10  - Type of day
                  Valid responses are: WEEKDAY and WEEKEND
------------------------------------------------------
/PERIOD/
Period type        : Monthly
Summation type     : Typical day
Year of episode    : 2025
Season of year     :
Month of year      : July
Weekday or weekend : Weekday
Year of growth calc:
Year of tech sel   :
/END/

------------------------------------------------------

                  OPTIONS PACKET

This is the packet that defines some of the user
options that drive the model.  Most parameters are
used to make episode specific emission factor
adjustments. The order of the records is fixed.
The order is as follows.

1  -  Char 80  - First title on reports
2  -  Char 80  - Second title on reports
3  -  Real 10  - Fuel RVP of gasoline for this simulation
4  -  Real 10  - Oxygen weight percent of gasoline for simulation
```

```
5  -  Real 10  - Percent sulfur for gasoline
6  -  Real 10  - Percent sulfur for diesel
7  -  Real 10  - Percent sulfur for LPG/CNG
8  -  Real 10  - Minimum daily temperature (deg. F)
9  -  Real 10  - maximum daily temperature (deg. F)
10 -  Real 10  - Representative average daily temperature (deg. F)
11 -  Char 10  - Flag to determine if region is high altitude
                     Valid responses are: HIGH and LOW
12 -  Char 10  - Flag to determine if RFG adjustments are made
                     Valid responses are: YES and NO
------------------------------------------------------
/OPTIONS/
Title 1            : METROLINA 2025, Gaston Mecklenburg
Title 2            : RVP 7.8, TYPICAL JULY DAY
Fuel RVP for gas   : 7.8
Oxygen Weight %    : 3.3446
Gas sulfur %       : 0.003
Diesel sulfur %    : 0.0011
Marine Dsl sulfur %: 0.0055
CNG/LPG sulfur %   : 0.003
Minimum temper. (F): 70.6
Maximum temper. (F): 90.1
Average temper. (F): 80.3
Altitude of region : LOW
EtOH Blend % Mkt   : 97
EtOH Vol %         : 10
/END/

------------------------------------------------------
                  REGION PACKET

This is the packet that defines the region for which
emissions are to be estimated.

The first record tells the type of region and
allocation to perform.

Valid responses are:
US TOTAL    -  emissions are for entire USA without state
               breakout.

50STATE     -  emissions are for all 50 states
               and Washington D.C., by state.

STATE       -  emissions are for a select group of states
               and are state-level estimates

COUNTY      -  emissions are for a select group of counties
               and are county level estimates.  If necessary,
               allocation from state to county will be performed.

SUBCOUNTY  -  emissions are for the specified sub counties
               and are subcounty level estimates.  If necessary,
               county to subcounty allocation will be performed.

The remaining records define the regions to be included.
The type of data which must be specified depends on the
```

```
region level.

US TOTAL   -  Nothing needs to be specified.  The FIPS
              code 00000 is used automatically.

50STATE    -  Nothing needs to be specified.  The FIPS
              code 00000 is used automatically.

STATE      -  state FIPS codes

COUNTY     -  state or county FIPS codes.  State FIPS
              code means include all counties in the
              state.

SUBCOUNTY  -  county FIPS code and subregion code.
-------------------------------------------------------
/REGION/
Region Level       : COUNTY
Gaston County NC   : 37071
Mecklenburg Coun NC: 37119
/END/

or use -
Region Level       : STATE
Michigan           : 26000
-------------------------------------------------------

                  SOURCE CATEGORY PACKET

This packet is used to tell the model which source
categories are to be processed.  It is optional.
If used, only those source categories list will
appear in the output data file.  If the packet is
not found, the model will process all source
categories in the population files.
-------------------------------------------------------


Diesel Only -
                   :2270000000
                   :2282020000
                   :2285002015
Spark Ignition Only -
                   :2260000000
                   :2265000000
                   :2267000000
                   :2268000000
                   :2282005010
                   :2282005015
                   :2282010005
                   :2285004015
                   :2285006015
-------------------------------------------------------
 This is the packet that lists the names of output files
 and some of the input data files read by the model.  If
 a drive:\path\ is not given, the location of the
 NONROAD.EXE file itself is assumed.  You will probably
```

```
 want to change the names of the Output and Message files
 to match that of the OPTion file, e.g., MICH-97.OPT,
 MICH-97.OUT, MICH-97.MSG, and if used MICH-97.AMS.
------------------------------------------------------
/RUNFILES/
ALLOC XREF          : data\allocate\allocate.xrf
ACTIVITY            : data\activity\activity.dat
EXH TECHNOLOGY      : data\tech\tech-exh.dat
EVP TECHNOLOGY      : data\tech\tech-evp.dat
SEASONALITY         : data\season\season.dat
REGIONS             : data\season\season.dat
MESSAGE             : c:\nonroad\outputs\mtr2025b.msg
OUTPUT DATA         : c:\nonroad\outputs\mtr2025b.out
EPS2 AMS            :
US COUNTIES FIPS    : data\allocate\fips.dat
RETROFIT            :
/END/

------------------------------------------------------
This is the packet that defines the equipment population
files read by the model.
------------------------------------------------------
/POP FILES/
Population File     : c:\nonroad\data\pop\nc.pop
/END/

POPULATION FILE     : c:\nonroad\data\POP\MI.POP


------------------------------------------------------
This is the packet that defines the growth files
files read by the model.
------------------------------------------------------
/GROWTH FILES/
National defaults   : data\growth\nation.grw
/END/


/ALLOC FILES/
Air trans. empl.    :c:\nonroad\data\allocate\nc_airtr.alo
Undergrnd coal prod:c:\nonroad\data\allocate\nc_coal.alo
Construction cost   :c:\nonroad\data\allocate\nc_const.alo
Harvested acres     :c:\nonroad\data\allocate\nc_farms.alo
Golf course estab. :c:\nonroad\data\allocate\nc_golf.alo
Wholesale estab.    :c:\nonroad\data\allocate\nc_holsl.alo
Family housing      :c:\nonroad\data\allocate\nc_house.alo
Logging employees   :c:\nonroad\data\allocate\nc_loggn.alo
Landscaping empl.   :c:\nonroad\data\allocate\nc_lscap.alo
Manufacturing empl.:c:\nonroad\data\allocate\nc_mnfg.alo
Oil & gas employees:c:\nonroad\data\allocate\nc_oil.alo
Census population   :c:\nonroad\data\allocate\nc_pop.alo
Allocation File     :c:\nonroad\data\allocate\nc_rail.alo
RV Park establish. :c:\nonroad\data\allocate\nc_rvprk.alo
Snowblowers comm.   :c:\nonroad\data\allocate\nc_sbc.alo
Snowblowers res.    :c:\nonroad\data\allocate\nc_sbr.alo
Snowmobiles         :c:\nonroad\data\allocate\nc_snowm.alo
Rec marine inboard :c:\nonroad\data\allocate\nc_wib.alo
```

```
Rec marine outboard:c:\nonroad\data\allocate\nc_wob.alo
/END/
------------------------------------------------------------
This is the packet that defines the emssions factors
files read by the model.
------------------------------------------------------------
/EMFAC FILES/
THC exhaust         : data\emsfac\exhthc.emf
CO exhaust          : data\emsfac\exhco.emf
NOX exhaust         : data\emsfac\exhnox.emf
PM exhaust          : data\emsfac\exhpm.emf
BSFC                : data\emsfac\bsfc.emf
Crankcase           : data\emsfac\crank.emf
Spillage            : data\emsfac\spillage.emf
Diurnal             : data\emsfac\evdiu.emf
Tank Perm           : data\emsfac\evtank.emf
Non-RM Hose Perm    : data\emsfac\evhose.emf
RM Fill Neck Perm   : data\emsfac\evneck.emf
RM Supply/Return    : data\emsfac\evsupret.emf
RM Vent Perm        : data\emsfac\evvent.emf
Hot Soaks           : data\emsfac\evhotsk.emf
RuningLoss          : data\emsfac\evrunls.emf
/END/

------------------------------------------------------------
This is the packet that defines the deterioration factors
files read by the model.
------------------------------------------------------------
/DETERIORATE FILES/
THC exhaust         : data\detfac\exhthc.det
CO exhaust          : data\detfac\exhco.det
NOX exhaust         : data\detfac\exhnox.det
PM exhaust          : data\detfac\exhpm.det
Diurnal             : data\detfac\evdiu.det
Tank Perm           : data\detfac\evtank.det
Non-RM Hose Perm    : data\detfac\evhose.det
RM Fill Neck Perm   : data\detfac\evneck.det
RM Supply/Return    : data\detfac\evsupret.det
RM Vent Perm        : data\detfac\evvent.det
Hot Soaks           : data\detfac\evhotsk.det
RuningLoss          : data\detfac\evrunls.det
/END/

Optional Packets - Add initial slash "/" to activate

/STAGE II/
Control Factor      : 0.0
/END/
Enter percent control: 95 = 95% control = 0.05 x uncontrolled
Default should be zero control.

/MODELYEAR OUT/
EXHAUST BMY OUT     :
EVAP BMY OUT        :
/END/

SI REPORT/
```

```
SI report file-CSV :OUTPUTS\NRPOLLUT.CSV
/END/

/DAILY FILES/
DAILY TEMPS/RVP    :
/END/

PM Base Sulfur
 cols 1-10: dsl tech type;
 11-20: base sulfur wt%; or '1.0' means no-adjust (cert= in-use)
/PM BASE SULFUR/
T2        0.0350    0.02247
T3        0.2000    0.02247
T3B       0.0500    0.02247
T4A       0.0500    0.02247
T4B       0.0015    0.02247
T4        0.0015    0.30
T4N       0.0015    0.30
T2M       0.0350    0.02247
T3M       1.0       0.02247
T4M       1.0       0.02247
/END/
```

```
Written by Nonroad interface at 10/4/2012 10:27:35 AM
This is the options file for the NONROAD program.
The data is sperated into "packets" bases on common
information.  Each packet is specified by an
identifier and a terminator. Any notes or descriptions
can be placed between the data packets.

9/2005 epa: Add growth & tech years to PERIOD packet
  and Counties & Retrofit files to RUNFILES packet.

------------------------------------------------------

                  PERIOD PACKET

This is the packet that defines the period for
which emissions are to be estimated.  The order of the
records matter.  The selection of certain parameters
will cause some of the record that follow to be ignored.
The order of the records is as follows:

1  - Char 10  - Period type for this simulation.
                  Valid responses are: ANNUAL, SEASONAL, and MONTHLY
2  - Char 10  - Type of inventory produced.
                  Valid responses are: TYPICAL DAY and PERIOD TOTAL
3  - Integer  - year of episode (4 digit year)
4  - Char 10  - Month of episode (use complete name of month)
5  - Char 10  - Type of day
```

```
                  Valid responses are: WEEKDAY and WEEKEND
------------------------------------------------------
/PERIOD/
Period type        : Monthly
Summation type     : Typical day
Year of episode    : 2025
Season of year     :
Month of year      : July
Weekday or weekend : Weekday
Year of growth calc:
Year of tech sel   :
/END/

------------------------------------------------------

                  OPTIONS PACKET

This is the packet that defines some of the user
options that drive the model.  Most parameters are
used to make episode specific emission factor
adjustments. The order of the records is fixed.
The order is as follows.

1  -  Char 80  - First title on reports
2  -  Char 80  - Second title on reports
3  -  Real 10  - Fuel RVP of gasoline for this simulation
4  -  Real 10  - Oxygen weight percent of gasoline for simulation
5  -  Real 10  - Percent sulfur for gasoline
6  -  Real 10  - Percent sulfur for diesel
7  -  Real 10  - Percent sulfur for LPG/CNG
8  -  Real 10  - Minimum daily temperature (deg. F)
9  -  Real 10  - maximum daily temperature (deg. F)
10 -  Real 10  - Representative average daily temperature (deg. F)
11 -  Char 10  - Flag to determine if region is high altitude
                      Valid responses are: HIGH and LOW
12 -  Char 10  - Flag to determine if RFG adjustments are made
                      Valid responses are: YES and NO
------------------------------------------------------
/OPTIONS/
Title 1            : METROLINA 2025, ALL COUNTIES
Title 2            : RVP 9, TYPICAL JULY DAY
Fuel RVP for gas   : 9.0
Oxygen Weight %    : 3.3446
Gas sulfur %       : 0.003
Diesel sulfur %    : 0.0011
Marine Dsl sulfur %: 0.0055
CNG/LPG sulfur %   : 0.003
Minimum temper. (F): 70.6
Maximum temper. (F): 90.1
Average temper. (F): 80.3
Altitude of region : LOW
EtOH Blend % Mkt   : 97
EtOH Vol %         : 10
/END/

------------------------------------------------------
                  REGION PACKET
```

```
This is the packet that defines the region for which
emissions are to be estimated.

The first record tells the type of region and
allocation to perform.

Valid responses are:
US TOTAL   -  emissions are for entire USA without state
              breakout.

50STATE    -  emissions are for all 50 states
              and Washington D.C., by state.

STATE      -  emissions are for a select group of states
              and are state-level estimates

COUNTY     -  emissions are for a select group of counties
              and are county level estimates.  If necessary,
              allocation from state to county will be performed.

SUBCOUNTY  -  emissions are for the specified sub counties
              and are subcounty level estimates.  If necessary,
              county to subcounty allocation will be performed.

The remaining records define the regions to be included.
The type of data which must be specified depends on the
region level.

US TOTAL   -  Nothing needs to be specified.  The FIPS
              code 00000 is used automatically.

50STATE    -  Nothing needs to be specified.  The FIPS
              code 00000 is used automatically.

STATE      -  state FIPS codes

COUNTY     -  state or county FIPS codes.  State FIPS
              code means include all counties in the
              state.

SUBCOUNTY  -  county FIPS code and subregion code.
-------------------------------------------------------
/REGION/
Region Level       : COUNTY
Cabarrus County NC : 37025
Gaston County NC   : 37071
Iredell County NC  : 37097
Lincoln County NC  : 37109
Mecklenburg Coun NC: 37119
Rowan County NC    : 37159
Union County NC    : 37179
/END/

or use -
Region Level       : STATE
Michigan           : 26000
```

```
-------------------------------------------------------

                   SOURCE CATEGORY PACKET

This packet is used to tell the model which source
categories are to be processed.  It is optional.
If used, only those source categories list will
appear in the output data file.  If the packet is
not found, the model will process all source
categories in the population files.
-------------------------------------------------------


Diesel Only -
                   :2270000000
                   :2282020000
                   :2285002015
Spark Ignition Only -
                   :2260000000
                   :2265000000
                   :2267000000
                   :2268000000
                   :2282005010
                   :2282005015
                   :2282010005
                   :2285004015
                   :2285006015
-------------------------------------------------------
 This is the packet that lists the names of output files
 and some of the input data files read by the model.  If
 a drive:\path\ is not given, the location of the
 NONROAD.EXE file itself is assumed.  You will probably
 want to change the names of the Output and Message files
 to match that of the OPTion file, e.g., MICH-97.OPT,
 MICH-97.OUT, MICH-97.MSG, and if used MICH-97.AMS.
-------------------------------------------------------
/RUNFILES/
ALLOC XREF         : data\allocate\allocate.xrf
ACTIVITY           : data\activity\activity.dat
EXH TECHNOLOGY     : data\tech\tech-exh.dat
EVP TECHNOLOGY     : data\tech\tech-evp.dat
SEASONALITY        : data\season\season.dat
REGIONS            : data\season\season.dat
MESSAGE            : c:\nonroad\outputs\mtrl2025.msg
OUTPUT DATA        : c:\nonroad\outputs\mtrl2025.out
EPS2 AMS           :
US COUNTIES FIPS   : data\allocate\fips.dat
RETROFIT           :
/END/

-------------------------------------------------------
This is the packet that defines the equipment population
files read by the model.
-------------------------------------------------------
/POP FILES/
Population File    : c:\nonroad\data\pop\nc.pop
/END/
```

```
POPULATION FILE    : c:\nonroad\data\POP\MI.POP


-------------------------------------------------------
This is the packet that defines the growth files
files read by the model.
-------------------------------------------------------
/GROWTH FILES/
National defaults  : data\growth\nation.grw
/END/


/ALLOC FILES/
Air trans. empl.   :c:\nonroad\data\allocate\nc_airtr.alo
Undergrnd coal prod:c:\nonroad\data\allocate\nc_coal.alo
Construction cost  :c:\nonroad\data\allocate\nc_const.alo
Harvested acres    :c:\nonroad\data\allocate\nc_farms.alo
Golf course estab. :c:\nonroad\data\allocate\nc_golf.alo
Wholesale estab.   :c:\nonroad\data\allocate\nc_holsl.alo
Family housing     :c:\nonroad\data\allocate\nc_house.alo
Logging employees  :c:\nonroad\data\allocate\nc_loggn.alo
Landscaping empl.  :c:\nonroad\data\allocate\nc_lscap.alo
Manufacturing empl.:c:\nonroad\data\allocate\nc_mnfg.alo
Oil & gas employees:c:\nonroad\data\allocate\nc_oil.alo
Census population  :c:\nonroad\data\allocate\nc_pop.alo
Allocation File    :c:\nonroad\data\allocate\nc_rail.alo
RV Park establish. :c:\nonroad\data\allocate\nc_rvprk.alo
Snowblowers comm.  :c:\nonroad\data\allocate\nc_sbc.alo
Snowblowers res.   :c:\nonroad\data\allocate\nc_sbr.alo
Snowmobiles        :c:\nonroad\data\allocate\nc_snowm.alo
Rec marine inboard :c:\nonroad\data\allocate\nc_wib.alo
Rec marine outboard:c:\nonroad\data\allocate\nc_wob.alo
/END/
-------------------------------------------------------
This is the packet that defines the emssions factors
files read by the model.
-------------------------------------------------------
/EMFAC FILES/
THC exhaust        : data\emsfac\exhthc.emf
CO exhaust         : data\emsfac\exhco.emf
NOX exhaust        : data\emsfac\exhnox.emf
PM exhaust         : data\emsfac\exhpm.emf
BSFC               : data\emsfac\bsfc.emf
Crankcase          : data\emsfac\crank.emf
Spillage           : data\emsfac\spillage.emf
Diurnal            : data\emsfac\evdiu.emf
Tank Perm          : data\emsfac\evtank.emf
Non-RM Hose Perm   : data\emsfac\evhose.emf
RM Fill Neck Perm  : data\emsfac\evneck.emf
RM Supply/Return   : data\emsfac\evsupret.emf
RM Vent Perm       : data\emsfac\evvent.emf
Hot Soaks          : data\emsfac\evhotsk.emf
RuningLoss         : data\emsfac\evrunls.emf
/END/

-------------------------------------------------------
```

```
This is the packet that defines the deterioration factors
files read by the model.
------------------------------------------------------
/DETERIORATE FILES/
THC exhaust        : data\detfac\exhthc.det
CO exhaust         : data\detfac\exhco.det
NOX exhaust        : data\detfac\exhnox.det
PM exhaust         : data\detfac\exhpm.det
Diurnal            : data\detfac\evdiu.det
Tank Perm          : data\detfac\evtank.det
Non-RM Hose Perm   : data\detfac\evhose.det
RM Fill Neck Perm  : data\detfac\evneck.det
RM Supply/Return   : data\detfac\evsupret.det
RM Vent Perm       : data\detfac\evvent.det
Hot Soaks          : data\detfac\evhotsk.det
RuningLoss         : data\detfac\evrunls.det
/END/

Optional Packets - Add initial slash "/" to activate

/STAGE II/
Control Factor     : 0.0
/END/
Enter percent control: 95 = 95% control = 0.05 x uncontrolled
Default should be zero control.

/MODELYEAR OUT/
EXHAUST BMY OUT    :
EVAP BMY OUT       :
/END/

SI REPORT/
SI report file-CSV :OUTPUTS\NRPOLLUT.CSV
/END/

/DAILY FILES/
DAILY TEMPS/RVP    :
/END/

PM Base Sulfur
 cols 1-10: dsl tech type;
 11-20: base sulfur wt%; or '1.0' means no-adjust (cert= in-use)
/PM BASE SULFUR/
T2        0.0350    0.02247
T3        0.2000    0.02247
T3B       0.0500    0.02247
T4A       0.0500    0.02247
T4B       0.0015    0.02247
T4        0.0015    0.30
T4N       0.0015    0.30
T2M       0.0350    0.02247
T3M       1.0       0.02247
T4M       1.0       0.02247
/END/
```