Appendix F.1

Point Source Emissions Inventory Documentation

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1. INTRODUCTION

The attainment modeling for the Charlotte-Gastonia-Rock Hill, North Carolina-South Carolina 8-hour ozone nonattainment area (referred to as the Metrolina area) was performed in conjunction with the regional haze modeling being done by the Southeast Regional Planning Organization, Visibility Improvement State and Tribal Association of the Southeast (VISTAS) and the fine particulate matter (PM2.5) and ozone modeling being done by the Association of Southeastern Integrated Planning (ASIP). VISTAS and ASIP are run by the ten Southeast states (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia and West Virginia). Since the regional haze and PM2.5 modeling uses annual simulations and includes an intermediate year that is the attainment year required for the Metrolina nonattainment area, the North Carolina Division of Air Quality (NCDAQ) decided to use the this modeling for its attainment demonstration.

Although the VISTAS/ASIP developed emission estimates for all pollutants of concern for regional haze, fine particulate matter and ozone, only the emissions inventory discussions relevant to ozone formation, i.e., nitrogen oxides (NOx) and volatile organic compounds (VOCs), will be discussed in this document. The other pollutants will be discussed in detail in the regional haze and fine particulate matter State Implementation Plans (SIPs).

2. 2002 POINT SOURCE INVENTORY DEVELOPMENT

This section details the development of the 2002 base year inventory for point sources. There were two major components to the development of the point source sector of the inventory. The first component was the incorporation of data submitted by State and Local (S/L) agencies to the United States Environmental Protection Agency (USEPA) as part of the Consolidated Emissions Reporting Rule (CERR) requirements. Work on incorporating the CERR data into the revised base year involved: 1) obtaining the data from the USEPA or the S/L agencies, 2) evaluating the emissions and pollutants reported in the CERR submittals, 3) augmenting CERR data with annual emission estimates for primary coarse particulate matter (PM_{10}-PRI) and $PM_{2.5}$-PRI; 4) evaluating the emissions from electric generating units, 5) completing quality assurance reviews for each component of the point source inventory, and 6) updating the database with corrections or new information from S/L agencies based on their review of the 2002 inventory. This document will not address the augmenting of the particulate matter since these pollutants are not considered an ozone precursor. The remaining processes used to perform the emission inventory development are described in the first portion of this section.

The second component was the development of a "typical" year inventory for electric generating units (EGUs). The VISTAS/ASIP states determined that a typical year EGU inventory was necessary to smooth out any anomalies in emissions from the EGU sector due to meteorology, economic, and outage factors in 2002. This is consistent with the USEPA's guidance for SIP modeling. The typical year EGU inventory is intended to represent the five-year (2000-2004) period that will be used for the attainment demonstration for the PM2.5 and ozone SIPs, and to determine the regional haze reasonable progress goals. The second part of this section discusses the development of the typical year EGU inventory.

A list of sources located in the Metrolina nonattainment area, as well as the average daily peak ozone season emissions can be found in Appendix E.

2.1 Development of 2002 Actual Point Source Inventory

VISTAS/ASIP contracted with MACTEC to develop the 2002 emission inventory. NCDAQ submitted the most updated statewide emission inventory to the contractor with the exception of the emissions from the three local programs. For the three local programs, Forsyth, Mecklenburg, and Buncombe Counties, the CERR submittal from the USEPA was used. Once all of the files were obtained, MACTEC ran the files through the USEPA's Nationa Emissions Inventory (NEI) Input Format (NIF) Basic Format and Content checking tool to ensure that the files were submitted in standard NIF format and that there were no referential integrity issues with those files.

The primary task in preparing the 2002 base year inventory was the incorporation of corrections and new information as submitted by the S/L agencies based on their review of the previous draft versions of the inventory. The following subsections document the data sources for the inventory, the checks made on the CERR submittals, the evaluation of EGU emissions, and other quality assurance/quality control (QA/QC) checks. The final subsection summarizes the 2002 NOx and VOC inventory by sector (EGU and non-EGU).

Throughout the development of the point source emissions inventory, the NCDAQ completed detailed reviews of the inventories prepared by the VISTAS/ASIP contractor and provided comments and data corrections when needed.

2.1.1 Consolidated Emissions Reporting Rule

The CERR was published in the Federal Register on Monday, June 10, 2002 (FR Volume 67, Number 111, pp 39602 - 39616). This brief summary is provided as a quick introduction to the CERR and covers the major items in the rule.

The purpose of the CERR is to simplify reporting, offer options for data collection and exchange, and unify reporting dates for various categories of criteria pollutant emission inventories. The rule applies to S/L agencies. Previous reporting requirements have, at times, forced reporting agencies into inefficient collecting and reporting activities. This rule consolidates the emission inventory reporting requirements found in various parts of the Clean Air Act (CAA). Consolidation of reporting requirements will enable S/L agencies to better explain to program managers and the public the necessity for a consistent inventory program, increases the efficiency of the emission inventory program, and provide more consistent and uniform data.

States are required to prepare a comprehensive statewide inventory every three years. The first inventory was for the year 2002 and was due June 1, 2004. This CERR inventory was used for the VISTAS/ASIP 2002 base year.

2.1.2 EGU Analysis

MACTEC made a comparison of the annual sulfur dioxide (SO2) and NO_x emissions for EGUs as reported in the S/L agencies CERR submittals and the data from the USEPA's Clean Air Markets Division (CAMD) continuous emission monitoring (CEM) database to identify any outstanding discrepancies. Facilities report hourly CEM data to the USEPA for units that are subject to CEM reporting requirements of the NOx SIP Call rule and Title IV of the CAA. The USEPA sums the hourly CEM emissions to the annual level, and MACTEC compared these annual CEM emissions to those in the S/L inventories. The 2002 CEM inventory containing NOx and SO2 emissions and heat input data were downloaded from the USEPA CAMD web site (www.epa.gov/airmarkets). The data were provided by quarter and emission unit.

The first step in the EGU analysis involved preparing a crosswalk file to match facilities and units in the CAMD inventory to facilities and units in the S/L inventories. In the CAMD inventory, the Office of Regulatory Information Systems (ORIS) identification (ID) code identifies unique facilities and the unit ID identifies unique boilers and internal combustion engines (i.e., turbines and reciprocating engines). In the North Carolina point source emissions inventories, the State and county code (FIPS code) and State facility ID together identify unique facilities and the emission unit ID identifies unique boilers or internal combustion engines. In most cases, there is a one-to-one correspondence between the CAMD identifiers and the S/L identifiers. However, in some of the S/L inventories, the emissions for multiple emission units are summed and reported under one emission unit ID. MACTEC created an Excel spreadsheet that contained an initial crosswalk with the ORIS ID and unit ID in the CEM inventory matched to the State and county FIPS, State facility ID, and emission unit ID in the emissions inventories. The initial crosswalk contained both the annual emissions summed from the CAMD database, as well as, the S/L emission estimate. The matching at the facility level was nearly complete. In some cases, however, S/L agencies or stakeholders' assistance was needed to match some of the CEM units to emission units in the S/L inventories.

The second step in the EGU analysis was to prepare an Excel spreadsheet that compared the annual emissions from the hourly CAMD inventory to the annual emissions reported in the S/L inventory. The facility-level comparison of CEM to emission inventory NOx and SO2 emissions found that for most facilities, the annual emissions from the S/L inventory equaled the CAMD CEM emissions. Minor differences could be explained because the facility in the S/L inventory contained additional small or emergency units that were not included in the CAMD database.

The final step in the EGU analysis was to compare the SO2 and NOx emissions for select Southern Company units in the VISTAS/ASIP region. Southern Company is a super-regional company that owns EGUs in four VISTAS/ASIP States – Alabama, Florida, Georgia, and Mississippi – and participates in VISTAS as an industry stakeholder. Southern Company independently provided emission estimates for 2002 as part of the development of the preliminary VISTAS 2002 inventory. Emission estimates were reviewed by the States and incorporated into the States CERR submittal. There were no major inconsistencies between the Southern Company data, the CAMD data, and the S/L CERR data.

The minor inconsistencies found included small differences in emission estimates (<2 percent difference), exclusion/inclusion of small gas-fired units in the different databases, and grouping of emission units in S/L CERR submittals where CAMD listed each unit individually. MACTEC compared SO_2 and NO_x emissions on a unit-by-unit basis and did not find any major inconsistencies.

2.1.3 Summary of the 2002 Actual Inventory

Tables 2.1.3-1 summarize the final 2002 actual base year inventory for North Carolina. All values are in tons per year. The EGU emissions include the emissions from all processes with a Source Classification Code (SCC) of either 1-01-xxx-xx (External Combustion Boilers – Electric Generation) or 2-01-xxx-xx (Internal Combustion Engines – Electric Generation). Emissions for all other SCCs are included in the non-EGU column.

Table 2.1.3-1 2002 Actual Point Source Inventory for North Carolina

State	All Point Sources	EGUs	Non-EGUs
SO2	522,113	477,990	44,123
NOx	196,782	151,854	44,928
VOC	62,170	988	61,182
CO	64,461	13,885	50,576
PM_{10}-PRI	36,592	22,754	13,838
$PM_{2.5}$-PRI	26,998	16,498	10,500
NH_3	1,234	54	1,180

2.2 Development of Typical Year EGU Inventory

VISTAS/ASIP developed a typical year 2002 emission inventory for EGUs to avoid anomalies in emissions due to variability in meteorology, economic, and outage factors in 2002. The typical year inventory represents the five year (2000-2004) period, which are the years used to calculate the average design value.

Data from the USEPA's CAMD were used to develop normalization factors for producing a 2002 typical year inventory for EGUs. The VISTAS/ASIP contractor used the ratio of the 2000-2004 average heat input and the 2002 actual heat input to normalize the 2002 actual emissions. MACTEC obtained data from the USEPA CAMD for utilities regulated by the Acid Rain program. Annual data for the period 2000 to 2004 were obtained from the CAMD web site. The parameters available were the SO2 and NOx emission rates, heat input, and operating hours.

MACTEC used the actual 2002 heat input and the average heat input for the 5-year period from 2000-2004 as the normalization factor, as follows:

$$\text{Normalization Factor:} \quad \frac{\text{2000-2004 average heat input}}{\text{2002 actual heat input}}$$

If the unit did not operate for all five years, then the 2000-2004 average heat input was calculated for the one or two years in which the unit did operate. The annual actual emissions were multiplied by the normalization factor to determine the typical emissions for 2002, as follows:

Typical Emissions = 2002 actual emissions x Normalization Factor

After applying the normalization factor, some adjustments were needed for special circumstances. For example, a unit may not have operated in 2002 and thus have zero emissions. If the unit had been permanently retired prior to 2002, then MACTEC used zero emissions for the typical year. If the unit had not been permanently retired and would normally operate in a typical year, then MACTEC used the 2001 (or 2000) heat input and emission rate to calculate the typical year emissions.

The final step was to replace the 2002 actual emissions with the 2002 typical year data described above. MACTEC provided the raw data and results of the typical year calculations in a spreadsheet for S/L agency to review and comment. Any comments made were incorporated into the typical 2002 inventory.

Table 2.2-1 summarizes emissions by State and pollutant for the actual 2002 EGU inventory and the typical year EGU inventory. For the entire VISTAS region, actual 2002 NOx emissions were about 0.1 percent lower than the typical year emissions. North Carolina's actual 2002 NOx emissions were 2.0 percent higher than the typical year emissions.

Table 2.2-1 NO_x Emissions Comparison for EGUs

	NO_x Emissions (tons/year)		
State	**Actual 2002**	**Typical 2002**	**Percentage Difference**
AL	161,038	154,704	3.9
FL	257,677	282,507	-9.6
GA	147,517	148,126	-0.4
KY	198,817	201,928	-1.6
MS	43,135	40,433	6.3
NC	151,854	148,812	2.0
SC	88,241	88,528	-0.3
TN	157,307	152,137	3.3
VA	86,886	85,081	2.1
WV	230,977	222,437	3.7

3. 2009 POINT SOURCE EMISSIONS INVENTORY DEVELOPMENT

Different approaches were used for different sectors of the point source inventory. For the EGUs, VISTAS/ASIP relied primarily on the Integrated Planning Model® (IPM) to project future generation, as well as, to calculate the impact of future emission control programs. The IPM results were adjusted based on S/L agency knowledge of planned emission controls at specific EGUs. For non-EGUs, VISTAS/ASIP used recently updated growth and control data consistent with the data used in the USEPA's Clean Air Interstate Rule (CAIR) analyses, and supplemented these data with available S/L agency input and updated fuel use forecast data for the United States Department of Energy.

For both sectors, VISTAS/ASIP generated 2009 inventory with control scenarios that account for post-2002 emission reductions from promulgated and proposed federal, State, local, and site-specific control programs as of July 1, 2004. Section 3.1 discusses the EGU projection inventory development, while Section 3.2 discusses the non-EGU projection inventory development.

3.1 EGU Emission Projections

The following subsections discuss the aspects of the development of the EGU projections.

- A chronology of the EGU development process used by MACTEC and discuss key decisions in selecting the final methods for performing the emissions projections.
- The development of the final set of IPM runs that are included in the VISTAS/ASIP 2009 inventory.
- The process of transforming the IPM parsed files into NIF format.
- The process for ensuring that units accounted for in IPM were not double-counted in the non-EGU inventory.
- The QA/QC checks that were made to ensure that the IPM results were properly incorporated into the VISTAS/ASIP inventory.
- The changes to the IPM results that S/L agencies requested be included in the VISTAS/ASIP inventory based on new information that was not accounted for in the IPM runs.
- Summary of 2002 and 2009 EGU emissions by state for NOx and VOC

3.1.1 Chronology of the Development of EGU Projections

Initially, VISTASASIP considered three options for developing the 2009 projection inventory for EGUs:

- Option 1 – Use the results of IPM modeling conducted in support of the proposed CAIR base and control case analyses as the starting point and refine the projections with readily available inputs from stakeholders; these IPM runs were conducted for 2010, which VISTAS would use to represent projected emissions in 2009.

- Option 2 – Use the VISTAS/ASIP 2002 typical year as the starting point, apply growth factors from the Energy Information Administration, and refine future emission rates with stakeholder input regarding utilization rates, capacity, retirements, and new unit information.

- Option 3 – Use the results of a new round of IPM modeling sponsored by VISTAS and the Midwest Regional Planning Organization (MRPO). These runs incorporated VISTAS specific unit and regulation modified parameters, and generate results for 2009 explicitly.

An additional consideration for each of the three options was the inclusion of emission projections developed by the Southern Company specifically for their units. Southern Company is a super-regional company that owns EGUs in Alabama, Florida, Georgia, and Mississippi and participates in VISTAS as an industry stakeholder. Southern Company used their energy budget forecast to project net generation and heat input for every existing and future Southern Company EGU for the year 2009. Further documentation of how Southern Company generated the 2009 inventory for their units can be found in *Developing Southern Company Emissions and Flue Gas Characteristics for VISTAS Regional Haze Modeling (April 2005, presented at 14th International Emission Inventory Conference).*

Each of these three options and the Southern Company projections were discussed in a series of conference calls with the VISTAS EGU Special Interest Work Group (SIWG) during the fall of 2004. During a conference call on December 6, 2004, the VISTAS EGU SIWG approved the use of the latest VISTAS/MRPO sponsored IPM runs (Option 3) to represent 2009 EGU forecasts of emissions the future year cases.

The Option 3 IPM modeling resulted from a joint agreement by VISTAS and MRPO to work together to develop future year utility emissions based on IPM modeling. The decision to use IPM modeling was based in part on a study of utility forecast methods by E.H. Pechan and Associates, Inc. (Pechan) for MRPO, which recommended IPM as a viable methodology (see *Electricity Generating Unit {EGU} Growth Modeling Method Task 2 Evaluation*, February 11, 2004). Although the USEPA used IPM recently to support their rulemaking for the CAIR, VISTAS stakeholders felt that certain model inputs needed to be improved. Thus, VISTAS and

MRPO decided to hire contractors to conduct new IPM modeling and to post-process the IPM results. Southern Company projections in 2009 were roughly comparable with IPM.

In August 2004, VISTAS/ASIP contracted with ICF to run IPM to provide utility forecasts for 2009 under two future scenarios – Base Case and CAIR Case. The Base Case represents the current operation of the power system under currently known laws and regulations, including those that come into force in the study horizon. The CAIR Case is the Base Case with the proposed CAIR rule superimposed. The run results were parsed at the unit level for 2009. The IPM output files were delivered by ICF in November, and the post-processed data files were delivered by Pechan in December 2004. Only the CAIR case was used in the final 2009 modeling.

On March 10, 2005, the USEPA issued the final CAIR. VISTAS and MRPO, in conjunction with other RPOs, conducted another round of IPM modeling, which reflected changes to control assumptions based on the final CAIR as well as additional changes to model inputs based on S/L agency and stakeholder comments. Several conference calls were conducted in the spring/summer of 2005 to discuss and provide comments on IPM assumptions related to six main topics: power system operation, generating resources, emission control technologies, set-up parameters and rule, financial assumptions, and fuel assumptions.

For the summer 2006 set of IPM runs, ICF generated two different parsed files. One file includes all fuel burning units (fossil, biomass, landfill gas), as well as, non-fuel burning units (hydro, wind, etc.). The second file contains just the fossil-fuel burning units (e.g., emissions from biomass and landfill gas are omitted). The RPOs decided to use the fossil-only file for modeling to be consistent with the USEPA, since the USEPA used the fossil only results for CAIR analyses. For the 10 VISTAS states, non-fossil fuels accounted for only 0.13 percent of the NOx emissions and 0.04 percent of the SO2 emissions in the 2009 IPM runs

VISTAS/ASIP asked S/L agencies to review the results of the summer 2006 set of IPM runs, which were incorporated into the VISTAS inventory. The NCDAQ primarily reviewed and commented on the IPM results with respect to IPM decisions on NOx post-combustion controls and SO2 scrubbers.

3.1.2 VISTAS/MRPO IPM runs for EGU sources

The following summary of the VISTAS/MRPO IPM® modeling is based on ICF's documentation *Future Year Electricity Generating Sector Emission Inventory Development Using the IPM® in Support of Fine Particulate Mass and Visibility Modeling in the VISTAS and*

Midwest RPO Regions, April 2005. The ICF documentation is to be used as an extension to EPA's proposed CAIR modeling runs documented in *Documentation Supplement for EPA Modeling Applications (V.2.1.6) Using the IPM*, EPA 430/R-03-007, July 2003.

IPM provides "forecasts of least-cost capacity expansion, electricity dispatch, and emission control strategies for meeting energy demand and environmental, transmission, dispatch, and reliability constraints." The underlying database in this modeling is USEPA's National Electric Energy Data System (NEEDS) released with the CAIR Notice of Data Availability (NODA). The NEEDS database contains the existing and planned/committed unit data in the USEPA modeling applications of IPM. NEEDS includes basic geographic, operating, air emissions, and other data on these generating units. VISTAS States and stakeholders provided changes for:

- NO_x post-combustion control on existing units
- SO_2 scrubbers on existing units
- SO_2 emission limitations
- PM controls on existing units
- Summer net dependable capacity
- Heat rate for existing units
- SO_2 and NO_x control plans based on State rules or enforcement settlements

The years 2009 and 2018 were explicitly modeled in this set of runs.

3.1.3 Post-Processing of IPM Parsed Files

The following summary of the VISTAS/MRPO IPM modeling is based on Pechan's documentation *LADCO IPM Model Parsed File Post-Processing Methodology and File Preparation*, February 8, 2005. The essence of the IPM model post-processing methodology is to take an initial IPM model output file and transform it into air quality model input files. ICF via VISTAS/MRPO provided an initial spreadsheet file containing unit-level records of both (1) "existing" units and (2) committed or new generic aggregates.

All records have unit and fuel type data; existing, retrofit (for SO2 and NOx), and separate NOx control information; annual SO2 and NOx emissions and heat input; summer season (May-September) NOx and heat input; July day NOx and heat input; coal heat input by coal type; nameplate capacity (MW), and State FIPS code. Existing units also have county FIPS code, a unique plant identifier (ORISPL) and unit ID (also called boiler ID) (BLRID); generic units do not have these data. The processing includes estimating various types of emissions and adding in control efficiencies, stack parameters, latitude-longitude coordinates, and State identifiers (plant ID, point ID, stack ID, process ID). Additionally, the generic units are sited in a county and given appropriate IDs. This processing is described in more detail below.

The data are prepared by transforming the generic aggregates into units similar to the existing units in terms of the available data. The generic aggregates are split into smaller generic units based on their unit types and capacity, are provided a dummy ORIS unique plant and boiler ID, and are given a county FIPS code based on an algorithm that sites each generic by assigning a sister plant that is in a county based on its attainment/nonattainment status. Within a State, plants (in county then ORIS plant code order) in attainment counties are used first as sister sites to generic units, followed by plants in PM2.5 nonattainment counties, followed by plants in 8-hour ozone nonattainment counties. Note that no LADCO or VISTAS States provided blackout counties that would not be considered when siting generics, so this process is identical to the one used for the USEPA IPM post-processing.

SCCs were assigned for all units; unit/fuel/firing/bottom type data were used for existing units' assignments, while only unit and fuel type were used for generic units' assignments. Latitude-longitude coordinates were assigned, first using the USEPA-provided data files, secondly using the September 17, 2004 Pechan in-house latitude-longitude file, and lastly using county centroids. These data were only used when the data were not provided in the 2002 NIF files. Stack parameters were attached, first using the USEPA-provided data files, secondly using a March 9, 2004 Pechan in-house stack parameter file based on previous EIA-767 data, and lastly using an USEPA June 2003 SCC-based default stack parameter file. These data were only used when the data were not provided in the 2002 NIF files.

Additional data were required for estimating VOC, CO, filterable primary PM_{10} and PM2.5, PM condensable, and NH_3 emissions for all units. Thus, ash and sulfur contents were assigned by first using 2002 EIA-767 values for existing units or SCC-based defaults; filterable PM10 and PM2.5 efficiencies were obtained from the 2002 EGU NEI that were based on 2002 EIA-767 control data and the PM Calculator program (a default of 99.2 percent is used for coal units if necessary); fuel use was back calculated from the given heat input and a default SCC-based heat content; and emission factors were obtained from an USEPA-approved October 7, 2004 Pechan emission factor file based on AP-42 emission factors. Note that this updated file is not the one used for estimating emissions for previous USEPA post-processed IPM files. Emissions for 28 temporal-pollutant combinations were estimated since there are seven pollutants (VOC, CO, primary PM_{10} and $PM_{2.5}$, NH_3, SO_2 and NO_x) and four temporal periods (annual, summer season, winter season, July day).

The next step was to match the IPM unit IDs with the identifiers in VISTAS/ASIP 2002 inventory. A crosswalk file was used to obtain FIPS State and county, plant ID (within State and county), and point ID. If the FIPS State and county, plant ID and point ID are in the 2002 VISTAS NIF tables, then the process ID and stack ID are obtained from the NIF; otherwise, defaults, described above, were used.

Pechan provided the post-processed files in NIF 3.0 format. Two sets of tables were developed: “NIF files” for IPM units that have a crosswalk match and are in the 2002 VISTAS inventory, and “NoNIF files” for IPM units that are not in the 2002 VISTAS inventory (which includes existing units with or without a crosswalk match as well as generic units).

For the 2009 projections, VISTAS/ASIP states reviewed the PM and NH_3 emissions from EGUs as provided by Pechan and identified significantly higher emissions in 2009 than in 2002. It was determined that Pechan used a set of PM and NH_3 emission factors that are “the most recent USEPA approved uncontrolled emission factors” for estimating 2009 emissions. These factors are most likely not the same emission factors used by States for estimating these emissions in 2002 for EGUs in the VISTAS/ASIP region. Thus, the emission increase from 2002 to 2009 was simply an artifact of the change in emission factor, not anything to do with changes in activity or control technology application. Also, VISTAS/ASIP states identified an inconsistent use of SCCs for determining emission factors between the base and future years. The resolution of the PM and NH_3 problem is fully documented in *EGU Emission Factors and Emission Factor Assignment*, memorandum from Greg Stella to VISTAS State Point Source Contacts and VISTAS EGU Special Interest Workgroup, June 13, 2005 (attached in Appendix Q). The first step was the adjustment of the 2002 base year emissions inventory. Using the latest “USEPA-approved” uncontrolled emission factors by SCC, Alpine Geophysics utilized CERR or VISTAS/ASIP reported annual heat input, fuel throughput, heat, ash and sulfur content to estimate annual uncontrolled emissions for units identified as output by IPM. This step was conducted for non-CEM pollutants (CO, VOC, PM, and NH_3) only. For PM emissions, the condensable component of emissions was calculated and added to the resulting PM primary estimations. The resulting emissions were then adjusted by any control efficiency factors reported in the CERR or VISTAS data collection effort. The second adjustment was to the future year inventories. Alpine Geophysics updated the SCCs in the future year inventory to assign the same base year SCC. Using the same methods as described for the 2002 revisions, those non-IPM generated pollutants were estimated using IPM predicted fuel characteristics and base year 2002 SCC assignments.

3.1.4 S/L Adjustments to IPM Modeling Results

After the S/L agency review of the final set of IPM runs, S/L agencies specified a number of changes to the IPM results to better reflect current information on when and where future controls would occur. These changes to the IPM results primarily involved S/L agency addition or subtraction of future emission controls based on the best available data from state rules, enforcement agreements, compliance plans, permits, and discussions/commitments from individual companies.

For example,Duke Energy and Progress Energy have updated their plans for complying with North Carolina's Clean Smokestack Act. The emissions outlined in the North Carolina's Clean Smokestacks Act compliance plans varied substantially from the IPM results. As a result, NCDAQ requested that the IPM emission projections for 2009 be adjusted to correspond with the compliance plans submitted in 2006 from the Duke Energy and Progress Energy.

Some S/L agencies specified changes to the controls assigned by IPM to reflect their best estimates of emission controls. The VISTAS/ASIP contractors used a scrubber control efficiency of 90 percent when adding or removing SO2 scrubber controls, used a control efficiency of 90 percent when adding or removing NOx SCR controls at coal-fired plants, 80 percent when adding or removing NOx SCR controls at gas-fired plants, and 35 percent when adding or removing NOx SNCR controls. The specific changes from NCDAQ to the IPM results are also summarized in Table 3.1.4-1.

S/L agencies provided information and/or comment on changes in stack parameters from the 2002 inventory for the 2009 inventory. Changes to stack parameters were also made in cases where new controls are scheduled to be installed. In cases where an emission unit projected to have a SO_2 scrubber in 2009, some states were able to provide revised stack parameters for some units based on design features for the new control system. Other units projected to install scrubbers by 2009 are not far enough along in the design process to have specific design details. For those units, the VISTAS EGU SIWG made the following assumptions: 1) the scrubber is a wet scrubber; 2) keep the current stack height the same; 3) keep the current flow rate the same, and 4) change the stack exit temperature to 169 degrees F (this is the virtual temperature derived from a wet temperature of 130 degrees F). VISTAS determined that exit temperature (wet) of 130 degrees F +/- 5 degrees F is representative of different size units and wet scrubber technology.

Table 3.1.4-1 NCDAQ Adjustments to IPM Results for the 2009 EGU Inventory.

Plant Name and ID	Unit	Nature of Update/Correction
G G Allen (2718) Belews Creek (8042)1 Buck (2720) Cliffside (2721) Dan River (2723) Marshall (2727) Riverbend (2732)	All	Replaced all IPM 2009 results with emission projections from Duke Power's NC Clean Smokestacks Act Compliance Plan for 2006.
Asheville (2706) Cape Fear (2708) Lee (2709) Mayo (6250) Roxboro (2712) Sutton (2713) Weatherspoon (2716)	All	Replaced all IPM 2009 results with emission projections from Progress Energy's NC Clean Smokestacks Act Compliance Plan for 2006.
Dwayne Collier Battle Cogeneration Facility ORISID=10384	GEN1 GEN2	Dwayne Collier Battle is a duplicate entry. This is Cogentrix of Rocky Mount (37-065-3706500146, stacks G-26 and G-27). Duplicate entries were removed from the 2009 inventory.
Kannapolis Energy Partners ORISID=10626	GEN2 GEN3	Kannapolis Energy emissions are being used as credits for another facility. IPM emissions from this facility (37-025-ORIS10626) were removed from the EGU inventory for 2009. Emissions from Kannapolis Energy (37-025-3702500113) were carried forward in the 2009 inventory.

3.1.5 Summary of 2009 EGU Point Source Inventory

Tables 3.1.5-1 and 3.1.5-2 summarize the 2002 base year inventory and 2009 projection inventory for the EGU source sector. The 2009 inventory include the adjustments to the IPM results specified by the S/L agencies in the previous section.

Table 3.1.5-1 EGU Point Source NOx Emission Comparison for 2002 and 2009.

State	2002 VISTAS	2009 IPM Based with S/L Adjustments
AL	161,038	82,305
FL	257,677	86,165
GA	147,517	98,497
KY	198,817	92,021
MS	43,135	36,011
NC	151,854	66,522
SC	88,241	46,915
TN	157,307	66,405
VA	86,886	66,219
WV	230,977	86,328
Total	**1,523,449**	**727,388**

Note: Emission summaries above are based on SCC's 1-01-xxx-xx and 2-01-xxx-xx .

Table 3.1.5-2 EGU Point Source VOC Emission Comparison for 2002 and 2009.

State	2002 VISTAS	2009 IPM Based with S/L Adjustments
AL	2,295	2,473
FL	2,524	1,910
GA	1,244	2,314
KY	1,487	1,369
MS	648	404
NC	988	954
SC	470	660
TN	926	932
VA	754	778
WV	1,180	1,361
Total	**12,516**	**13,155**

Note: Emission summaries above are based on SCC's 1-01-xxx-xx and 2-01-xxx-xx.

3.2 Non-EGU Emission Projections

The general approach for assembling future year data was to use recently updated growth and control data consistent with the data used in the USEPA's CAIR analyses, supplement these data with available stakeholder input, and provide the results for stakeholder review to ensure credibility. The VISTAS/ASIP contractor used the 2002 VISTAS/ASIP base year inventory, based on the 2002 CERR submittals as the starting point for the non-EGU projection inventory. The 2002 VISTAS/ASIP point source emission inventory contains both EGUs and non-EGUs. Since this file contains both EGUs and nonEGU point sources, and EGU emissions are projected using the IPM, it was necessary to split the 2002 point source file into two components. The first component contains those emission units accounted for in the IPM forecasts. The second component contains all other point sources not accounted for in IPM and constitutes the non-EGU emissions inventory.

MACTEC performed the following activities to apply growth and control factors to the 2002 non-EGU emissions inventory to generate the 2009 projection inventory:

- Obtained, reviewed, and applied the most current growth factors developed by EPA, based on forecasts from an updated Regional Economic Models, Inc. (REMI) model (version 5.5) and the latest *Annual Energy Outlook* published by the Department of Energy (DOE);

- Obtained, reviewed, and applied any State-specific or sector-specific growth factors submitted by stakeholders;

- Obtained and incorporated information regarding sources that have shut down after 2002 and set the emissions to zero in the projection inventories;

- Obtained, reviewed, and applied control assumptions;

- Provided data files in NIF3.0 format and emission summaries in EXCEL format for review and comment; and

- Updated the database with corrections or new information from S/L agencies based on their review of the 2009 inventory.

The following sections discuss each of these steps.

3.2.1 Growth assumptions for non-EGU sources

The growth factor data used in developing the emission inventory were consistent with the USEPA's analyses for the CAIR rulemaking. These growth factors are fully documented in the reports entitled *Development of Growth Factors for Future Year Modeling Inventories* (dated April 30, 2004) and *CAIR Emission Inventory Overview* (dated July 23, 2004). Three sources of data were used in developing the growth factors for the 2009 emissions inventory:

- State-specific growth rates from the Regional Economic Model, Inc. (REMI) Policy Insight® model, version 5.5 (being used in the development of the EGAS Version 5.0). The REMI socioeconomic data (output by industry sector, population, farm sector value added, and gasoline and oil expenditures) are available by 4-digit SIC code at the State level.

- Energy consumption data from the DOE's Energy Information Administration's (EIA) *Annual Energy Outlook 2004, with Projections through 2025* for use in generating growth factors for non-EGU fuel combustion sources. These data include regional or national fuel-use forecast data that were mapped to specific SCCs for the non-EGU fuel use sectors (e.g., commercial coal, industrial natural gas). Growth factors for the residential natural gas combustion category, for example, are based on residential natural gas consumption forecasts that are reported at the Census division level. These Census divisions represent a group of States (e.g., the South Atlantic division includes eight southeastern States and the District of Columbia). Although one would expect different growth rates in each of these States due to unique demographic and socioeconomic trends, all States within each division received the same growth rate.

- Specific changes for sectors (e.g., plastics, synthetic rubber, carbon black, cement manufacturing, primary metals, fabricated metals, motor vehicles and equipment) where the REMI-based rates were unrealistic or highly uncertain. Growth projections for these sectors were based on industry group forecasts, Bureau of Labor Statistics (BLS) projections and Bureau of Economic Analysis (BEA) historical growth from 1987-2002.

In addition to the growth data described above, VISTAS received two sets of growth projections from stakeholders. The American Forest and Paper Association (AF&PA) supplied growth projections for the pulp and paper sector, which were applied to SIC 26xx Paper and Allied Products, for growth from 2002 to 2009. The AF&PA projection factor (1.067) is for the United States industry and apply to all States equally. The number come from the 15-year forecast for world pulp and recovered paper prepared by Resource Information Systems Inc. (RISI). The VISTAS/ASIP contractor used the above AF&PA growth factors by SIC instead of the factors obtained from the USEPA's CAIR analysis for the 2009 emission inventory.

NCDAQ considered recent projections for three key sectors in North Carolina where declining production was anticipated – SIC 22xx Textile Mill Products, 23xx Apparel and Other Fabrics, and 25xx Furniture and Fixtures. For the 2009 inventory, NCDAQ decided to use a growth factor of 1.0 for these SIC codes. Although NCDAQ has data that shows a steady decline in these industries in North Carolina, NCDAQ wanted to maintain the emission levels at 2002 levels so the future emission reduction credits were available in the event that they are needed for nonattainment areas.

For the 2009 inventory, the VISTAS/ASIP contractor made one additional change to the growth factors. The AEO2004 data was replaced with the more recent AEO2006 forecasts (released in February 2006) to reflect changes in the energy market and to improve the emissions growth factors produced. The VISTAS/ASIP contractor obtained the corresponding AEO2006 projection tables from DOE's web site. VISTAS developed tables comparing the growth factors based on AEO2004 and AEO2006 and these comparison tables were reviewed by the S/L agencies. Based on this review, the VISTAS/ASIP states decided to use the AEO2006 growth factors for fuel burning SCCs.

VISTAS used the USEPA's EGAS model and updated the corresponding AEO2006 projection tables to create growth factors by SCC. VISTAS applied the updated growth factors to 2002 actual emissions and replaced the 2009 emissions in NIF EM tables for the affected SCCs.

3.2.2 Control Programs applied to non-EGU sources

VISTAS developed two control scenarios: on-the-books (OTB) controls and on-the-way (OTW) controls. The OTB control scenario accounts for post-2002 emission reductions from recently promulgated federal, State, local, and site-specific control programs. The OTW control scenario accounts for proposed (but not final) control programs that are reasonably anticipated to result in post-2002 emission reductions. The methodologies used to account for the emission reductions associated with these emission control programs are discussed in the following sections.

Table 3.2.2-1 Non-EGU Point Source Control Programs Included in 2009 Inventory.

On-the-Books (Cut-off of July 1, 2004 for Base 1 adoption)

- Atlanta / Northern Kentucky / Birmingham 1-hr SIPs
- Industrial Boiler/Process Heater/RICE MACT
- NO_x RACT in 1-hr NAA SIPs
- NO_x SIP Call (Phase I- except where States have adopted II already e.g. NC)
- RFP 3 percent Plans where in place for one hour plans
- VOC 2-, 4-, 7-, and 10-year MACT Standards
- Combustion Turbine MACT

On-the-Way

- NO_x SIP Call (Phase II – remaining States & IC engines)

3.2.2.1 OTB - NOx SIP Call (Phase I)

Phase I of the NOx SIP call applies to certain large non-EGUs, including large industrial boilers and turbines, and cement kilns. States in the VISTAS region affected by the NOx SIP call have developed rules for the control of NOx emissions that have been approved by the USEPA. VISTAS reviewed the available State rules and guidance documents to determine the affected sources and ozone season allowances. VISTAS also obtained and reviewed information in the EPA's CAMD NOx Allowance Tracking System – Allowances Held Report. Since these controls are to be in effect by the year 2007, VISTAS capped the emissions for NOx SIP call affected sources at 2007 levels and carried forward the capped levels for the 2009 future year inventory.

3.2.2.2 OTB - Industrial Boiler/Process Heater MACT

The USEPA anticipates reductions in PM and SO2 as a result of the Industrial Boiler/Process Heater MACT standard. The methods used to account for these reductions are the same as those used for the CAIR analysis. Reductions were included for existing units firing solid fuel (coal, wood, waste, biomass), which had a design capacity greater than 10 mmBtu/hr. The USEPA prepared a list of SCCs for solid fuel industrial, commercial/ institutional boilers and process heaters. The VISTAS/ASIP contractor identified boilers greater than 10 mmBtu/hr using either the boiler capacity from the VISTAS 2002 inventory, or if the boiler capacity was missing, a default capacity based on a methodology developed by the USEPA for assigning default capacities based on SCC code. The applied MACT control efficiencies were 4 percent for SO2 and 40 for percent for PM10 and PM2.5.

3.2.2.3 OTB - 2, 4, 7, and 10-year MACT Standards

Maximum achievable control technology (MACT) requirements were also applied, as documented in the report entitled *Control Packet Development and Data Sources,* dated July 14, 2004. The point source MACTs and associated emission reductions were designed from Federal Register (FR) notices and discussions with the USEPA's Emission Standards Division (ESD) staff. VISTAS did not apply reductions for MACT standards with an initial compliance date of 2001 or earlier, assuming that the effects of these controls are already accounted for in the 2002 inventories supplied by the States. Emission reductions were applied only for MACT standards with an initial compliance date of 2002 or greater.

3.2.2.4 OTB Combustion Turbine MACT

The projection inventory does not include the NOx co-benefit effects of the MACT regulations for Gas Turbines or stationary Reciprocating Internal Combustion Engines, which the USEPA estimates to be small compared to the overall inventory.

3.2.2.5 OTW - NOx SIP Call (Phase II)

The final Phase II NOx SIP call rule was finalized on April 21, 2004. States had until April 21, 2005, to submit SIPs meeting the Phase II NOx budget requirements. The Phase II rule applies to large IC engines, which are primarily used in pipeline transmission service at compressor stations. VISTAS identified affected units using the same methodology as was used by the USEPA in the proposed Phase II rule (i.e., a large IC engine is one that emitted, on average, more than 1 ton per day during 2002). The final rule reflects a control level of 82 percent for natural gas-fired IC engines and 90 percent for diesel or dual fuel categories. North Carolina provided more specific information on the anticipated controls at the compressor stations. This information was used in the 2009 inventory instead of the default approach used by the USEPA in the proposed Phase II rule.

3.2.2.6 Clean Air Interstate Rule

CAIR does not require or assume additional emission reductions from non-EGU boilers and turbines.

3.2.3 Summary of 2009 non-EGU Point Source Inventory

Tables 3.2.3-1 and 3.2.3-2 summarize the 2009 non-EGU point source inventory for NOx and VOC emissions.

Table 3.2.3-1 Non-EGU Point Source NO_x Emission Comparison.

State	2002	2009
AL	83,310	69,409
FL	45,156	46,020
GA	49,251	50,353
KY	38,392	37,758
MS	61,526	56,397
NC	44,928	34,767
SC	42,153	40,019
TN	64,344	57,883
VA	60,415	51,046
WV	46,612	38,031
Total	**536,087**	**481,683**

Table 3.2.3-2 Non-EGU Point Source VOC Emission Comparison.

State	2002	2009
AL	47,037	46,644
FL	38,471	36,880
GA	33,709	34,116
KY	44,834	47,785
MS	43,204	37,747
NC	61,182	61,925
SC	38,458	35,665
TN	84,328	74,089
VA	43,152	43,726
WV	14,595	13,810
Total	**448,970**	**432,387**

Appendix F.2

Area and Nonroad Mobile Sources Emissions Inventory Documentation

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LIST OF TABLES

List of Acronyms

Acronym	Definition
AEO	Annual Energy Outlook
ATADS	Air Traffic Activity Data System
BTS	Bureau of Transportation Statistics
BTU	British Thermal Units
CAIR	Clean Air Interstate Rule
CERR	Consolidated Emissions Reporting Rule
CMU	Carnegie Mellon University
CMV	Commercial Marine Vessel
CNG	Compressed Natural Gas
EDMS	Emissions and Dispersion Modeling System
EF	Emission Factor
EGAS 5.0	Economic Growth Analysis System version 5.0
EIA	Energy Information Administration
EIIP	Emissions Inventory Improvement Program
FAA	Federal Aviation Administration
GF	Growth Factor
HDD	Heavy Duty Diesel
IAQTR	Interstate Air Quality Transport Rule
LPG	Liquid Petroleum Gas
LTO	Landing and Takeoff
MSW	Municipal Solid Waste
NAAQS	National Ambient Air Quality Standards
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
NCSU	North Carolina State University
NEI	National Emissions Inventory
NG	Natural Gas
NIF	National Emissions Inventory Input Format
NOx	Nitrogen Oxides
NWR	National Wildlife Refuge
OTAQ	Office of Transportation and Air Quality
PFC	Portable Fuel Container
PM	Particulate Matter

QA	Quality Assurance
RIA	Regulatory Impact Analysis
SCC	Source Classification Code
SI	Spark-Ignition
SIC	Standard Industrial Classification
SIWG	Special Interest Workgroup
T4	Tier 4
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFA	U.S. Fire Administration
USFWS	U.S. Fish and Wildlife Service
USFS	U.S. Forest Service
VISTAS	Visibility Improvement State & Tribal Association of the Southeast
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds

1. INTRODUCTION AND SCOPE

The attainment modeling for the Charlotte-Gastonia-Rock Hill, NC-SC 8-hour ozone nonattainment area (referred to as the Metrolina area) was performed in conjunction with the regional haze modeling being done by the Southeast Regional Planning Organization, Visibility Improvement State and Tribal Association of the Southeast (VISTAS) and the fine particulate matter (PM2.5) and ozone modeling being done by the Association of Southeastern Integrated Planning (ASIP). VISTAS and ASIP are run by the ten Southeast states (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia and West Virginia. Since the regional haze and PM2.5 modeling uses annual simulations and includes an intermediate year that is the attainment year required for the Metrolina nonattainment area, the North Carolina Division of Air Quality (NCDAQ) decided to use the this modeling for its attainment demonstration.

A portion of the emissions inventory was developed by the NCDAQ and the VISTAS/ASIP contractors developed a portion. In all cases, a statewide emissions inventory was developed for modeling purposes and the emission estimates were calculated in tons per year. Sections 3 documents the portion of the 2002 base year area source annual emissions inventory that was developed by the NCDAQ. Section 4 documents the area source developed by VISTAS/ASIP and Section 5 addresses the development of the 2009 area source emissions inventory. Section 6 and 7 document the nonroad mobile source emissions inventory for 2002 and 2009, respectively.

A summary of the area source and nonroad mobile source peak ozone season daily emissions, by source category, can be found in Appendix E.

2. OVERALL METHODOLOGY

2.1 SOURCE CATEGORY IDENTIFICATION

The area source categories were identified from U. S. Environmental Protection Agency's (USEPA's) guidance document 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; the *Emissions Inventory Improvement Program (EIIP) Technical Reports, Volume 3, Area Sources* as of December 2002 (the most current version at the time of the inventory development), from this point on this document will be referred to as EIIP Tech Report; and a report entitled, *Documentation of the Base G 2002 Base Year, 2009 and 2018, Emission Inventories for VISTAS* and written by the VISTAS contractor company, MACTEC, Inc.

Nonroad mobile sources were identified from the USEPA's 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); and from the USEPA's nonroad mobile model NONROAD2005c released March 21, 2006.

2.2 AREA SOURCE 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 Reports, the Procedures document or the USEPA's *AP-42 Compilation of Air Pollutant Emission Factors, Fifth Edition*, referred to as AP-42.

There are several methods for estimating the activity level for a specific area source category. These are: treating area sources as point sources, surveying local activity levels, apportioning national or statewide activity totals to local inventory areas, using population or employment data. All of these methods were used to estimate area source emissions

Certain emission categories were adjusted for such things as season or rule effectiveness and rule penetration. These are discussed in the particular source categories descriptions.

For certain categories, there can be overlap between the point source emissions and the area source emissions calculated with emission factors. The 2002 point source emissions in these categories were identified so that they could be subtracted where appropriate.

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. The tables from the US Census showing the NAICS-SIC crosswalk are reproduced in Section 8 – Additional Data. It should be noted that the crosswalk is based on national totals and is not specific to any particular state. In Section 8.2, the employment fraction of the NAICS codes used to create the SIC code employment data is tabulated.

The employment numbers were obtained from the on-line 2002 County Business Patterns 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 County Business Patterns 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 County Business Patterns 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.

2.3 NONROAD MOBILE SOURCE EMISSION ESTIMATION APPROACH

Non-highway mobile sources, sometimes referred to as off-road mobile, are those sources that can move but do not use the highway system. Off-road mobile sources are further divided into non-road mobile, railroad locomotives, aircraft engines, and commercial marine vessels (CMV). The estimation of emissions from mobile sources, like area sources, involves multiplying an activity level by an emission factor.

The majority of the off-road mobile emissions were estimated by using the USEPA's off-road mobile model NONROAD2005c. Direct emissions are generated with this model. For aircraft engine emissions, the Federal Aviation Administration (FAA) Emissions and Dispersion

Modeling System (EDMS) model was used. Aircraft operations were inputted into the model and the model predicts the engine emissions based on average landing and take-off practices for the aircraft type. For railroad locomotive emissions, emission factors were obtained from the Mobile Source Procedures document and the activity level was obtained from the various railroad companies.

3. NORTH CAROLINA-DEVELOPED 2002 AREA SOURCE INVENTORY

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. Emissions are calculated on an annual basis in tons per year.

3.1 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.

3.1.1 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, 3) spillage and 4) truck transit losses. The emissions from vehicle refueling are captured in the mobile source inventory in the emission factors produced by the USEPA's MOBILE6.2 model and therefore are not estimated as part of the area source 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 they meet 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 assessed. From this information the rule effectiveness and rule penetration can be estimated. The rule effectiveness is the percentage of facilities with proper equipment maintenance and use and represents the actual degree of source compliance. Rule penetration is the percentage of facilities covered by the rule and thus require Stage I equipment. Control efficiency is the expected percent reduction from proper application of this control technology.

The volatile organic compound (VOC) emission factor for underground storage tank filling was calculated by using an equation from AP-42, in Section 5.2, Transportation And Marketing Of Petroleum Liquids on page 5.2-4 (equation).

$$EF = 12.46 \left[\frac{SPM}{T}\right] \times [1-(RE \times CE \times RP)]$$

where
- EF = emission factor in pounds of VOC per 1000 gallons
- S = Saturation factor
- P = True vapor pressure (in pounds per square inch area)
- M = Molecular weight of vapors (lb/lb-mole)
- T = Temperature of bulk liquid (^{o} Rankin)
- RE = Rule Effectiveness
- CE = Control Efficiency
- RP = Rule Penetration

The saturation factor was obtained from AP-42, Table 5.2-1 and the true vapor pressure and molecular weight of vapors were obtained from AP-42, Table 7.1-2. For the temperature an average of the June, July and August average monthly temperature for 2002 was used. A worst case temperature estimate was used year round in calculating annual emissions. These temperatures were obtained from the North Carolina Climatological Data, a publication of the National Oceanic and Atmospheric Administration. All of the factors used to calculate the emission factor for Stage I, i.e. balanced submerged filling, are listed in Table 3.1.1-1.

Table 3.1.1-1 Factors Used For Calculating Emission Factor

S	P	M	T
1	6.49	67	537.6^{o}R (77.6^{o}F)

$$EF = 12.46 \left[\frac{1 \times 6.49 \times 67}{537.6} \right] \times [1 - (.97 \times .95 \times .99)]$$

$$= 0.884 \text{ lb VOC/1000 gal. Gasoline}$$

The emission factors for tank truck transit, breathing losses and spillage were obtained from the EIIP Tech Report, Chapter 11 Gasoline Marketing, Table 11.3-1 and are listed below in Table 3.1.1-2. The tank truck transit emission factor includes the emission rate for an empty tank plus a full tank and was adjusted by a factor of 1.25 as recommended by the EIIP Tech Report, pg. 11.5-3.

Table 3.1.1-2 Emission Factors For Gasoline Dispensing

Underground Storage Tank Filling	Tank Truck Transit	Breathing	Spillage
0.884 lb/1000gal	0.000075 lb/gal	0.001 lb/gal	0.00068 lb/gal

The activity data needed to calculate the emissions is number of gallons of fuel sold in each county per year. This was obtained from a report from the North Carolina Petroleum Marketers Association. A weighting factor was devised by producing the sum of county population (1000's), county registered vehicles (1000's), and county motor fuel outlets. The factors were summed for the 100 counties and a fractional part of the whole found for each county. This fraction was multiplied by the state total gallons of gasoline and diesel sold in 2002 to get an estimate of gallons of fuel per county.

According to the EIIP Tech Report, the activity days per week for truck transit and underground storage tank filling are 6 and 7 days per week and for spillage and breathing losses, respectively.

Note that diesel fuel used is combined with gasoline for the sake of simplification. This will result in some overestimation of VOC emissions because the volatility of gasoline is higher than diesel fuel.

Annual VOC emissions for underground storage tank filling, tank truck transit, breathing losses and spillage were calculated and SMOKE modeling was later used to allocate annual emissions to a daily level. Underground storage tank annual VOC emissions for each county were calculated using the following equation.

$$EM = FC \times (1/1000) \times EF \times (1 \text{ ton}/2000 \text{ lbs.})$$

where EM = annual county VOC emissions in tons per year
FC = county fuel consumption of gasoline and diesel in gallons
EF = emission factor in pounds of VOC per 1000 gallons

Tank truck transit, breathing losses, and spillage annual VOC emissions for each county were calculated individually, using the following equation.

$$EM = FC \times EF \times (1 \text{ ton}/2000 \text{ lbs.})$$

where EM = annual county VOC emissions in tons per year for tank truck transit, breathing losses, or spillage
FC = county fuel consumption of gasoline and diesel in gallons
EF = emission factor in pounds of VOC per gallon for tank truck transit, breathing losses, or spillage

3.1.2 Aircraft Refueling

Like vehicle refueling, aircraft refueling results in VOC emissions from displacement of the vapor laden air in the aircraft's fuel tank. This source category is generally estimated only for large commercial airports. There are a few small commuter and general aviation airports in the State; however, the amount of the emissions from these are typically negligible.

The emissions from aircraft refueling were determined by using the number of gallons of fuel supplied to the airports and multiplying it by the appropriate emission factor. The businesses that supply the fuel to the airports were contacted to determine the amount and type of fuel supplied to each airport during 2002. The information obtained was for the two fuel types supplied, Jet A Kerosene and Aviation Gasoline.

The emission factors used are 11.38 lb VOC/1000 gallons of aviation gasoline and 0.065 lb VOC/1000 gallons of Jet A kerosene. Airport refueling occurs on a daily basis, therefore the activity days per week are 7.

The annual emissions for the base year were calculated using equation 3.1.2-1.

$$EM_i = \frac{\text{Gallons/year} \times EF_i}{(2000 \text{ lbs/ton})} \qquad 3.1.2\text{-}1$$

where EM_i = emissions for source category (i)
EF_i = emission factor for source category (i)

3.2 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.

3.2.1 Dry Cleaning

The VOC emissions from dry cleaning vary with the type of process and the solvent used. For the most part, dry cleaners (coin-operated and conventional commercial) are small business entities. As a result of their size, dry cleaning emissions are typically 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 cleaners are estimated by multiplying the number of employees at dry cleaners by a national per-employee emission factor, 1800 lbs. of VOC/employee/year, found in the EIIP Tech. Report. The guidance also stated that the number of employees can be found in the County Business Patterns for SIC code 7215 (coin-operated) and 7216 (commercial). In 1997, the SIC code system was replaced with the NAICS. Thus, the number of employees was obtained for NAICS codes 812310 (coin-operated) and 812320 (commercial). The NAICS employment numbers were previously processed to exclude any facilities with 100 or more employees, which were deemed to be point sources. According to the SIC to NAICS crosswalk, 80% of employment for NAICS 812320 represents the number of employees for commercial dry cleaners (SIC 7216).

As reported in the EIIP Tech. Report, the activity days per week is 6 days. The emissions for 2002 were calculated using equation 3.2.1-1.

$$EM = \frac{\text{Employees x EF}}{(2000\ \text{lb/tons})} \qquad 3.2.1\text{-}1$$

where EM = emissions for source category tons/year
EF = emission factor for source category, 1800 lbs VOC/employee/yr

3.2.2 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. Therefore, an employee per SIC code emission factor is not very reliable. The per-capita emission factor of 1.3 lbs VOC/person/year provided by the EIIP Tech. Report was used to calculate the VOC emissions. This emission factor estimates the emissions from facilities less than 100 tons VOC/year. It assumes that facilities greater than 100 tons VOC/year will be in the point source inventory. The population used to calculate the base year emissions was obtained from the North Carolina Office of State Budget and Management (OSBM).

According to the Procedures document, Table 5.8-1, the activity days per week is 5. The annual emissions for the base year were calculated using equation 3.2.2-1.

$$EM = ((EF)*(\text{Population}_{2002})*(1 \text{ ton}/2000 \text{ lb})) \qquad 3.2.2\text{-}1$$

where EM = emissions for source category for county (a) ton/yr
EF = emission factor for source category, 1.3 lbs VOC/person/yr

3.2.3 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 and therefore 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. These machines are batch loaded, and 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 the per employee factors (from the EIIP Tech. Report, Chapter 6, Table 6.5-2) listed in Table 3.2.3-1 below:

Table 3.2.3-1 Emission Factors Cleaning & Degreasing

Source Category	lb VOC/employee/yr
Electronic and Other Elec: 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 2002 County Business Patterns provided by the U. S. Census Bureau. For each of these categories, employment in a number of SIC groups is needed. These employment numbers were generated from the NAICS employment numbers for each county and summed as needed. See SIC Codes from NAICS Codes for Employment Based Categories in Section 10 for the full listing of NAICS and SIC for each source category. Fractional employee numbers are a result of the NAICS to SIC conversion process.

The annual emissions for the base year were calculated using equation 3.2.3-1.

$$EM = \frac{(Employment_{2002}) \times EF}{(2000\ lb/tons)} \qquad 3.2.3\text{-}1$$

where EM = emissions for source category, tons per year
EF = emission factor for source category

3.2.4 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 solvent is typically 100% volatile and can constitute up to 6.5 pounds of VOC per gallon of cleaner or paint.

The EIIP methodology for estimating emissions from this source category recommends apportioning a national VOC emission estimate to the county level by the number of employees reported for NAISC code 811121. The national estimate of 79,429.59 tons of VOC per year was based on 1997 data. In order to estimate the emissions for 2002, the 1997 national VOC estimate provided by the EIIP Tech. Report was divided by the 1997 national employment data to create a per employee emission factor.

This emission factor was used with the 2002 employment data to estimate emissions from auto body refinishing. The employment data was obtained from the 2002 County Business Patterns.

According to the EIIP Tech. Report the activity days per week is 5 days. The emissions for 2002 were calculated using equation 3.2.4-1.

$$EM = Employees \times EF \qquad 3.2.4\text{-}1$$

where EM = emissions for source category
EF = emission factor for source category, 0.387 tons VOC/employee/yr

3.2.5 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 data by a usage factor for either water or solvent based coatings, and an emissions factor for either water or solvent based coatings. This method entails gathering national architectural paint usage from the County Business industrial report MA325F and generating per capita usage factors. It is important to be able to differentiate between the water based usage from the solvent based usage since the emission factor for solvent based paints is over 5 times higher than the factor for water based paints.

Emissions Factor: Water based = 0.74 lb VOC/gallon;
Solvent Based= 3.87 lb VOC/gallon

$VOC_a = (POP_a*UF_b*EF_b)/(2000lbs/ton)$ -- ton/year

Where:

Where:	VOC_a	=	VOC emissions for county (a)
	POP_a	=	Population for county (a)
	EF_b	=	emission factor for paint type (b)
	UF_b	=	Usage factor for paint type (b)

The usage factor is found by dividing the national total architectural surface coating quantities for either solvent or water-based coatings by the U.S. population for that year. For 2002, the usage factor for each paint type is estimated below:

UF solvent: (127,703,000 gallons of solvent based) / (287,973,924) = 0.443 gal./person
UF water : (589,527,000 gallons of water based) / (287,973,924) = 2.047 gal./person

3.2.6 Traffic Markings

The paint used in traffic markings operations (the painting of center lines, shoulders, etc.) emits VOC emissions during the drying process. The extent of emissions is largely a function of the paint being solvent or water based. The North Carolina Department of Transportation (NCDOT) utilizes three general types of paint, which can be classified as water based paint, epoxy paint containing organic solvents, and thermoplastic paint. The use of thermoplastic paint results in negligible VOC emissions and therefore is not included in the emissions inventory.

Although the NCDOT utilizes both water and solvent based paints, there is uncertainty with respect to what percentage of the paint used is organic solvent based. To avoid under estimating the emissions from this source category, it is assumed that all paint, excluding thermoplastic, is organic solvent based.

The NCDOT reported that 854,215 gallons of paint were used statewide in 2002. The gallons of paint by county were apportioned by number of lane miles in the county divided by the state total (equation 3.2.6-1) and the estimated gallons used. The emission factors were obtained from the EIIP Tech. Report, Table-14.4-1 and Table-14.5-2, which gave emission factors as a function of gallons of paint (3.64 lb VOC/gal.).

$$\text{Gallons Paint}_{\text{County}} = (\text{Gallons Paint}_{\text{State}}) \times \frac{(\#\ \text{Lane Miles})_{\text{County}}}{(\#\ \text{Lane Miles})_{\text{State}}} \qquad 3.2.6\text{-}1$$

The emissions for 2002 were calculated using equation 3.2.6-2.

$$EM = \frac{\text{Gallons Paint} \times EF}{(2000\ \text{lb/ton})} \qquad 3.2.6\text{-}2$$

where EM = emissions for source category
EF = emission factor for source category

3.2.7 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, three of the industrial surface coating subcategories, namely other product coatings, high-performance maintenance, and other special purpose coatings, only utilized per capita emission factors and have no NAICS associated with them. The emission factors, obtained from the EIIP Tech. Report, Table 8.5-2, for these surface coating subcategories are listed in the Table 3.2.7-1 below.

Table 3.2.7-1 Per Capita Emission Factors For Industrial Surface Coating

Subcategory	Per Capita Factor (lb/yr/person)
Other product coatings	0.6
High-performance maintenance.	0.8
Other special purpose coatings	0.8

The emissions for the remaining industrial surface coating subcategories were estimated using per employee emission factors. These emission factors were obtained from the EIIP Tech. Report, Table 8.5-1 and are listed below in Table 3.2.7-2.

Table 3.2.7-2 Per Employee Emission Factors for Industrial Surface Coating

Subcategory	Per Employee Factor (lb VOC/employee/yr)
Furniture & Fixtures	944
Metal Containers	6,029
Automobile (new)	794
Machinery & Equipment	77
Appliances	463
Other Transportation Equipment	35
Sheet, strip & Coil	2,877
Factory Finished Wood	131
Electrical Insulation	290
Marine Coatings	308

The EIIP Tech. Report also listed SIC codes for these industrial surface coating subcategories. As stated earlier, the SIC codes were replaced in 1997 with NAICS. The employment data was estimated using the method previously outlined in Subsection 3.2.1.

According to the EIIP Tech. Report the activity days per week is 5 days. The annual emissions for population and employment based emission factors were calculated using equations 3.2.7-1 and 3.2.7-2, respectively.

$$EM = \frac{\text{Population} \times \text{EF}}{(2000\ \text{lb/ton})} \qquad 3.2.7\text{-}1$$

$$EM = \frac{\text{Employees x EF}}{\text{(2000 lb/ton)}} \qquad 3.2.7\text{-}2$$

where EM = emissions for source category
EF = emission factor for source category

3.2.8 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.

Cutback asphalt emissions are included in the asphalt paving category. Since the assembly of the final VISTAS 2002 inventory, it was found that 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. Although cutback asphalt emissions are included in the 2002 inventory, the 93.04 tons of VOC per year represents a relatively small amount and does not significantly affect the accuracy of the inventory.

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 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 districts and not on a county basis. District tonnage was allocated on a county basis by apportioning county paved mileage as reported in the NCDOT 2000 Highway Summary Report. However, the amount of emulsified asphalt used is not tracked by the NCDOT in any useable way. As a consequence, the NCDOT provided the following methodology to predict emulsified usage:

$$\text{Square Yd. of hot-mix} = \frac{\text{(Tons of Hot-mix) x (2000 lbs./Ton)}}{\text{(220 lbs/ Square Yd. of Hot-mix)}} \qquad 3.2.8\text{-}1$$

Gallons of Emulsified asphalt = (Sq. Yd. of hot-mix) x (0.08 gal./Sq. Yd. of hot-mix) 3.2.8-2

The VOC emissions were calculated using the emissions factor for emulsified asphalt (9.2 lb VOC/barrel) and the number of gallons of emulsified asphalt per barrel (42 gal./barrel) from Table 17.5-2 of the EIIP Tech. Report.

The emissions for the base year were calculated using equation 3.2.8-3.

$$EM = \frac{\text{(gallons Emulsified Asphalt) x EF}}{\text{(42 gal/barrel) x (2000 lb/tons)}} \qquad 3.2.8\text{-}3$$

where EM = emissions for source category
EF = emission factor for source category

3.2.9 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 amount of asphalt roofing activity is estimated by summing the number of felt, cap, and flashing squares used in North Carolina during the year 2002. This information was ascertained from the Asphalt Roofing Manufacturing Association. The amount of asphalt used is given by the equation 3.2.9-1, which uses the default value of 20 lbs. of asphalt / square found in the EIIP Tech. Report. The emissions by county, shown in equation 3.2.9-2, were apportioned by roofing establishments in the county divided by the state total, using the number of establishments from NAISC code 23561 from the 2000 County Business Patterns. The 2000 County Business Patterns was the latest available data at the time of the inventory development.

$$\text{Asphalt (Ton/yr)} = \frac{\text{(\# squares) x (20 lbs. of asphalt/square)}}{\text{(2000 lbs./ton)}} \qquad 3.2.9\text{-}1$$

$$\text{Asphalt}_{\text{County}} = \frac{\text{(Tons Asphalt}_{\text{State}}\text{) x (\# Roofing Establishments)}_{\text{County}}}{\text{(\# Roofing Establishments)}_{\text{State}}} \qquad 3.2.9\text{-}2$$

Asphalt roofing activities are assumed to have uniform operations throughout the year with a 5-day work week per the EIIP Tech. Report. Additionally, the EIIP Tech. Report reported the emissions factor as 6.2 lbs. VOC/ton asphalt for roofing operations.

The emissions for the base year inventory were calculated using equation 3.2.9-3.

$$EM = \frac{(\text{tons Asphalt}) \times EF}{(2000 \text{ lb/tons})} \qquad 3.2.9\text{-}3$$

where EM = emissions for source category
EF = emission factor for source category

3.2.10 Pesticide Application

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 occur 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 Cooperative Extension office. 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 North Carolina Cooperative Extension office, 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 percent 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 North Carolina Cooperative Extension office.

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 reports 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 per year 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 3.2.10-1 and an example calculation for soybeans follows. Table 3.2.10-1 presents the pesticides associated with a particular crop, the % of treated acres, and the lbs. of active pesticide ingredient per year.

$$(\text{lbs. AI/acre})_{CROP} = \sum (\%\text{ acres treated}) \times (\text{lb AI/acre})_{PESTICIDE} \qquad 3.2.10\text{-}1$$

where AI = active ingredient.

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

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

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

Table 3.2.10-1 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
Imidacoloprid	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
Sorghum		
MethyParathion	1	0.75
Chlorpyrifus	1	1
Carbaryl	1	2

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
Dichloropropene	0.16	80

The emission factors for each crop were calculated utilizing information from the EIIP Tech. Report, p 9.5-4, which relates active ingredients to VOC emissions. According to the EIIP Tech. Report, for every pound of active ingredient there are 2.45 pounds of VOC, of this 90% is evaporated. The emission factors for each crop were calculated using Equation 3.2.10-2, with an example calculation for soybean following.

$$EF_{CROP} = (\text{lb } AI_{CROP}/\text{acre}) \times (2.45 \text{ lb. VOC/lb. of AI}) \times (0.90) \qquad 3.2.10\text{-}2$$

Where EF_{CROP} = Emission factor in lbs. VOC/active ingredient for each crop
AI_{CROP} = Active ingredient for each crop

For soybeans the emission factor is:
Lbs. AI/acre for soybean = 0.844 lbs. AI/acre

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

An exception to the above calculation was for the usage of the 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 pounds/acre for chloropicrin and 89.5 pounds/acre for 1,3 dichloropropene. Table 3.2.10-2 list the pounds of active ingredients per acre and the calculated emission factor for each crop.

Table 3.2.10-2 Emission Factors by Crop Type

Crop	Lbs. Active Ingredients/acre	Lbs. VOC/Acre
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

The emissions for 2002 were calculated using equation 3.2.10-3.

$$EM_a = \frac{(\sum (CROP)_a \text{ x } EF_{CROP})}{(2000 \text{ lb/tons})} \qquad 3.2.10\text{-}3$$

where EM_a = emissions for source category in county (a)
$CROP$ = acres of specific crop in county (a)
EF_{CROP} = emission factor for specific crop

Nonagricultural Pesticide

Nonagricultural pesticide applications are considered as part of the commercial/consumer solvent use emission factor and no longer a separate subcategory. Please refer to the next section.

3.2.11 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.

There are seven categories. They are named and their emission factors listed in Table 3.2.11-1 below.

Table 3.2.11-1 Misc. Non-Industrial Consumer-Commercial Emission Factors

Subcategory	lb VOC/yr/person.	lb NH_3/yr/person.
All Coatings and Related Products	0.95	-
All FIFRA Related Products	1.78	-
Miscellaneous Products (Not Otherwise Covered)	0.07	-
Personal Care Products	2.32	-
Household Products	0.079	0.031
Automotive Aftermarket Products	1.36	-
Adhesives and Sealants	0.57	-

VOC emissions for this category is estimated by using nationally based per capita emissions factors. The county population values are used to estimate the emissions from this source category.

According to the EIIP Tech. Report, emissions from this source category occur 365 days per year. The emissions for the base year inventory were calculated using equation 3.2.11-1.

$$EM = \frac{(Population_{2002}) \times EF}{(2000 \text{ lb/tons})} \qquad 3.2.11\text{-}1$$

where EM = emissions for source category, tons per year
EF = emission factor for source category

3.3 BIOPROCESS EMISSION SOURCES

Bioprocess emission sources include those sources whose emissions result from biological processes (e.g., fermentations). Source categories include bakeries, breweries, wineries and distilleries.

3.3.1 Bakeries

Ethanol, a VOC, is a by-product of fermentation of bread dough. The ethanol emissions from large commercial bakeries are accounted for as point sources; however, ethanol emissions occur from grocery store bakery departments and small business bakeries not accounted for under the point source inventory.

The EIIP Tech. Report prescribes accounting for these emissions by the use of a per capita consumption factor of 70 pounds of bread per person per year and an emission factor of 0.5 pounds of VOC per 1000 pounds of baked bread. The county populations obtained from the North Carolina Office of State Budget and Management were used to estimate the emissions from this source category.

According to the EIIP Tech. Report, emissions from this source category occur 365 days per year. The emissions for the base year inventory were calculated using equation 3.3.1-1.

$$EM = \frac{(\text{Population})_b \times CF \times EF}{(2000 \text{ lb/tons})} \qquad 3.3.1\text{-}1$$

where EM = emissions for source category
Population_b = Population in base year
CF = Consumption factor, 70 lb bread/person/year
EF = emission factor for source category, 0.5 lb VOC/1000 lb bread baked

3.4 OTHER MAN MADE AREA SOURCES

Other man made area sources include forest fires, slash burning and prescribed burning, agricultural burning, structure fires, and orchard heaters. The methodology used to calculate the emissions from these sources are described in detail in each subsection.

3.4.1 Structure Fires

Burning fires can produce short term emissions of organic compounds and nitrogen oxides (NOx). The U.S. Fire Administration (USFA) of the Department of Homeland Security maintains statistics on the number of fires per county. The number of fires per county for 2002 was derived from 2001 and 2002 population statistics and 2001 USFA fire statistics. The USFA fire statistics were obtained from the USFA website at http://www.usfa.fema.gov/safety/. As 2002 fire statistics were not available, a fires per person factor for 2001 was calculated and found to be equal to 0.00184 fires/person. The 2001 county population values were obtained from the North Carolina State Demographics website at http://demog.state.nc.us/. The 2001 population values were the latest data available. The 0.00184 fires per person was applied to the 2002 population for each county to determine the number of fires in each county for 2002.

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

According to the EIIP Tech. Report, emissions from this source category occur 365 days per year.

The emissions for the base year 2002 inventory were calculated using Equation 3.4.1-1.

$$EM_P = \frac{(\text{2002 County population}) \times (FPP) \times (CF) \times (EF_P)}{(\text{2000 lb/tons})} \qquad 3.4.1\text{-}1$$

where EM_P = emissions for structure fires for pollutant (P)
FPP = fires per person in 2001, 0.00184 fires/person
CF = Conversion factor, 1.15 tons burned/structure fire
EF_P = emission factor for pollutant (P)

3.4.2 Charbroiling

The commercial charbroiling of ground beef emits VOC emissions. According to the methodology in the EIIP Tech. Report, county Health Departments should be able to provide the number of restaurants in a county as well as the percentage of those restaurants that charbroil meat. The NCDAQ was able to ascertain the number of restaurants in each county in 2002 from the North Carolina Division of Environmental Services, Inspection, Statistics, and Fee Branch.

To determine the percentage of charbroiling restaurants, the county Health Departments of several counties were surveyed.

According to the EIIP Tech. Report, the average throughput of meat per restaurant with a charbroiler is 1160 pounds per week and the emissions factor is 3.94 pounds of VOC per 1000 pounds of meat. Emissions from this source category occur 365 days per year.

The emissions for the base year inventory were calculated using Equations 3.4.2-1.

$$EM_a = \frac{(\#\ Restaurants) \times (\%\ Charbroiling) \times (CF) \times (EF)}{(2000\ lb/tons) \times (1\ yr/52\ wks)} \qquad 3.4.2\text{-}1$$

where EM_a = emissions for source category in county (a), tons/yr
CF = conversion factor, 1160 lb meat charbroiled/week
EF = emission factor, lbs. pollutant/1000 lb meat charbroiled

3.4.3 Open Burning – Municipal Solid Waste and Yard Trimmings

This Subsection describes the combined emission inventory methodology for source classification code (SCC) 2610030000 Residential Open Burning – Household and SCC 2610000100 Open Burning – Yard Trimmings. Open burning is treated as a means of waste disposal in rural areas. Materials burned generally include agricultural refuse, landscaping refuse, or scrap wood. Local authorities could not provide assistance with estimating the tons of refuse burned or the amount burned. According to local authorities, burning permits are issued year round without requiring a notation for the amount burned.

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. According to the EIIP Tech. Report, Table 16.5-1, it is estimated that 3.77 pounds of MSW is generated per person per day and 0.64 pounds of yard trimmings are generated per person per day. Since it is illegal to burn within the corporate limits, the rural population was estimated by using the same percentage of rural population in each county as what was reported in the 2000 census. The 2000 total and rural populations for each county was obtained from the North Carolina Office of State Budget and Management, State Data Center. The 2000 total and rural populations was the latest data available.

VOC and NOx emission factors for open burning of MSW were obtained from EIIP Tech. Report, Table 16.4-1, Open Burning of Municipal Refuse. The emission factors are 6.676 pounds VOC per ton MSW burned and 6 pounds NOx per ton MSW burned.

The VOC emission factor for open burning of yard trimmings was obtained from EIIP Chapter 16, Table 16.4-7. The factor is 28 pounds VOC per ton yard trimmings. The rural percent of the populations for the statewide counties were obtained from the 2000 census data. Since burning permits are issued year round, the activity days per year was 365. These values were used to calculate the tons per year emissions for the base year. The emissions from the burning of MSW for the base year 2002 inventory were calculated using equation 3.4.3-1. The emissions from the burning of yard trimmings for the base year 2002 inventory were calculated using equation 3.4.3-2.

$$EM_{P,MSW} = \frac{(\text{Rural Population in 2002}) \times (CF_{MSW}) \times (EF_P) \times (365\ \text{days/yr})}{(2000\ \text{lb/tons})} \qquad 3.4.3\text{-}1$$

$$EM_{P,YT} = \frac{(\text{Rural Population in 2002}) \times (CF_{YT}) \times (EF_P) \times (365\ \text{days/yr})}{(2000\ \text{lb/tons})} \qquad 3.4.3\text{-}2$$

where $EM_{P,MSW}$ = emissions from burning MSW for pollutant (P)
$EM_{P,YT}$ = emissions from burning yard trimmings for pollutant (P)
CF_{MSW} = conversion factor, 3.77 lb MSW/person/day
= 0.001885 ton MSW/person/day
CF_{YT} = conversion factor, 0.64 lb yard trimmings/person/day
= 0.00032 ton yard trimmings/person/day
EF_P = emission factor for pollutant (P)

3.4.4 Small Stationary Source Fossil Fuel Use

In general, fossil fuels are burned for space and hot water heating. This source category covers VOC and NOx emissions from natural gas (NG) and liquid petroleum gas (LPG), oil, coal, and wood combustion in the residential, commercial/institutional (called commercial), and industrial sectors.

The "demand for energy" for these fuel types is known as fuel usage. Fuel usage data for North Carolina was taken from NC Energy Outlook 2003 by Global Insight, Inc for the base year 2002. The following table shows the data used.

Table 3.4.4-1 Fuel Use in North Carolina 2002

Fuel	Units	Residential	Commercial	Industrial
NG	10^6 ft^3	64,014	40,580	95,718
LPG	gallons	282,775,596	47,960,199	198,606,965
Oil	gallons	215,804,019	113,088,933	343,414,390
Coal	tons	46,872	85,735	0
Wood	tons	1,625,111	164,327	8,583,778

Emission factors used are shown in Table 3.4.4-2 below.

Table 3.4.4-2 Combustion Emission Factors

Sector	Fuel	Units	VOC	NOx
Residential	NG	lb/10^6 ft^3	5.5	94
Residential	LPG	lb/gal	0.0003	0.014
Residential	Oil	lb/gal	0.000713	0.018
Residential	Coal	lb/ton	0.07	9.1
Residential	Wood	lb/ton	229.0	2.6
Commercial	NG	lb/10^6 ft^3	5.5	167.5
Commercial	LPG	lb/gal	0.00035	0.0145
Commercial	Oil	lb/gal	0.000735	0.037
Commercial	Coal	lb/ton	0.07	15.8
Commercial	Wood	lb/ton	0.255326	3.304224
Industrial	NG	lb/10^6 ft^3	4.96	163.33
Industrial	LPG	lb/gal	0.00035	0.02
Industrial	Oil	lb/gal	0.00024	0.039
Industrial	Coal	lb/ton	0.07	14.9
Industrial	Wood	lb/ton	0.255326	3.304224

3.4.4.1 Fuel Oil Combustion

Fuel oil consumption covers the use of kerosene, distillate oil and residual oil. Distillate oil includes fuel oil grades 1, 2, and 4; residual oil includes fuel grades 5 and 6. In most areas, residual oil is not used by residential sources. Kerosene and distillate oils are primarily used for space heating in domestic and small commercial buildings, while residual oils are used primarily for industrial and large commercial applications. It was assumed that residential fuel oils are normally used only for heating and therefore, no residential fuel oil emissions were calculated for summer months.

The base year statewide annual fuel oil demand for energy, obtained from the NC Energy Outlook 2003, was converted British Thermal Units (BTUs) to gallons of fuel used for each heating classification (i.e., residential, commercial, and industrial). The conversion factors used were obtained from the NC Energy Outlook 2003 and are 135,000 BTU per gallon of kerosene, 138,690 BTU per gallon of distillate oil, and 149,690 BTU per gallon of residual oil.

Once converted to gallons of fuel, the statewide fuel use was then apportioned to the county level. This was accomplished by multiplying the number of gallons of fuel used in the state by the fraction of housing units heated by fuel oils in the county compared to that of the whole state (see the equation below).

$$\text{\# gal. fuel for County X} = (\text{\# gal. fuel oil for State}) \times \frac{(\text{\# housing units heated by fuel oil in County X})}{(\text{\# housing units heated by fuel oil in State})}$$

The fraction of housing units was used to distribute the fuel on a county level for the residential heating classifications. The number of housing units heated by fuel oils was obtained from the 2000 Census.

Commercial and industrial fuel usage was apportioned according to the number of business establishments in the State and counties. The numbers were taken from 1997 (last year of SIC based statistics) County Business Patterns. Establishments with SICs from 50*xx* through 99*xx* were summed. Industrial sources were calculated in a manner similar to commercial sources burning oil or coal.

For residential, commercial and industrial consumption, NOx and VOC emission factors were obtained from AP-42, Table 1.3-1 and Table 1.3-3, respectively. The residential emission factors were 0.018 pounds of NOx per gallon of fuel burned and 0.000713 pounds of VOC per gallon of fuel burned. The commercial emission factors were 0.037 pounds of NOx per gallon of fuel burned and 0.000735 pounds of VOC per gallon of fuel burned. The commercial emission factors were 0.039 pounds of NOx per gallon of fuel burned and 0.00024 pounds of VOC per gallon of fuel burned.

According to the Procedures document, Table 5.8-1, the activity days per week is 7 for residential heating and 6 for commercial and industrial heating. These values were used to calculate the emissions in tons per year for the base year.

Point source emissions with SCC 1-03-004-xx and 1-03-005-xx identified commercial residual oil and distillate oil emissions, respectively; while source emissions with SCC 1-02-004-xx and

1-02-005-xx identified industrial residual and distillate oil emissions, respectively. The point source emissions in tons per year were subtracted from the area source emissions.

3.4.4.2 Coal Combustion

There are three types of coal used for space heating: anthracite, bituminous and lignite. According to AP-42, anthracite, or hard coal, is mined almost exclusively in Pennsylvania and is consumed in Pennsylvania and in states that are within easy shipping distance. In addition, lignite coal is mined in North Dakota and Texas and is consumed near where it mined. Since the incidence of anthracite and lignite coal burning is low in North Carolina, the emissions from coal combustion were calculated utilizing only the emission factors for bituminous coal.

It was assumed that residential coal is normally used only for heating and therefore, no residential coal emissions were calculated for summer months.

The base year statewide annual coal demand for energy, obtained from the NC Energy Outlook 2003, were converted from BTU to tons of coal used for each heating classification (i.e., residential, commercial, and industrial). The conversion factor used was 21,100,000 BTU per ton of coal.

Once converted to tons of coal, the statewide coal use was then apportioned to the county level. This was calculated by multiplying the number of tons of coal used in the state by the fraction of housing units heated by coal in the county, compared to that of the whole state (see the equation below).

$$\text{\# ton of coal for County X} = (\text{\# ton of coal for State}) \times \frac{(\text{\# housing units heated by coal in County X})}{(\text{\# housing units heated by coal in State})}$$

The fraction of housing units was used to distribute the coal on a county level for both heating classifications. The number of housing units heated by coal was obtained from the Federal Bureau of the Census and the 2003 NC State Energy Plan (http://www.doa.state.nc.us/doa/energy).

There were several emission factors for bituminous coal combustion listed in AP-42, Table 1.1-3. For the purpose of estimating the emissions from coal combustion, the equipment listed in AP-42, Table 1.1-3 were grouped into industrial, commercial/institutional and residential type equipment. The emission factors were averaged for each type and the averaged emission factors were used to calculate the emissions. Table 3.4.4.2-1 lists the averaged emission factors used in the calculations. It should be noted that fluidized bed combustors (FBC) were not included in the averaged emission factors because FBC does not constitute a significant percentage of the total boiler population, according to AP-42, Section 1.1. The Procedures document, Table 5.8-1, lists the activity days per week as 7 for residential heating and 6 for commercial and industrial heating. Point source emissions with SCC 1-03-002-xxidentified commercial coal combustion emissions. The point source annual emissions in tons per year were subtracted from the area source emissions.

Table 3.4.4.2-1 Coal Combustion Emission Factors

Application/Equipment Type	Emission Factor (lb NOx/ton Coal)	Emission Factor (lb VOC/ton Coal)
Industrial Applications		
Averaged Emission Factor	14.9	0.07
Commercial Applications		
Averaged Emission Factor	15.8	0.07
Residential Applications		
Hand-fed units	9.1	0.07

Residential Coal Combustion Emissions:

$$\text{Pollutant emitted by coal combustion} = \frac{(\#\ \text{tons/year Coal}) \times EF}{(2000\ \text{pounds/ton})}$$

Commercial Coal Combustion Emissions:

$$\text{Pollutant emitted by coal combustion} = \frac{(\#\ \text{tons/year Coal}) \times EF}{(2000\ \text{pounds/ton})}$$

Industrial Coal Combustion Emissions:

There is no industrial coal combustion in the area source inventory because it is included in the point source emissions inventory.

3.4.4.3 Natural Gas Combustion

Currently in the United States, natural gas is one of the major types of fuels used for heating. It is mainly used for industrial process stream and heat production, commercial and residential space heating and for electric power generation. Although natural gas is a relatively clean burning fuel, some emissions can result from its combustion.

The base year statewide annual demand for natural gas energy, obtained from the NC Energy Outlook 2003, was converted from BTU to 10^6 cubic feet of natural gas used for each heating classification (i.e., residential, commercial, and industrial). The conversion factor used was 1,000 BTU per cubic foot of natural gas.

Once converted to cubic feet of natural gas, the statewide natural gas use was then apportioned to the county level. This was calculated by multiplying the number of cubic feet of natural gas used in the state by the fraction of housing units heated by natural gas in the county, in comparison to the state (see the equation below).

$$\#\ ft^3 \text{ nat gas for County X} = (\#\ ft^3 \text{ nat gas for State}) \times \frac{(\#\text{ housing units heated by nat gas in County X})}{(\#\text{ housing units heated by nat gas in State})}$$

The fraction of housing units was used to distribute the natural gas usage on a county level for each heating classification. The number of housing units heated by natural gas was obtained from the 2000 Census.

The North Carolina Utilities Commission provided data from the U.S. Department of Energy, Energy Information Administration giving monthly usage of natural gas by residential and commercial customers in North Carolina for 2002.

There were several emission factors listed for industrial and commercial natural gas boilers in AP-42, Table 1.4-1. For the purpose of estimating the emissions from natural gas combustion, an average of the emission factors were used. Table 3.4.4.3-1 lists averaged emission factors used in the calculations. According to the Procedures document, Table 5.8-1, the activity days per week is 7 for residential heating and 6 for commercial and industrial heating. These values were used to calculate the annual emissions in tons per year for the base year.

Point source emissions with SCC 1-03-006-xxx and 1-02-006-xxx, identified commercial and industrial natural gas combustion emissions, respectively. Where point source emissions were indicated, these were deducted from the 2002 annual emission estimates.

Table 3.4.4.3-1 Emission Factors for Natural Gas

Application/Equipment Type	Emission Factor ($lb\ NOx/10^6\ ft^3$)	Emission Factor ($lb\ VOC/10^6\ ft^3$)
Industrial Applications		
Averaged Emission Factor	163.33	4.96
Commercial Applications		
Averaged Emission Factor	167.5	5.5
Residential Applications		
Uncontrolled	94	5.5

Residential Natural Gas Combustion Emissions:

$$\text{Pollutant emitted by Nat. gas combustion} = \frac{(\#\ ft^3/\text{year natural gas}) \times EF}{(2000\ \text{pounds/ton})}$$

Commercial Natural Gas Combustion Emissions:

$$\text{Pollutant emitted by Nat. gas combustion} = \frac{(\#\ ft^3/\text{year natural gas}) \times EF}{(2000\ \text{pounds/ton})}$$

Industrial Natural Gas Combustion Emissions:

$$\text{Pollutant emitted by Nat. gas combustion} = \frac{(\#\ ft^3/\text{year natural gas}) \times EF}{(2000\ \text{pounds/ton})}$$

3.4.4.4 Liquefied Petroleum Gas Combustion

Liquefied petroleum gas (LPG) consists of propane, propylene, butane, and butylenes. The largest market for LPG is the domestic/commercial market, followed by the chemical industry and agricultural markets. LPG is also used as a stand-by fuel for facilities that have natural gas service contracts that can be interrupted. The form of LPG used primarily for domestic heating is propane. Liquefied petroleum gas is considered a clean fuel because it does not produce visible emissions. However, gaseous pollutants such as VOC do occur.

The base year statewide annual LPG demand for energy, obtained from the NC Energy Outlook 2003, was converted from BTU to 10^3 gallons of LPG used for each heating classification (i.e., residential, commercial, and industrial). The conversion factor was 95,475 BTU per gallon of LPG.

Once converted to gallons of LPG, the statewide LPG use was then apportioned to the county level. This was accomplished by multiplying the number of gallons of LPG used in the state by the fraction of housing units heated by LPG in the county compared to that of the whole state (see the equation below).

$$\text{\# gal LPG for County X} = (\text{\# gal LPG for State}) \times \frac{(\text{\# housing units heated by LPG in County X})}{(\text{\# housing units heated by LPG in State})}$$

The fraction of housing units was used to distribute the LPG usage on a county level for each heating classification. The number of housing units heated by LPG was obtained from the 2000 Census.

The North Carolina Utilities Commission provided data from the U.S. Department of Energy, Energy Information Administration giving monthly usage of LPG by residential and commercial customers in North Carolina for 2002.

The emission factors listed in AP-42, Table 1.5-1 were averaged for industrial and commercial sources. There is no residential LPG emission factor listed in AP-42. Since the form of LPG used primarily for domestic heating is propane, the commercial propane emission factor was used for residential LPG combustion. The emission factors listed in AP-42, as well as the average emission factors used for estimating the emissions from LPG combustion are listed in Table 3.4.4.4-1. According to the Procedures document, Table 5.8-1, the activity days per week is 7 for residential heating and 6 for commercial and industrial heating. Point source emissions with SCC 1-03-006-xxx and 1-02-006-xxx, identified commercial and industrial natural gas combustion emissions, respectively. Where point source emissions were indicated, these were deducted from the 2002 annual emission estimate.

Residential LPG Emissions:

$$\text{Pollutant emitted by LPG combustion} = \frac{(\text{\# gal/year LPG}) \times EF}{(2000 \text{ pounds/ton})}$$

Commercial LPG Combustion Emissions:

Pollutant emitted by= $\frac{\text{(\# gal/year LPG) x EF}}{\text{(2000 pounds/ton)}}$
LPG combustion

Industrial LPG Combustion Emissions:

Pollutant emitted by= $\frac{\text{(\# gal/year LPG) x EF}}{\text{(2000 pounds/ton)}}$
LPG combustion

Table 3.4.4.4-1 Emission Factors for Liquefied Petroleum Gas

Application/Fuel Type	Emission Factors (lb /gallon)		
	Industrial	*Commercial*	*Residential*
Butane	0.021	0.015	
Propane	0.019	0.014	0.014
Averaged NOx Emission Factor	0.02	0.0145	
Butane	0.0004	0.0004	
Propane	0.0003	0.0003	0.0003
Averaged VOC Emission Factor	0.00035	0.00035	

3.4.4.5 Wood Combustion

The use of wood as a source of heat occurs in the residential and industrial sectors. It was assumed that residential wood is normally used only for heating and therefore, no residential wood emissions were calculated for summer months. The burning of wood waste in boilers is mostly confined to those industries where the wood is available as a byproduct. Most often this is in the lumber, furniture and plywood industries. These types of industries are included in the point source inventory, therefore, no area source emissions will be calculated for industrial wood combustion. Wood stoves, commonly used in residences as space heaters, are used both as the primary source of heat and as a supplement to conventional heating systems.

The base year statewide annual wood demand for energy, obtained from the NC Energy Outlook 2003, was converted from BTU to tons of wood used for residential heating. The conversion factor was 4,500 BTU per pound of wood, which is the mid-point of the range (4,000 to 5,000 BTU per pound of wood) given in AP-42, Section 1.6.

Once converted to tons of wood, the statewide wood use was then apportioned to the county level. This was accomplished by multiplying the number of tons of wood use in the state by the fraction of housing units heated by wood in the county compared to that of the whole state (see the equation below).

$$\#\text{ tons Wood for County X} = (\#\text{ ton Wood for State}) \times \frac{(\#\text{ housing units heated by Wood in County X})}{(\#\text{ housing units heated by Wood in State})}$$

The fraction of housing units was used to distribute the wood usage on a county level. The number of housing units heated by wood was obtained from the 2000 Census.

Wood combustion emission factors are 229 lb/ton burned and 2.6 lb/ton burned for VOC and NOx, respectively. The residential wood combustion emission factors were obtained from the Table 2.4-1 of the EIIP Tech. Report, Volume III, Chapter II. According to the Procedures document, Table 5.8-1, the activity days per week is 7 for residential heating.

Wood Combustion Emissions:

$$\text{Pollutant emitted by Wood combustion} = \frac{(\#\text{ ton/year Wood}) \times EF}{(2000\text{ pounds/ton})}$$

3.4.4.6 Small Electric Utility Boilers

This source subcategory has been treated as a point source since the information was available for each facility.

3.4.5 Vehicle Fires

Vehicle fire emissions within the State demonstration area are estimated by considering the estimated number vehicles burned in the State, the amount of material burned (the fuel loading) in a vehicle fire, and the emission factors for the open burning of automobile components. The assumptions for amount of material burned and the emission factors were based on the USEPA's AP-42, Section 2.5 Open Burning.

The estimated number of vehicle fires was determined by apportioning a national fire statistic to a county level. The USFA of the Department of Homeland Security maintains national-level fire statistics. The number of fires nationwide in 2002 was 1,734,500 and was available from the USFA website at http://www.usfa.fema.gov/statistics/national/. The percentage of vehicle fires was applied to the national-level total number of fires. The number of national-level vehicle fires was then apportioned to a state-level. The ratio of North Carolina vehicle miles traveled (VMT) to U.S. VMT (92,894,000,000 VMT / 2,855,756,000,000 VMT) was applied to the number of national-level vehicle fires to obtain the number of North Carolina vehicle fires. The VMT statistics were obtained from the U.S. Department of Transportation, Federal Highway Administration website at http://www.fhwa.dot.gov/policy/ohim/hs02/vm2.htm. The number of state-level vehicle fires was then apportioned to a county level based on paved mile per county in 2002. Paved mile per county data was obtained from the NCDOT. Using the above method, 2002 vehicle fire emissions were calculated.

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

The emission factors were obtained from Table 2.5-1, Emission Factors for Open Burning of Municipal Refuse, of the USEPA's AP-42, Section 2.5 Open Burning. The emission factors are 32 pounds of VOC per ton burned and 4 pounds of NOx per ton burned.

The emissions for the base inventory were calculated using equation 3.4.5-1.

$$EM_P = \frac{(\#\text{ of Vehicle Fires per year}) \times (CF) \times (EF_P)}{(2000\text{ lb/tons})} \qquad 3.4.5\text{-}1$$

where EM_P = annual emissions for structure fires for pollutant (P)
CF = Conversion factor, 0.25 tons burned/vehicle fire
EF_P = emission factor for pollutant (P)

3.4.6 Agricultural Burning

This source subcategory covers burning practices used to clear and/or prepare land for planting. These operations include stubble burning, burning of agricultural crop residues, and the burning of stand field crops as part of harvesting (e.g., sugar cane). 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, one fourth of the acreage of wheat planted in 2002 was used to calculate the emissions from agricultural burning practices in North Carolina.

The fuel loading factor and the yield of VOC for burning wheat stubble was obtained from AP-42, Table 2.5.5. The fuel loading factor is 1.9 tons of fuel consumed per acre burned. The yield of VOC 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 VOC used, 11 pounds 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.

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

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.

The number of acres of wheat planted was obtained from the North Carolina Department of Agriculture, Agriculture Statistics Division. The emissions for the 2002 base year inventory were calculated using equation 3.4.6-1.

$$EM = \frac{(\frac{1}{4} \times \text{(wheat acreage)}) \times EF}{\text{(2000 lb/ton)}} \qquad 3.4.6\text{-}1$$

where EM = emissions for source category for VOC
EF = emission factor for VOC

3.4.7 On Site Incineration

On-site incineration is the confined burning of waste leaves, landscape refuse and other refuse or rubbish. In North Carolina, commercial/institutional and industrial incinerators are required to have an Air Quality Permit in order to operate. Therefore, all industrial incinerators are identified in the point source inventory. There may be small commercial/institutional incinerators that have not been identified in the point source inventory and as a result emissions were calculated for commercial on-site incinerators.

No data was available to determine the amount of waste burned in on-site incinerators. Therefore, the amount of solid waste burned was estimated with the fuel loading factor (L) given in Table 4.6-1 of the Procedures document. The commercial fuel loading factor is 23 tons of refuse/1,000 population/year. The yield for commercial incineration was obtained from several sources. The yield of NOx (P) was obtained from AP-42, Table 2.1-12 and is listed in Table 3.4.7-1. The yield value used for NOx was the average of the yield values listed in AP-42.

The yield of VOC is 8.556 lb/ton of refuse and was obtained from EIIP Technical Report, Open Burning, Table 16.4-1.

Table 3.4.7-1 Yield of Pollutant Values for Uncontrolled Refuse Combustors

Pollutant	Multiple Chamber Combustor Yield Value (lb/ton refuse burned)	Single Chamber Combustor Yield Value (lb/ton refuse burned)	Yield Value (lb/ton refuse burned)
NOx	3	2	2.5 (average)
VOC	-	-	8.556

To calculate the per capita pollutant emission factor (EF) for on-site commercial incinerators, the fuel loading factor was multiplied by the yield of the pollutant, as shown in the following equation.

$EF_P = L_{COMMERCIAL} \times P_{INCINERATION}$

$= \text{(23 tons of refuse/1000 population/year) x (2.5 lb NOx/ton of refuse burned)}$

$= \text{57.5 lb NOx/1000 population/year}$

The emissions from commercial on-site incineration for the base year 2002 inventory were calculated using equation 3.4.7-1.

$$EM_P = \frac{\text{(Rural Population in 2002)} \times (EF_P)}{\text{(2000 lb/tons)}} \qquad 3.4.7\text{-}1$$

where EM_P = emissions from on-site incineration for pollutant (P) in tons/year

EF_P = emission factor for pollutant (P)

The population was obtained from the 2000 census data. The 2000 census data was the latest data available. According to the Procedures document, on-site incineration occurs uniformly year round and operates 7 days per week. Point source emissions with SCC 5-xx-xxx-xx identified waste incineration emissions. The point source emissions in tons per year were subtracted from the area source emissions.

4. VISTAS DEVELOPED 2002 AREA SOURCE INVENTORY

Section 4.0 details the portion of the 2002 base year area source inventory, which was developed for VISTAS/ASIP by the VISTAS contractor, MACTEC, Inc. This information was obtained from the report entitled *Documentation of the Base G 2002 Base Year, 2009, and 2018, Emission Inventories for VISTAS* prepared for VISTAS by MACTEC, Inc. This report is included in Appendix Q.

Several major components of the area source sector of the inventory, which were developed by VISTAS, are discussed in Sections 4.1 through 4.3. Stage II emissions are discussed in Section 4.1 and were removed from the area source inventory and included in the mobile sector of the inventory. Also, emissions from portable fuel containers were added and are discussed in Section 4.2. Section 4.3 describes the development of the fires emissions inventory and distinguishes the difference between an actual versus typical inventory with regards to fires.

The following Sections are based on excerpts, with some editing, taken from a document entitled, *Documentation of the Base G 2002 Base Year, 2009 and 2018 Emission Inventories for VISTAS* and prepared by MACTEC, Inc.

4.1 Vehicle Refueling (Stage II) emissions

For the 2002 inventory, the VISTAS/ASIP States all agreed to remove the Stage II refueling emissions from the area source inventory and include them in the non-road and on-road sectors.

4.2 Portable Fuel Containers

Portable fuel containers (PFCs), SCC 2501060300, covers emissions from residential and commercial sector portable gasoline containers. Permeation, diurnal, transport, spillage, and vapor displacement emissions are typically accounted for in this category. Spillage from refueling operations and vapor displacement emissions were not included in the inventory to avoid double counting refueling in the non-road sector.

MACTEC found that the USEPA had prepared a national inventory of emissions by State for portable fuel containers. Data on emissions from this source prepared by the USEPA were presented in the report, *Estimating Emissions Associated with Portable Fuel Containers (PFCs), Draft Report*, Office of Transportation and Air Quality, USEPA, Report # EPA420-D-06-003, February 2006.

The 2002 county-level emission estimates were obtained through an allocation method based on fuel usage. Initially, 2005 emission estimates, except those from vapor displacement and spillage from refueling operations, were obtained from the USEPA's report and assumed to be equal to 2002 values. Permeation, diurnal, and transport emission estimates were summed and allocated to the county-level, based on the fuel usage information obtained from the NONROAD2005 model. The SCCs that use containers for refueling were acquired from the spillage file of the NONROAD model. Then the fuel usages by county from the NONROAD 2005 runs prepared for VISTAS/ASIP were summed for those SCCs by county. The county level fuel use was then divided by the State total fuel use for the same SCCs to determine the fraction of total State fuel usage and that fraction was used to allocate the State-level emissions to the county.

4.3 Forest Fires

The fires source category includes wildfire, prescribed burning, and land clearing fires. These fires can be intermittent in nature, but many of these can produce large quantities of air pollutant emissions. Wildfires in certain rural areas can produce large, short-term organic emissions. Prescribed burning is used a as a forest management practice to establish favorable seedbeds, remove competing underbrush, accelerate nutrient cycling, control tree pests and contribute other ecological benefits. Agricultural burning covers agricultural burning practices used to clear and/or prepare land for planting. In land clearing fires, waste from logging operations is often burned under controlled conditions to reduce the potential fire hazards in forests and to remove brush that can serve as a host for destructive insects.

The total wildfire acreage burned was obtained from the NCDFR for each county in the State. These numbers however are replaced with the 2002 "typical" year for the purpose of modeling. Fire emissions are not easily grown or projected. Thus, the replacement was done so that the fires represented in the area source inventory are considered typical and do not reflect an abnormally low or high year as far as fires. The typical year forest fire inventories were developed by MACTEC, Inc. with input from state and federal forest resource staff. The typical year covered wildfire, prescribed burning, agricultural fires and land clearing fires. The development of the typical year inventory is described below.

State level ratios of acres over a longer-term record (three or more years) developed for each fire type relative to 2002. The 2002 acreage was then scaled up or down based on these ratios to develop a typical year inventory. VISTAS Fire Special Interest Work Group based the ratio on county-level data for States that supplied long-term fire-by-fire acreage data rather than State-level ratios. Where States did not supply long-term fire-by-fire acreage data, MACTEC reverted to using State-level ratios. With one broad exception (wildfires) this method was implemented for all fires. MACTEC solicited long term fire-by-fire acreage data by fire type from each VISTAS State. A minimum of three or more years of data were used to develop the ratios. Those data were then used to develop a ratio for each county based on the number of acres burned in each county for each fire type relative to 2002.

If VISTAS had long term county prescribed fire data from a State, a county acreage ratio, described below, was developed.

$$Ratio = \frac{\text{Long term average county level Rx acres}}{\text{2002 actual county level Rx acreage}}$$

This ratio was then multiplied times the actual 2002 acreage to get a typical value (basically the long term average county level acres). Wherever possible this calculation was performed on a fire-by-fire basis. The acreage calculated using the ratio was then used with the fuel loading and emission factor values to calculate emissions.

There were three exceptions to this method.

Exception 1: Use of State Ratios for Wildfires

Wildfires estimates were developed using State ratios rather than county ratios because some counties were showing unrealistic ratios, which were created by very short term data records or missing data. In addition, exceptionally large and small fires were removed from the database. VISTAS also removed all fires less than 0.1 acres from the dataset.

Exception 2: Correction for Blackened Acres on Forest Service Lands

Acres, submitted by the U.S. Forest Service (USFS) for wildfires and prescribed fires on USFS lands, represented perimeter acres rather than “blackened” acres. Therefore, for prescribed fires greater than 100 acres in size, the acreage was adjusted to be 80 percent of the initial reported value. For prescribed fires of 100 acres or less, the acreage values were maintained as reported. All reported acreage values for wildfires were adjusted to be 66 percent of their values, as initially reported.

Exception 3: Missing/Non-reported data

When VISTAS did not receive data from a VISTAS State for a particular fire type, a composite average for the entire VISTAS region was used to determine the typical value for that type fire. This technique was applied to all fire types when data was missing.

For wildfires and prescribed burning, ratios were also developed for “northern” and “southern” tier States within the VISTAS region and those ratios were applied to each State with missing data depending upon whether they were considered a “northern” or “southern” tier State. Development of “southern” and “northern” tier data was an attempt to account for a change from a predominantly pine/evergreen ecosystem (southern) to a pine/deciduous ecosystem (northern).

Table 4.3-1 below presents a comparison in tons per year of the 2002 actual fire emissions and the 2002 typical fire emissions for NOx and VOC for wildfires, prescribed burning, agricultural fires and land clearing fires in North Carolina.

Table 4.3-1 2002 North Carolina Actual and Typical Fire Emissions

	Actual Fire Emissions		**Typical Fire Emissions**	
Fire Type	**NOx (TPY)**	**VOC (TPY)**	**NOx (TPY)**	**VOC (TPY)**
Wildfires	458.18	1005.04	733.62	1609.22
Prescribed Burning	282.28	619.19	810.38	1777.61
Agricultural Fires	-	1123.38	-	1609.22
Landclearing Fires	3460.84	8029.08	3460.84	8029.08

5. 2009 AREA SOURCE EMISSION INVENTORY DEVELOPMENT

This Section describes the methodology used to develop the 2009 area source inventory. Separate methods for projecting emissions were used for non-agricultural (stationary area), agricultural area sources and forest fire area sources. The agricultural area sources method are for ammonia emissions and are not related to ozone formation, therefore it will not be discussed in this documentation. Since ammonia is important for regional haze and fine particulate matter, the method for projecting agricultural area sources will be detailed in the respective State Implementation Plans.

The following Sections are based on excerpts, with some editing, taken from a document entitled, *Documentation of the Base G 2002 Base Year, 2009 and 2018 Emission Inventories for VISTAS* and prepared by MACTEC, Inc.

5.1 Projection of Stationary Area Sources

VISTAS 2002 base year inventory emissions were used as a starting point for calculating 2009 emissions. MACTEC, Inc. first back calculated uncontrolled emissions from the 2002 base year inventory. Growth and control factors were then applied based on controls initially identified for the Clean Air Interstate Rule (CAIR) and growth factors identified for the CAIR projections. In some cases, Economic Growth Analysis System version 5.0 (EGAS 5.0) growth factors were used if no growth factor was available from the CAIR growth factor files.

The 2009 growth factors were obtained from the USEPA growth factors and indirectly from 2010 and 2015 CAIR growth factors. Using a 2001 base year, interpolation of 2010 and 2015 CAIR growth factors yielded 2009 growth factors. MACTEC used the TREND function of Microsoft Excel for interpolation. Interpolated growth factors were calculated at the State and SCC level.

In a few cases, additional growth factors had to be added for sources that had not initially been included in a draft 2002 inventory. These growth factors were obtained from EGAS 5.0. Finally updates to growth factors from EGAS 5.0 were made for fuel fired emission sources. The updated growth factors reflected the most recent data from the Department of Energy's Annual Energy Outlook (AEO). These data were used to reflect changes in energy efficiency resulting from new or updated fuel firing technologies.

North Carolina provided 2009 updated emission files used to update the emissions for each year for several source categories. However not all sources in the inventory were included in these North Carolina updates. As a consequence, the final 2009 inventory for North Carolina included emissions updated using the North Carolina supplied files and emissions developed using growth and control factors as outlined above.

5.2 Projection of Forest Fires Area Sources

Several Federal agencies indicated that they had plans for increased prescribed fire burning in future years and that the "typical" fire inventory would likely not adequately capture those increases. Thus, MACTEC acquired the data necessary to provide 2009 specific projections for the prescribed fire component of the fire inventory.

The U.S. Fish and Wildlife Service (USFWS) submitted annual acreage data by National Wildlife Refuge (NWR) and by county with estimates of acres burned per day for each NWR. USFS provided fire-by-fire acreage estimates based on mapping projected burning acreage to current 2002 modeling days. However, USFWS did not submit data for VISTAS original base year preparation process, thus there was no known USFWS data in the 2002 actual or typical inventories. MACTEC therefore developed a method that could use the county-level data submitted by USFWS.

Several VISTAS/ASIP States run a prescribed fire-permitting program. To avoid double counting, only State data and not USFWS or USFS data was used in those States for the 2002 actual inventory.

The method used by MACTEC to include the USFS data applied a county level data approach for USFS data where a State had a prescribed fire permitting program and a fire-by-fire replacement for USFS data in States without permit programs. MACTEC used a county level approach for all of the USFWS data. The approach used for each data set is discussed below.

For USFWS data, 2002 annual county acres burned was subtracted from the USFWS projected acreage. A 0.8 factor was applied to the difference to account for blackened acres instead of the total perimeter acres that were reported. The revised total additional USFWS acreage was then added to the total county "typical" acreage to determine future acreage burned for 2009.

MACTEC then allocated the increased acreage to current modeling days. The average daily acres burned data provided by USFWS per NWR/county was used to allocate the acreage to the correct number of days required to burn all of the acres. Guidance supplied by USFWS indicated that up to three times the average daily acres burned could potentially be allocated to any one day.

For the USFS fire-by-fire acreage estimates, MACTEC summed the USFS data at a county-level for States that had permit programs, then added the sum to the typical acreage and allocated the acres to current modeling days. For States that do not have a State prescribed fire permit program, MACTEC simply replaced the current fire-by-fire records in the database with fire-by-fire records from the USFS and recalculated emissions based on fuel model and fuel loading. VISTAS also applied the same 0.8 correction for blackened acres applied to all USFS supplied acreage as the supplied values represented perimeter acres.

An additional problem with developing year-specific prescribed fire projections was how to adequately capture the temporal profile for those fires. In the 2002 actual fire inventory, fires occur on same days as state/FLM records. In the 2002 "typical" year inventory, fire acreage increased or decreased from acreage on the same fire days as were in the 2002 actual inventory, since the acres were simply increased for each day based on a multiplier used to convert from actual to typical.

When prescribed fires acreage was added to a future year, MACTEC added acreage to individual fire days proportional to the annual increase (if acreage on a day is 10 percent of annual, add 10 percent of projected increase to that same day).

6. VISTAS DEVELOPED 2002 NONROAD MOBILE SOURCE INVENTORY

Development of emission estimates for nonroad mobile sources is documented in the MACTEC, Inc. document titled *Documentation of the Base G 2002 Base Year, 2009 and 2018, Emission Inventories for VISTAS*.

Nonroad mobile sources are those sources that can move but do not use the highway system. Examples include lawn mowers, agricultural equipment, construction equipment, aircraft engines, railroad locomotives, powerboats, and commercial marine (ships). All but the aircraft engine, railroad locomotive emissions and commercial marine activity were estimated using the USEPA's off-road mobile model NONROAD2005c, which was released March 21, 2006. Direct emissions are generated with this model. This version incorporates all the USEPA final nonroad mobile engine emission standards, including the recreational and large spark-ignition engines rules that were published in the Federal Register in November 2002. Although this model is considered to be a final model, an updated version is planned that may incorporate revised inputs for the small spark-ignition (SI) (<19 kW) and recreational marine SI categories in conjunction with additional promulgated nonroad mobile engine standards.

Nonroad mobile sources calculated through the NONROAD model are discussed in Section 6.1 Aircraft, railroad and commercial marine emissions are discussed in Sections 6.2 through 6.4.

6.1 NONROAD Model Sources

The nonroad mobile source category includes a diverse collection of equipment such as lawn mowers, chain saws, tractors, all terrain vehicles, fork lifts and construction equipment. The USEPA NONROAD2005c model generates emissions directly and includes more than 80 different types of equipment. To facilitate analysis and reporting, the USEPA grouped the equipment types into ten equipment categories. These include:

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

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

One of the default input files was edited to reflect North Carolina specific information. In the "SEASON.DAT" file, the region representative of North Carolina was changed from Mid-Atlantic to Southeast. This was done after an evaluation of the meteorological data in the two files and comparing it to that of Charlotte. Default data was used for the remaining input files used in the NONROAD model.

6.2 Aircraft Engines

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

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

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

Emission factors are available for the many aircraft and engine combinations that exist. Factors for each aircraft exist for four operating modes in the LTO cycle. Emissions are calculated by obtaining data for the number of LTO cycles of the various aircraft at each airport in question, multiplying by the appropriate factors, and summing the results for the year under consideration.

Development of the 2002 aircraft emissions are described in the MACTEC document titled *Documentation of the Base G 2002 Base Year, 2009 and 2018 Emission Inventories for VISTAS* . This document refers back to a document titled *"Development of the VISTAS Draft 2002 Mobile Source Emission Inventory (February 2004 Version)"* prepared by E.H. Pechan & Associates, Inc. Both of these documents are included in Appendix Q.

The starting point for development of aircraft emissions estimates is the 1999 National Emission Inventory (1999 NEI) prepared by the USEPA. These emissions were grown to appropriate values for 2002 and 2009 using growth factors developed by the USEPA for the CAIR. Along the way there was input by the various States including North Carolina to arrive at more accurate emission estimates.

6.3 Railroad Locomotives

Railroads are categorized by size (Class I, Class 2) and passenger service (Amtrak and North Carolina Department of Transportation (NCDOT) Rail Division). Class I railroads are long haul operations, consisting of Norfolk Southern Corporation and CSX Corporation in North Carolina. Class II and Class III railroads are short lines, serving localized markets. Passenger service is provided by Amtrak and the NCDOT Rail Division in North Carolina. These entities lease trackage from Class I railroads.

Development of railroad emissions is described in the MACTEC document titled *Documentation of the Base G 2002 Base Year, 2009 and 2018 Emission Inventories for VISTAS*. The VISTAS/ASIP railroad emission estimates started with 1999 emission estimates developed for the USEPA's 1999 NEI Version 2 as base year estimates for the VISTAS region. Additional information is provided in *"Development of the VISTAS Draft 2002 Mobile Source Emission Inventory (February 2004 Version)"* prepared by E.H. Pechan & Associates, Inc.

Projected emissions for 2002 were developed in two steps as described below. For 1999 to 2001, State-level rail fuel consumption was obtained from the Department of Energy, Energy Information Administration's (EIA's) *Fuel Oil and Kerosene Sales.* For 2001 to 2002, VISTAS applied national growth factors developed from fuel consumption projections in EIA's *Annual Energy Outlook.* A growth factor of 1.4 was used for locomotives and applied to 1999 emissions to first develop 2001 emissions. Table 6.3-1 lists the growth factors used to generate 2002 emissions.

Table 6.3-1 2002 National Rail Transportation Energy Use by Fuel Type (Trillion BTU)

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

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

6.4 Commercial Marine Vessel (CMV)

The following description of development of commercial marine emission estimates is based on excerpts, with some editing, taken from the MACTEC document titled *Documentation of the Base G 2002 Base Year, 2009 and 2018 Emission Inventories for VISTAS* and a document titled *"Development of the VISTAS Draft 2002 Mobile Source Emission Inventory (February 2004 Version)"* prepared by E.H. Pechan & Associates, Inc

An initial 2002 base year emissions inventory for commercial marine vessels (CMV) was prepared for VISTAS in early 2004. The methods and data used to develop the inventory are presented in a February 9, 2004 report "*Development of the VISTAS Draft 2002 Mobile Source Emission Inventory (February 2004 Version)*" prepared by E.H. Pechan & Associates, Inc. Revisions to the initial 2002 emissions inventory (prepared by Pechan) were implemented to ensure that the latest State and local data were incorporated. For CMV, North Carolina provided no revised data.

For 2002 commercial marine vessels (CMVs), Pechan used 1999 emission estimates developed for the USEPA's 1999 NEI Version 2 as base year estimates for the VISTAS region. Pechan then improved the spatial distribution of CMV emission estimates for the VISTAS region.

Ideally, CMV emission estimates would be developed using local activity data that account for vessel type, engine type and mode of operation (cruise, maneuvering, and hotelling). Creating this type of "bottom-up" emission inventory requires a large amount of effort. Therefore, Pechan utilized port-specific emission estimates developed for the 1999 NEI, distributed using a revised allocation methodology, which incorporates information on the number of port facilities in each county.

The 2002 VISTAS commercial marine inventory is based on the USEPA's 1999 NEI Version 2.0, projected to 2002 using appropriate growth factors. The 1999 NEI estimated emissions for these categories according to the following SCCs:

SCC	Descriptor 1	Descriptor 3	Descriptor 6	Descriptor 8
2280002100	Mobile Sources	Marine Vessels, Commercial	Diesel	Port emissions
2280002200	Mobile Sources	Marine Vessels, Commercial	Diesel	Underway emissions
2280003100	Mobile Sources	Marine Vessels, Commercial	Residual	Port emissions
2280003200	Mobile Sources	Marine Vessels, Commercial	Residual	Underway emissions

For the 1999 NEI, commercial marine diesel emissions were developed by obtaining 2000 emission estimates for all pollutants except SO_2 from the USEPA's Office of Transportation and Air Quality (OTAQ) marine diesel regulatory background documentation (*Draft Regulatory Impact Analysis - Control of Emissions from Compression-Ignition Marine Engines*). To estimate emissions for 1999, 2000 estimates were backcast using growth factors obtained from the draft Regulatory Impact Analysis (RIA) cited above. Steam-powered residual CMV emission estimates were developed by obtaining fuel usage data from OTAQ and applying fuel-based emission factors. A similar method was used for diesel SO_2 emissions. National diesel usage was estimated assuming a sulfur content of 0.25 percent and USEPA emission factors.

In apportioning, distillate and residual fuels are considered separately. National diesel emissions were disaggregated into port and underway emissions estimates based on the assumption that 75 percent of distillate fuel is consumed within the port, while the remaining fuel is consumed while underway, consistent with USEPA guidance. National residual emissions were disaggregated into port and underway emissions estimates based on the assumption that 25 percent of residual fuel is consumed within the port, while the remaining fuel is consumed while underway.

To allocate to counties, port emissions were assigned to the 150 largest U.S. ports based on activity obtained from the U.S. Army Corps of Engineers (USACE). The percentage of total traffic for each port was calculated by dividing the port-level traffic by the total traffic. Emissions for each port were then assigned to a single county.

Underway emissions are assigned to counties based on a county's shipping lane traffic. The Bureau of Transportation Statistics' (BTS) *National Transportation Atlas Databases-1999* contains data on the thousand tons per mile traveled for each shipping lane link in the United States (BTS-CD26). Where navigable rivers form a county or State boundary, the shipping lane traffic is proportioned to individual counties based on the length of shoreline that is shared. For example, if two counties share a navigable river, and both counties have the same length of shoreline, the shipping traffic is split evenly between the two counties. Shipping lanes that are not within counties, for example in the ocean, are associated to States based on BTS assignments. These waterway weights are then evenly distributed among the counties within these States that have navigable waterways. All shipping activity is summed at the county-level and compared with national shipping activity to determine what portion of activity can be attributed to individual counties. These proportions were used in disaggregating the national CMV emission estimates to the county level.

States that share borders with non-VISTAS States along the Mississippi and Ohio Rivers have expressed concern about the representativeness of port emission estimates at a county-level. Revising the county-level emissions estimates would allow more accurate modeling of emissions in the VISTAS states.

For underway emissions, Pechan believes that the allocation procedure results in a reasonable distribution of county-level emissions. However, the methodology to allocate port emissions results in all the emissions being assigned to a single county.

Port areas encompass multiple States and counties and in some cases, multiple waterways. Therefore, the emissions allocation process must incorporate all counties in the vicinity of the port where activity is occurring. This is especially true for inland rivers where activity takes place on both riverbanks and for ten river miles or more outside the port city. The revised methodology allocates port emissions based on a surrogate for port-related activity in each county, rather than using a single county to define the port.

The report, Waterborne Commerce of the United States, Calendar Year 1999, hereafter referred to as Waterborne Commerce, presents the cargo tonnage and number of vessel trips in major waterways of the United States. The report defines port areas, which USACE uses to develop the Top 150 Ports in the United States by amount of cargo tonnage. As discussed previously, the 1999 NEI allocates all the port emissions to these 150 ports based on the cargo tonnage handled by the port. Pechan uses this allocation of emissions to each port area as the starting point of its revised allocation process. Morehead City Harbor and the Port of Wilmington are the two main ports in North Carolina.

The next step was to develop a list of counties that make up the port area. Port area definitions were obtained from *Waterborne Commerce*. The port area definition for Morehead City Harbor port was “Morehead City Harbor, NC”. The port area definition for Wilmington City port was “Both banks of the Cape Fear River extending from a point about 18 miles below the foot of Castle St. in Wilmington to a point about 2 miles above the Railroad Bridge at Navassa, and both banks of Northeast (Cape Fear) River from its mouth to a point about 1.67 miles above the Hilton Railroad Bridge”. Using the port definitions by river mile, Pechan established which counties are included in each port area. The Port of Wilmington is included in the counties of Hanover and New Brunswick. The Morehead City Harbor is included in Carteret county.

The next step in allocating emissions is to develop a surrogate for the amount of CMV activity in each county of the port area. Pechan assumed that the activity of vessels in each county is related to the number of port facilities operating in a given county. Port facilities include terminals, piers, wharves, and docks that are involved in all types of commercial activity and support services. Pechan obtained the number of port facilities in each county from USACE reports, The Port Series Reports. The USACE periodically surveys the commercial marine industry to obtain information on port facilities and publishes it in The Port Series Reports. The reports give the name, location, operations, and describe the physical and inter-modal characteristics of the facilities. The data includes the location of the facility by river mile, State, and county.

For each port area, Pechan calculated the ratio between the number of port facilities in each county to the total number of facilities in all counties that make up the port area. This ratio was used to allocate emissions for each port area to the county-level. The ratio for Morehead City Harbor was 1.0 in Carteret county and the ratios for the Port of Wilmington were 0.8974 in New Hanover county and 0.1026 in Brunswick county. Pechan was directed to perform the reallocation for all VISTAS ports.

7. 2009 NONROAD MOBILE SOURCE EMISSION INVENTORY DEVELOPMENT

The subsections that follow describe the projection process used to develop 2009 nonroad mobile source projection estimates for sources found in the NONROAD model and those sources estimated outside of the model (locomotives, airplanes, and commercial marine vessels).

7.1 Projection of NONROAD Model Sources

NONROAD model input files were prepared based on the 2002 base year inventory input files with appropriate updates for the projection years. Other specific updates for the projection years for NONROAD model sources consist of:

1. Revise the emission inventory year in the model (as well as various output file naming commands) to be reflective of the projection year.

2. Revise the fuel sulfur content for gasoline and diesel powered equipment.

3. Implement a limited number of local control program changes (national control program changes are handled internally within the NONROAD model, so explicit input file changes are not required).

All equipment population growth and fleet turnover impacts are handled internally within the NONROAD model, so that explicit input file changes are not required.

The final NONROAD2005c that was used for inventory development is capable of handling separate diesel fuel sulfur inputs for land-based and marine-based nonroad mobile source equipment in a single model execution. The following diesel fuel sulfur values were used:

Diesel S (ppm)	2002	2009
Land-Based	2500	348
Marine-Based	2638	408

7.2 Projection of Non-NONROAD Model Sources

Using the 2002 base year emissions inventory for aircraft, locomotives, and CMV prepared as described earlier in this document, corresponding emission projections for 2009 were developed. The following description is largely taken from the MACTEC document titled *Documentation of* *the Base G 2002 Base Year, 2009 and 2018 Emission Inventories for VISTAS*. Briefly, the methodology relies on growth and control factors developed from inventories used in support of recent USEPA rulemakings, and consists of the following steps:

(a) Begin with the 2002 base year emission estimates for aircraft, locomotive, and CMV.

(b) Detailed inventory data (both before and after controls) for these same emission sources for 1996, 2010, 2015, and 2020 were obtained from the USEPA's CAIR Technical Support Document. Using these data, combined growth and control factors for the period 2002-2009 were estimated using straight line interpolation between 1996 and 2010 (for 2009). This is done at the State-county-SCC-pollutant level of detail.

(c) The USEPA growth and control data are matched against the 2002 VISTAS base year data using State-county-SCC-pollutant as the match key. Ideally, there would be a one-to-one match and the process would end at this point. Unfortunately, actual match results were not always ideal, so additional matching criteria were required. For subsequent reference, this initial (highest resolution) matching criterion is denoted as the "CAIR-Primary" criterion.

(d) A second matching criterion is applied that utilizes a similar, but higher-level SCC (lower resolution) matching approach. For example, SCC 2275020000 (commercial aircraft) in the 2002 base year inventory data would be matched with SCC 2275000000 (all aircraft) in the CAIR data. This criterion is applied to records in the 2002 base year emissions file that are not matched using the "CAIR-Primary" criterion, and is also performed at the State-county-SCC-pollutant level of detail. For subsequent reference, this is denoted as the "CAIR-Secondary" criterion. At the end of this process, a number of unmatched records continued to remain, so a third level matching criterion was required.

(e) In the third matching step, the most frequently used SCC in the USEPA CAIR files for each of the aircraft, locomotive, and commercial marine sectors is averaged at the State level to produce a "default" State and pollutant-specific growth and control factor for the sector. The resulting factor is used as a "default" growth factor for all unmatched county-SCC-pollutant level data in each State. In effect, State-specific growth data are applied to county level data for which an explicit match between the VISTAS 2002 base year data and the USEPA CAIR data could not be developed. The default growth and control SCCs are 2275020000 (commercial aircraft) for the aircraft sector, 2280002000 (commercial marine diesel total) for the CMV sector, and 2285002000 (railroad equipment diesel total) for the locomotive sector. Matches made using this criterion are denoted as “CAIR-Tertiary” matches.

(f) According to USEPA documentation, the CAIR baseline emissions include the impacts of the (then proposed) Tier 4 (T4) nonroad mobile diesel rulemaking, which implements a low sulfur fuel requirement that affects both future CMV and locomotive emissions. However, the impacts of this rule were originally intended to be excluded from the initial VISTAS 2018 forecast, which was to include only “on-the-books” controls. (The T4 rule was finalized subsequent to the development of the preliminary 2018 inventory in March of 2004.) Given its final status, T4 impacts have now been moved into the “on the books” inventory for nonroad mobile source equipment. In addition, since there are no other proposed rules affecting the nonroad mobile source sector between 2002 and 2018, there is no difference between the 2018 “on the books” and 2018 “on the way” inventories for the sector; so that only a single forecast inventory (for each evaluation year) was developed. Nevertheless, since the algorithms developed to produce the VISTAS forecasts were developed when there was a distinction between the “on the books” and “on the way” inventories, the distinct algorithms used to produce the two inventories have been maintained even though the conceptual distinctions have been lost. This approach was taken for two reasons. First, it allowed the previously developed algorithms to be utilized without change. Second, it allowed for separate treatment of the T4 emissions impact which was important as those impacts have changed between the proposed and final T4 rules. Thus, previous USEPA inventories that include the proposed T4 impacts would not be accurate. Therefore, the procedural discussion continues to reflect the distinctions between non-T4 and T4 emissions, as these distinctions continue to be intrinsically important to the forecasting process. Therefore, a second set of USEPA CAIR files that excluded the Tier 4 diesel impacts was obtained and the same matching exercise described above in steps (b) through (e) was performed using these “No T4” files. It is important to note that the matching exercise described in steps (b) through (e) cannot simply be replaced because the “No T4” files obtained from the USEPA include only those SCCs specifically affected by the T4 rule (i.e., diesel CMV and locomotives). So in effect, the matching exercise was augmented (rather than replaced) with an additional three criteria analogous to those described in steps (c) through (e), and these are denoted as the “No T4-Primary,” “No T4-Secondary,” and “No T4-Tertiary” criteria. Because they exclude the impacts of the proposed T4 rule, matches using the “No T4” criteria supersede matches made using the basic CAIR criteria (as described in steps (c) through (e) above).

(g) The CAIR matching criteria were overridden for any record for which States provided local growth data. Only North Carolina provided these forecasts, as North Carolina has provided specific growth factors for airport emissions in four counties. Because the provided data were based on forecasted changes in landings and takeoffs at major North Carolina airports, the factors were applied only to commercial (SCC 2275020000) and air taxi (SCC 2275060000) emissions. Emissions forecasts for military and general aviation aircraft operations, as well as all aircraft operations in counties other than the four identified in the North Carolina growth factor submission, continued to utilize the growth factors developed according to steps (b) through (f) above. The locally generated growth factor (2002 to 2009) applied in Mecklenburg County was 1.15.

(h) Using this approach, each State-county-SCC-pollutant was assigned a combined growth and control factor using the USEPA CAIR forecast or locally provided data. The 22,838 data records for aircraft, locomotives, and CMV in the 2002 base year emissions file were assigned growth factors in accordance with the following breakdown:

48	records matched State-provided growth factors,
4,179	records matched using the CAIR-Primary criterion,
240	records matched using the CAIR-Secondary criterion,
7,463	records matched using the CAIR-Tertiary criterion,
720	records matched using the No T4-Primary criterion,
3,858	records matched using the No T4-Secondary criterion, and
6,330	records matched using the No T4-Tertiary criterion.

(i) Finally, the impacts of the T4 rule as adopted were applied to the grown "non T4" emission estimates. The actual T4 emission standards do not affect aircraft, locomotive, or CMV directly, but associated diesel fuel sulfur requirements do affect locomotives and CMV. Lower fuel sulfur content affects both SO_2 and PM emissions. Expected fuel sulfur content was obtained for 2009 from the USEPA technical support document for the final T4 rule (*Final Regulatory Analysis: Control of Emissions from Nonroad Diesel Engines*, EPA420-R-04-007, May 2004). According to that document, the average diesel fuel sulfur content for locomotives and CMV is expected to be 408 parts per million by weight (ppmW) in 2009. This compares to expected non-T4 fuel sulfur levels of 2599 ppmW in 2009. Table 7.2-1 uses calculated emissions estimates for base and T4 control scenarios to estimate emission reduction impacts.

Table 7.2-1 Estimated Emission Reduction Impacts based on T-4 Rule

				2009
CMV SO_2	=	Non-T4 SO_2	×	0.1569
Locomotive SO_2	=	Non-T4 SO_2	×	0.1569
CMV PM	=	Non-T4 PM	×	0.8962
Locomotive PM	=	Non-T4 PM	×	0.8117

However, since the diesel fuel sulfur content assumed for the 2002 VISTAS base year inventory, upon which the 2009 inventory was based, is 2500 ppmW, a small adjustment to the emission reduction multiplier calculated from the T4 rule is appropriate since they are measured relative to modestly different sulfur contents (2599 ppmW for 2009). Correcting for these modest differences produces the emission reduction impact estimates relative to forecasts based on the VISTAS 2002 inventory shown in Table 7.2-2.

Table 7.2-2 Estimated Emission Reduction Impacts Relative to VISTAS 2002 Base Year Values

				2009
CMV SO_2	=	Non-T4 SO_2	×	0.1632
Locomotive SO_2	=	Non-T4 SO_2	×	0.1632
CMV PM	=	Non-T4 PM	×	0.9004
Locomotive PM	=	Non-T4 PM	×	0.8187

These factors were applied directly to the non-T4 emission forecasts to produce the final VISTAS 2009 emissions inventories for aircraft, locomotive, and CMV.

During the development of the preliminary 2018 VISTAS inventory in March 2004, this process yielded reasonable results and exhibited no particular systematic concerns. However, when the 2009 Base F inventory was developed, significant concerns related to SO_2 and PM were encountered. Essentially, what was revealed by the Base F 2009 forecast was a series of apparent inconsistencies in the CAIR 2010 and 2015 emission inventories (as compared to the 1996 and 2020 CAIR inventories) that were masked during the construction of the "longer-term" 2018 inventory.

For the most part, the issue seems to be centered on SO_2 and PM records, which are those records primarily affected by the T4 rule. But, as noted above, there does not seem to be any pattern of consistency that would indicate that either inclusion or exclusion of T4 rule impacts is the underlying cause. Moreover, where they occur, the observed growth extremes generally affect both SO_2 and PM equally, while one would expect PM effects to be buffered if the T4 rule was the underlying cause, since changes in diesel fuel sulfur content will only affect a fraction of PM (i.e., sulfate), while directly reducing SO_2.

While forecast inventories for aircraft, locomotives, and CMV were developed for 2009 and 2018 using both growth methods, it was ultimately decided to utilize the 1996-2020 growth basis since it provided more reasonable growth rates for 2009.

8. ADDITIONAL DATA

8.1 SIC TO NAICS CROSSWALK

U.S. Census Bureau

ECONOMIC CENSUS 1997

1997 Economic Census: Bridge Between SIC and NAICS

SIC: Manufacturing

SIC 24: Lumber and wood products - Finder by 3-digit SIC

Includes only establishments with payroll. Introductory text includes scope and methodology.

Go to bridge	SIC	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
	24	Lumber and wood products	36,735	111,930,684	757,267	18,668,558
	241	Logging	13,533	13,625,734	83,212	2,014,254
	242	Sawmills and planing mills	6,270	32,750,181	178,575	4,477,618
	243	Millwork, plywood, and structural members	9,373	33,200,977	260,726	6,599,370
	244	Wood containers	2,922	4,332,491	49,580	936,731
	245	Wood buildings and mobile homes	1,028	13,179,370	91,234	2,362,873
	249	Miscellaneous wood products	3,609	14,841,931	93,940	2,277,712

N=Comparable data not available D=Withheld to avoid disclosure

SIC 24: Lumber and wood products - 4-digit SIC to 6-digit NAICS

Includes only establishments with payroll. Introductory text includes scope and methodology. Figures to the left of NAICS codes indicate the percent of NAICS receipts represented by this part; and link to Table 1 where other parts of the NAICS are shown.

97/92 links to 1997 and 1992 Comparative Statistics for whole SICs.

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
241	97/92		**Logging**	**13,533**	**13,625,734**	**83,212**	**2,014,254**
2411			Logging	13,533	13,625,734	83,212	2,014,254
	0% of 113310	10	Logging	13,533	13,625,734	83,212	2,014,254

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
242	97/92		**Sawmills and planing mills**	**6,270**	**32,750,181**	**178,575**	**4,477,618**
2421							

			Sawmills & planing mills, general	5,176	29,414,116	143,292	3,741,583
	100% of 321113	10	Sawmills (pt)	4,334	24,743,160	119,456	3,191,780
	74% of 321912	10	Cut stock, resawing lumber, & planing (pt)	761	4,447,045	22,105	515,145
	0% of 321918	10	Other millwork (including flooring) (pt)	5	19,285	91	2,695
	5% of 321999	10	All other miscellaneous wood product mfg (pt)	76	204,626	1,640	31,963
2426			Hardwood dimension & flooring mills	992	3,206,954	33,940	708,100
	24% of 321912	20	Cut stock, resawing lumber, & planing (pt)	619	1,455,914	17,109	357,168
	30% of 321918	20	Other millwork (including flooring) (pt)	127	1,368,123	10,521	235,924
	5% of 337215	10	Showcase, partition, shelving, & locker mfg (pt)	246	382,917	6,310	115,008
2429			Special product sawmills, n.e.c.	102	129,111	1,343	27,935
	0% of 321113	20	Sawmills (pt)	70	26,457	304	5,750
	2% of 321920	10	Wood container & pallet mfg (pt)	24	68,695	684	14,493
	1% of 321999	20	All other miscellaneous wood product mfg (pt)	8	33,959	355	7,692
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
243	9/32		**Millwork, plywood, and structural members**	**9,373**	**33,200,977**	**260,726**	**6,599,370**
2431			Millwork	2,745	12,013,383	92,259	2,344,586
	321911		Wood window & door mfg	1,409	8,896,734	64,771	1,714,686
	69% of 321918	30	Other millwork (including flooring) (pt)	1,336	3,116,649	27,488	629,900
2434			Wood kitchen cabinets	5,096	7,483,209	79,579	1,866,940
	82% of 337110	10	Wood kitchen cabinet & counter top mfg (pt)	5,096	7,483,209	79,579	1,866,940
2435			Hardwood veneer & plywood	332	2,856,487	22,151	525,887
	321211		Hardwood veneer & plywood mfg	332	2,856,487	22,151	525,887
2436			Softwood veneer & plywood	155	5,762,664	28,843	912,613
	321212		Softwood veneer & plywood mfg	155	5,762,664	28,843	912,613
2439			Structural wood members, n.e.c.	1,045	5,085,234	37,894	949,344
	0% of 321113	30	Sawmills (pt)	0	0	0	0
	321213		Engineered wood member (except truss) mfg	53	1,431,123	5,372	154,564
	321214		Truss mfg	992	3,654,111	32,522	794,780
	0% of 321912	30	Cut stock, resawing lumber, & planing (pt)	0	0	0	0
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**

SIC	NAICS	Pt	Description	Establishments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
244	97/92		**Wood containers**	**2,922**	**4,332,491**	**49,580**	**936,731**
2441			Nailed wood boxes & shook	318	405,966	4,885	108,629
	9% of 321920	20	Wood container & pallet mfg (pt)	318	405,966	4,885	108,629
2448			Wood pallets & skids	2,347	3,449,491	38,994	717,863
	77% of 321920	30	Wood container & pallet mfg (pt)	2,347	3,449,491	38,994	717,863
2449			Wood containers, n.e.c.	257	477,034	5,701	110,239
	11% of 321920	40	Wood container & pallet mfg (pt)	257	477,034	5,701	110,239
SIC	**NAICS**	**Pt**	**Description**	**Establishments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
245	97/92		**Wood buildings and mobile homes**	**1,028**	**13,179,370**	**91,234**	**2,362,873**
2451			Mobile homes	319	10,167,746	68,269	1,788,646
	321991		Manufactured home (mobile home) mfg	319	10,167,746	68,269	1,788,646
2452			Prefabricated wood buildings	709	3,011,624	22,965	574,227
	321992		Prefabricated wood building mfg	709	3,011,624	22,965	574,227
SIC	**NAICS**	**Pt**	**Description**	**Establishments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
249	97/92		**Miscellaneous wood products**	**3,609**	**14,841,931**	**93,940**	**2,277,712**
2491			Wood preserving	451	4,461,521	11,668	298,123
	321114		Wood preservation	451	4,461,521	11,668	298,123
2493			Reconstituted wood products	316	5,273,794	25,269	797,838
	321219		Reconstituted wood product mfg	316	5,273,794	25,269	797,838
2499			Wood products, n.e.c.	2,842	5,106,616	57,003	1,181,751
	1% of 321912	40	Cut stock, resawing lumber, & planing (pt)	20	73,251	549	12,847
	2% of 321920	50	Wood container & pallet mfg (pt)	49	65,184	870	18,727
	94% of 321999	30	All other miscellaneous wood product mfg (pt)	2,324	3,740,920	41,844	879,178
	0% of 332321	10	Metal window & door mfg (pt)	0	0	0	0
	15% of 339999	10	All other miscellaneous mfg (pt)	449	1,227,261	13,740	270,999

N=Comparable data not available D=Withheld to avoid disclosure

Σ=sum of NAICS parts listed below the symbol 97/92 links to Comparative Statistics for 1992 and 1997

(Bridge complete.)	Comparable	SIC derivable from NAICS data.
(Drawbridge slightly open.)	Almost comparable	Sales or receipts from NAICS are within 3% of SIC sales or receipts.
(Drawbridge open.)	Not comparable	SIC sales or receipts cannot be estimated within 3% from NAICS data.

All-sector menu Menu of all 2-digit SICs Data in formats for downloading PDF report

U.S. Census Bureau

1997 Economic Census: Bridge Between SIC and NAICS

SIC: Manufacturing

SIC 25: Furniture and fixtures - Finder by 3-digit SIC

Includes only establishments with payroll. Introductory text includes scope and methodology.

Go to bridge	SIC	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
	25	Furniture and fixtures	12,095	61,527,902	523,872	13,344,344
	251	Household furniture	5,609	26,334,791	265,115	5,861,109
	252	Office furniture	1,036	11,340,955	74,863	2,402,387
	253	Public building and related furniture	468	7,869,175	36,979	1,022,978
	254	Partitions and fixtures	3,751	10,637,959	101,925	2,899,667
	259	Miscellaneous furniture and fixtures	1,231	5,345,022	44,990	1,158,203

N=Comparable data not available D=Withheld to avoid disclosure

SIC 25: Furniture and fixtures - 4-digit SIC to 6-digit NAICS

Includes only establishments with payroll. Introductory text includes scope and methodology. Figures to the left of NAICS codes indicate the percent of NAICS receipts represented by this part; and link to Table 1 where other parts of the NAICS are shown. 97/92 links to 1997 and 1992 Comparative Statistics for whole SICs.

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
251	97/92		**Household furniture**	**5,609**	**26,334,791**	**265,115**	**5,861,109**
2511			Wood household furniture	3,035	10,940,684	123,368	2,587,446
	97% of 337122	10	Nonupholstered wood household furniture mfg (pt)	3,035	10,940,684	123,368	2,587,446
2512			Upholstered household furniture	1,095	8,034,017	85,258	1,930,167
	96% of 337121	10	Upholstered household furniture mfg (pt)	1,095	8,034,017	85,258	1,930,167
2514			Metal household furniture	420	2,422,853	22,835	503,957
	337124		Metal household furniture mfg	420	2,422,853	22,835	503,957

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
2515			Mattresses & bedsprings	742	4,067,225	24,673	643,390
	2% of 337121	20	Upholstered household furniture mfg (pt)	35	159,199	1,601	31,760
	337910		Mattress mfg	707	3,908,026	23,072	611,630
2517			Wood TV & radio cabinets	100	320,714	4,273	84,391
	337129		Wood television, radio, & sewing machine cabinet mfg	100	320,714	4,273	84,391
2519			Household furniture, n.e.c.	217	549,298	4,708	111,758
	337125		Household furniture (except wood & metal) mfg	217	549,298	4,708	111,758
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
252	97/92		**Office furniture**	**1,036**	**11,340,955**	**74,863**	**2,402,387**
2521			Wood office furniture	677	3,110,020	30,641	781,220
	337211		Wood office furniture mfg	677	3,110,020	30,641	781,220
2522			Office furniture, except wood	359	8,230,935	44,222	1,621,167
	337214		Office furniture (except wood) mfg	359	8,230,935	44,222	1,621,167
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
253	97/92		**Public building and related furniture**	**468**	**7,869,175**	**36,979**	**1,022,978**
2531			Public building & related furniture	468	7,869,175	36,979	1,022,978
	57% of 336360	30	Motor vehicle seating & interior trim mfg (pt)	184	6,060,320	20,784	610,043
	42% of 337127	10	Institutional furniture mfg (pt)	267	1,697,870	15,254	385,680
	9% of 339942	10	Lead pencil & art good mfg (pt)	17	110,985	941	27,255
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
254	97/92		**Partitions and fixtures**	**3,751**	**10,637,959**	**101,925**	**2,899,667**
2541			Wood partitions & fixtures	2,825	5,388,485	57,453	1,624,792
	10% of 337110	20	Wood kitchen cabinet & counter top mfg (pt)	812	938,353	9,785	254,585
	337212		Custom architectural woodwork & millwork mfg	1,105	2,197,493	24,363	715,011
	28% of 337215	20	Showcase, partition, shelving, & locker mfg (pt)	908	2,252,639	23,305	655,196
2542			Partitions & fixtures, except wood	926	5,249,474	44,472	1,274,875
	66% of 337215	30	Showcase, partition, shelving, & locker mfg (pt)	926	5,249,474	44,472	1,274,875
SIC	**NAICS**	**Pt**	**Description**	**Establish-**	**Value of Shipments**	**Paid**	**Annual payroll**

			ments	($1,000)	employees	($1,000)
259	97/92	**Miscellaneous furniture and fixtures**	**1,231**	**5,345,022**	**44,990**	**1,158,203**
2591		Drapery hardware, blinds, & shades	488	2,393,564	19,617	436,757
	337920	Blind & shade mfg	488	2,393,564	19,617	436,757
2599		Furniture & fixtures, n.e.c.	743	2,951,458	25,373	721,446
57% of	337127 20	Institutional furniture mfg (pt)	727	2,305,770	22,448	605,971
4% of	339113 10	Surgical appliance & supplies mfg (pt)	16	645,688	2,925	115,475

N=Comparable data not available D=Withheld to avoid disclosure

Σ=sum of NAICS parts listed below the symbol 97/92 links to Comparative Statistics for 1992 and 1997

(Bridge complete.)	Comparable	SIC derivable from NAICS data.
(Drawbridge slightly open.)	Almost comparable	Sales or receipts from NAICS are within 3% of SIC sales or receipts.
(Drawbridge open.)	Not comparable	SIC sales or receipts cannot be estimated within 3% from NAICS data.

Source: 1997 Economic Census, Comparative Statistics

Last modified: 6/27/00

1997 Economic Census: Bridge Between SIC and NAICS

SIC: Manufacturing

SIC 33: Primary metal industries - Finder by 3-digit SIC

Includes only establishments with payroll. Introductory text includes scope and methodology.

Go to bridge	SIC	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
	33	Primary metal industries	6,275	188,774,795	692,175	26,829,622
	331	Blast furnace and basic steel products	954	77,532,783	217,679	10,059,589
	332	Iron and steel foundries	1,144	17,533,215	132,853	4,666,674
	333	Primary nonferrous metals	179	16,320,560	33,255	1,404,870
	334	Secondary nonferrous metals	256	6,977,168	13,479	468,021
	335	Nonferrous rolling and drawing	1,011	52,863,733	166,344	6,093,518
	336	Nonferrous foundries (castings)	1,676	11,598,177	94,496	2,897,629
	339	Miscellaneous primary metal products	1,055	5,949,159	34,069	1,239,321

N=Comparable data not available D=Withheld to avoid disclosure

SIC 33: Primary metal industries - 4-digit SIC to 6-digit NAICS

Includes only establishments with payroll. Introductory text includes scope and methodology. Figures to the left of NAICS codes indicate the percent of NAICS receipts represented by this part; and link to Table 1 where other parts of the NAICS are shown. 97/92 links to 1997 and 1992 Comparative Statistics for whole SICs.

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
331	97/92		**Blast furnace and basic steel products**	**954**	**77,532,783**	**217,679**	**10,059,589**
3312			Blast furnaces & steel mills	201	56,796,871	145,805	7,446,304
	25% of 324199	20	All other petroleum & coal products mfg (pt)	8	438,107	1,731	74,553
	99% of 331111	10	Iron & steel mills (pt)	193	56,358,764	144,074	7,371,751
3313			Electrometallurgical products	28	1,535,779	4,035	168,728

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
	331112		Electrometallurgical ferroalloy product mfg	24	1,409,834	3,724	156,946
	3% of 331492	10	Other nonferrous metal secondary smelting, refining, & alloying (	4	125,945	311	11,782
3315			Steel wire & related products	304	5,291,290	25,754	799,508
	331222		Steel wire drawing	273	4,920,798	23,489	733,281
	7% of 332618	10	Other fabricated wire product mfg (pt)	31	370,492	2,265	66,227
3316			Cold finishing of steel shapes	186	6,343,466	14,362	639,349
	331221		Cold-rolled steel shape mfg	186	6,343,466	14,362	639,349
3317			Steel pipe & tubes	235	7,565,377	27,723	1,005,700
	331210		Iron & steel pipes & tubes mfg from purchased steel	235	7,565,377	27,723	1,005,700
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
332	97/92		**Iron and steel foundries**	**1,144**	**17,533,215**	**132,853**	**4,666,674**
3321			Gray iron foundries	669	11,911,623	83,570	3,120,450
	97% of 331511	10	Iron foundries (pt)	669	11,911,623	83,570	3,120,450
3322			Malleable iron foundries	28	352,615	2,628	113,937
	3% of 331511	20	Iron foundries (pt)	28	352,615	2,628	113,937
3324			Steel investment foundries	159	2,341,737	22,673	669,452
	331512		Steel investment foundries	159	2,341,737	22,673	669,452
3325			Steel foundries, n.e.c.	288	2,927,240	23,982	762,835
	331513		Steel foundries (except investment)	288	2,927,240	23,982	762,835
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
333	97/92		**Primary nonferrous metals**	**179**	**16,320,560**	**33,255**	**1,404,870**
3331			Primary copper	16	6,540,441	7,360	287,382
	331411		Primary smelting & refining of copper	16	6,540,441	7,360	287,382
3334			Primary aluminum	21	6,224,610	15,763	707,402
	331312		Primary aluminum production	21	6,224,610	15,763	707,402
3339			Primary nonferrous metals, n.e.c.	142	3,555,509	10,132	410,086
	331419		Other nonferrous metal primary smelting & refining	142	3,555,509	10,132	410,086
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
334	97/92		**Secondary nonferrous metals**	**256**	**6,977,168**	**13,479**	**468,021**
3341			Secondary nonferrous metals	256	6,977,168	13,479	468,021

	95% of 331314	10	Secondary smelting & alloying of aluminum (pt)	101	3,478,625	6,226	210,318
	85% of 331423	10	Secondary smelting, refining, & alloying of copper (pt)	24	1,082,052	1,768	69,988
	64% of 331492	20	Other nonferrous metal secondary smelting, refining, & alloying (	131	2,416,491	5,485	187,715

SIC	NAICS	Pt	Description	Establishments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
335	97/92		**Nonferrous rolling and drawing**	**1,011**	**52,863,733**	**166,344**	**6,093,518**
3351			Copper rolling & drawing	129	7,679,080	21,150	786,621
	331421		Copper rolling, drawing, & extruding	129	7,679,080	21,150	786,621
3353			Aluminum sheet, plate, & foil	70	13,755,566	25,111	1,199,382
	331315		Aluminum sheet, plate, & foil mfg	70	13,755,566	25,111	1,199,382
	0% of 332996	10	Fabricated pipe & pipe fitting mfg (pt)	0	0	0	0
3354			Aluminum extruded products	160	6,177,701	30,357	944,829
	331316		Aluminum extruded product mfg	160	6,177,701	30,357	944,829
3355			Aluminum rolling & drawing, n.e.c.	20	1,295,284	2,657	97,537
	78% of 331319	10	Other aluminum rolling & drawing (pt)	20	1,295,284	2,657	97,537
3356			Nonferrous rolling & drawing, n.e.c.	184	4,839,547	17,237	709,102
	66% of 331491	10	Other nonferrous metal rolling, drawing, & extruding (pt)	184	4,839,547	17,237	709,102
3357			Nonferrous wire drawing & insulating	448	19,116,555	69,832	2,356,047
	22% of 331319	20	Other aluminum rolling & drawing (pt)	16	361,323	1,649	46,377
	331422		Copper wire (except mechanical) drawing	36	1,029,653	4,692	131,549
	34% of 331491	20	Other nonferrous metal rolling, drawing, & extruding (pt)	83	2,475,702	8,635	280,606
	335921		Fiber optic cable mfg	38	2,767,017	8,589	364,654
	335929		Other communication & energy wire mfg	275	12,482,860	46,267	1,532,861

SIC	NAICS	Pt	Description	Establishments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
336	97/92		**Nonferrous foundries (castings)**	**1,676**	**11,598,177**	**94,496**	**2,897,629**
3363			Aluminum die-castings	318	3,791,717	27,717	906,108
	331521		Aluminum die-casting foundries	318	3,791,717	27,717	906,108
3364			Nonferrous die-casting, except aluminum	279	2,055,264	17,243	502,552
	331522		Nonferrous (except aluminum) die-casting foundries	279	2,055,264	17,243	502,552
3365			Aluminum foundries	626	3,937,406	34,098	1,013,843
	331524		Aluminum foundries (except die-casting)	626	3,937,406	34,098	1,013,843

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
3366			Copper foundries	312	854,704	8,909	260,340
	331525		Copper foundries (except die-casting)	312	854,704	8,909	260,340
3369			Nonferrous foundries, n.e.c.	141	959,086	6,529	214,786
	331528		Other nonferrous foundries (except die-casting)	141	959,086	6,529	214,786

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
339	97/92		**Miscellaneous primary metal products**	**1,055**	**5,949,159**	**34,069**	**1,239,321**
3398			Metal heat treating	808	3,485,459	22,674	802,930
	332811		Metal heat treating	808	3,485,459	22,674	802,930
3399			Primary metal products, n.e.c.	247	2,463,700	11,395	436,391
1% of	331111	20	Iron & steel mills (pt)	82	596,791	2,440	95,739
5% of	331314	20	Secondary smelting & alloying of aluminum (pt)	10	172,555	488	18,975
15% of	331423	20	Secondary smelting, refining, & alloying of copper (pt)	11	187,036	565	21,117
32% of	331492	30	Other nonferrous metal secondary smelting, refining, & alloying (	117	1,207,951	5,814	225,722
6% of	332618	20	Other fabricated wire product mfg (pt)	27	299,367	2,088	74,838

N=Comparable data not available D=Withheld to avoid disclosure

Σ=sum of NAICS parts listed below the symbol 97/92 links to Comparative Statistics for 1992 and 1997

(Bridge complete.)	Comparable	SIC derivable from NAICS data.
(Drawbridge slightly open.)	Almost comparable	Sales or receipts from NAICS are within 3% of SIC sales or receipts.
(Drawbridge open.)	Not comparable	SIC sales or receipts cannot be estimated within 3% from NAICS data.

All-sector menu   Menu of all 2-digit SICs   Data in formats for downloading   PDF report

Source: 1997 Economic Census, Comparative Statistics

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1997 Economic Census: Bridge Between SIC and NAICS

SIC: Manufacturing

SIC 34: Fabricated metal products - Finder by 3-digit SIC

Includes only establishments with payroll. Introductory text includes scope and methodology.

Go to bridge	SIC	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
	34	Fabricated metal products	37,985	231,704,012	1,549,494	50,904,372
	341	Metal cans and shipping containers	425	13,352,606	33,634	1,377,932
	342	Cutlery, handtools, and hardware	2,494	D	(100,000+)	D
	343	Plumbing and heating, except electric	662	8,671,083	49,165	1,501,147
	344	Fabricated structural metal products	13,959	65,206,295	459,789	14,111,998
	345	Screw machine products, bolts, etc.	3,785	16,460,738	133,399	4,573,452
	346	Metal forgings and stampings	3,625	44,832,778	267,958	10,486,353
	347	Metal services, n.e.c.	5,610	14,454,652	130,755	3,722,220
	348	Ordnance and accessories, n.e.c.	434	5,438,140	38,482	1,489,257
	349	Miscellaneous fabricated metal products	6,991	D	(100,000+)	D

N=Comparable data not available D=Withheld to avoid disclosure

SIC 34: Fabricated metal products - 4-digit SIC to 6-digit NAICS

Includes only establishments with payroll. Introductory text includes scope and methodology. Figures to the left of NAICS codes indicate the percent of NAICS receipts represented by this part; and link to Table 1 where other parts of the NAICS are shown. 97/92 links to 1997 and 1992 Comparative Statistics for whole SICs.

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
341	97/92		**Metal cans and shipping containers**	425	**13,352,606**	**33,634**	**1,377,932**
3411			Metal cans	274	12,042,011	27,316	1,185,705

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
	332431		Metal can mfg	274	12,042,011	27,316	1,185,705
3412			Metal barrels, drums, & pails	151	1,310,595	6,318	192,227
	58% of 332439	10	Other metal container mfg (pt)	151	1,310,595	6,318	192,227
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
342	9/32		**Cutlery, handtools, and hardware**	**2,494**	**D**	**(100,000+)**	**D**
3421			Cutlery	164	2,198,365	11,129	357,283
	100% of 332211	10	Cutlery & flatware (except precious) mfg (pt)	164	2,198,365	11,129	357,283
3423			Hand & edge tools, n.e.c.	1,069	5,677,903	42,947	1,329,593
	86% of 332212	10	Hand & edge tool mfg (pt)	1,069	5,677,903	42,947	1,329,593
3425			Hand saws & saw blades	176	1,452,540	9,149	300,538
	332213		Saw blade & handsaw mfg	176	1,452,540	9,149	300,538
3429			Hardware, n.e.c.	1,085	D	(50k-99999)	D
	18% of 332439	20	Other metal container mfg (pt)	117	402,378	4,135	116,588
	96% of 332510	10	Hardware mfg (pt)	952	10,359,952	70,884	2,186,800
	D 332919	10	Other metal valve & pipe fitting mfg (pt)	16	D	(500-999)	D
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
343	9/32		**Plumbing and heating, except electric**	**662**	**8,671,083**	**49,165**	**1,501,147**
3431			Metal sanitary ware	88	1,575,505	9,994	280,462
	332998		Enameled iron & metal sanitary ware mfg	88	1,575,505	9,994	280,462
3432			Plumbing fittings & brass goods	121	3,708,187	16,676	510,498
	332913		Plumbing fixture fitting & trim mfg	116	3,590,128	16,202	499,675
	1% of 332999	20	All other miscellaneous fabricated metal product mfg (pt)	5	118,059	474	10,823
3433			Heating equipment, except electric	453	3,387,391	22,495	710,187
	91% of 333414	10	Heating equipment (except warm air furnaces) mfg (pt)	453	3,387,391	22,495	710,187
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
344	9/32		**Fabricated structural metal products**	**13,959**	**65,206,295**	**459,789**	**14,111,998**
3441			Fabricated structural metal	2,900	14,200,270	84,704	2,672,087
	87% of 332312	10	Fabricated structural metal mfg (pt)	2,900	14,200,270	84,704	2,672,087
3442			Metal doors, sash, & trim	1,384	9,876,049	72,970	1,896,135

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
	96% of 332321	20	Metal window & door mfg (pt)	1,384	9,876,049	72,970	1,896,135
3443			Fabricated plate work, boiler shops	2,130	11,463,395	87,038	2,886,191
	332313		Plate work mfg	1,035	2,806,913	25,453	797,131
	332410		Power boiler & heat exchanger mfg	472	3,849,100	27,542	946,401
	332420		Metal tank (heavy gauge) mfg	614	4,764,118	33,704	1,134,441
	0% of 333415	10	AC & warm air heating & commercial/industrial refrig equip mfg (p	9	43,264	339	8,218
3444			Sheet metal work	4,605	16,233,432	131,900	4,128,514
	332322		Sheet metal work mfg	4,479	15,957,992	129,826	4,068,484
	12% of 332439	30	Other metal container mfg (pt)	126	275,440	2,074	60,030
3446			Architectural metal work	1,744	3,536,413	30,960	875,174
	88% of 332323	10	Ornamental & architectural metal work mfg (pt)	1,744	3,536,413	30,960	875,174
3448			Prefabricated metal buildings	604	4,199,550	25,946	776,575
	332311		Prefabricated metal building & component mfg	604	4,199,550	25,946	776,575
3449			Miscellaneous metal work	592	5,697,186	26,271	877,322
	332114		Custom roll forming	401	3,074,662	15,219	500,899
	13% of 332312	20	Fabricated structural metal mfg (pt)	152	2,166,021	8,729	302,853
	4% of 332321	30	Metal window & door mfg (pt)	33	364,564	1,974	64,115
	2% of 332323	20	Ornamental & architectural metal work mfg (pt)	6	91,939	349	9,455
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
345			**Screw machine products, bolts, etc.**	**3,785**	**16,460,738**	**133,399**	**4,573,452**
3451			Screw machine products	2,745	8,326,077	80,404	2,634,075
	332721		Precision turned product mfg	2,745	8,326,077	80,404	2,634,075
3452			Bolts, nuts, rivets, & washers	1,040	8,134,661	52,995	1,939,377
	332722		Bolt, nut, screw, rivet, & washer mfg	1,040	8,134,661	52,995	1,939,377
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
346			**Metal forgings and stampings**	**3,625**	**44,832,778**	**267,958**	**10,486,353**
3462			Iron & steel forgings	421	4,924,426	26,432	1,035,345
	332111		Iron & steel forging	421	4,924,426	26,432	1,035,345
3463			Nonferrous forgings	84	1,858,708	9,129	366,879
	332112		Nonferrous forging	84	1,858,708	9,129	366,879
3465			Automotive stampings	810	23,668,110	126,905	5,647,964

	336370		Motor vehicle metal stamping	810	23,668,110	126,905	5,647,964
3466			Crowns & closures	67	969,982	4,682	167,443
	332115		Crown & closure mfg	67	969,982	4,682	167,443
3469			Metal stampings, n.e.c.	2,243	13,411,552	100,810	3,268,722
	332116		Metal stamping	2,166	12,041,638	93,086	3,039,459
	332214		Kitchen utensil, pot, & pan mfg	77	1,369,914	7,724	229,263
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
347	97/92		**Metal services, n.e.c.**	**5,610**	**14,454,652**	**130,755**	**3,722,220**
3471			Plating & polishing	3,404	5,979,405	74,640	2,089,261
	332813		Electroplating, plating, polishing, anodizing, & coloring	3,404	5,979,405	74,640	2,089,261
3479			Metal coating & allied services	2,206	8,475,247	56,115	1,632,959
	332812		Metal coating/engraving (exc jewelry/silverware)/allied services	2,156	8,460,896	55,904	1,628,585
	0% of 339911	10	Jewelry (except costume) mfg (pt)	22	5,798	79	1,620
	1% of 339912	10	Silverware & plated ware mfg (pt)	12	6,296	103	2,091
	0% of 339914	10	Costume jewelry & novelty mfg (pt)	16	2,257	29	663
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
348	97/92		**Ordnance and accessories, n.e.c.**	**434**	**5,438,140**	**38,482**	**1,489,257**
3482			Small arms ammunition	113	938,818	6,863	242,068
	332992		Small arms ammunition mfg	113	938,818	6,863	242,068
3483			Ammunition, except small arms, n.e.c.	53	1,497,045	9,427	379,450
	332993		Ammunition (except small arms) mfg	53	1,497,045	9,427	379,450
3484			Small arms	198	1,251,792	9,907	320,614
	332994		Small arms mfg	198	1,251,792	9,907	320,614
3489			Ordnance & accessories, n.e.c.	70	1,750,485	12,285	547,125
	332995		Other ordnance & accessories mfg	70	1,750,485	12,285	547,125
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
349	97/92		**Miscellaneous fabricated metal products**	**6,991**	**D**	**(100,000+)**	**D**
3491			Industrial valves	538	8,699,300	53,459	1,904,134
	332911		Industrial valve mfg	538	8,699,300	53,459	1,904,134

3492		Fluid power valves & hose fittings	424	6,602,909	37,132	1,324,392
100% of	332912 10	Fluid power valve & hose fitting mfg (pt)	424	6,602,909	37,132	1,324,392
3493		Steel springs, except wire	129	761,711	5,381	174,467
	332611	Spring (heavy gauge) mfg	129	761,711	5,381	174,467
3494		Valves & pipe fittings, n.e.c.	245	2,827,380	18,216	576,136
94% of	332919 20	Other metal valve & pipe fitting mfg (pt)	222	2,753,397	17,652	558,712
1% of	332999 30	All other miscellaneous fabricated metal product mfg (pt)	23	73,983	564	17,424
3495		Wire springs	396	D	(10k-24999)	D
	332612	Spring (light gauge) mfg	394	2,481,151	18,798	564,372
D	334518 10	Watch, clock, & part mfg (pt)	2	D	(100-249)	D
3496		Miscellaneous fabricated wire products	1,253	4,587,656	41,821	1,025,279
87% of	332618 30	Other fabricated wire product mfg (pt)	1,253	4,587,656	41,821	1,025,279
3497		Metal foil & leaf	107	3,257,743	10,615	418,574
	322225	Laminated aluminum foil mfg for flexible packaging uses	43	1,546,143	4,967	211,497
16% of	332999 40	All other miscellaneous fabricated metal product mfg (pt)	64	1,711,600	5,648	207,077
3498		Fabricated pipe & fittings	856	4,024,999	29,364	870,291
100% of	332996 20	Fabricated pipe & pipe fitting mfg (pt)	856	4,024,999	29,364	870,291
3499		Fabricated metal products, n.e.c.	3,043	D	(50k-99999)	D
	332117	Powder metallurgy part mfg	128	1,317,301	10,760	367,623
12% of	332439 40	Other metal container mfg (pt)	98	273,541	2,331	70,293
4% of	332510 20	Hardware mfg (pt)	58	435,815	3,401	93,516
D	332919 30	Other metal valve & pipe fitting mfg (pt)	7	D	(250-499)	D
72% of	332999 50	All other miscellaneous fabricated metal product mfg (pt)	2,592	7,558,137	63,736	1,870,813
2% of	337215 40	Showcase, partition, shelving, & locker mfg (pt)	78	123,057	1,295	35,369
4% of	339914 20	Costume jewelry & novelty mfg (pt)	82	49,953	568	10,912

N=Comparable data not available D=Withheld to avoid disclosure

Σ=sum of NAICS parts listed below the symbol 97/92 links to Comparative Statistics for 1992 and 1997

(Bridge complete.)	Comparable	SIC derivable from NAICS data.
(Drawbridge slightly open.)	Almost comparable	Sales or receipts from NAICS are within 3% of SIC sales or receipts.
(Drawbridge open.)	Not comparable	SIC sales or receipts cannot be estimated within 3% from NAICS data.

All-sector menu | Menu of all 2-digit SICs | Data in formats for downloading | PDF report

Source: 1997 Economic Census, Comparative Statistics

ECONOMIC CENSUS 1997

1997 Economic Census: Bridge Between SIC and NAICS

SIC: Manufacturing

SIC 35: Industrial machinery and equipment - Finder by 3-digit SIC

Includes only establishments with payroll. Introductory text includes scope and methodology.

Go to bridge	SIC	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
	35	Industrial machinery and equipment	56,383	407,393,276	1,978,226	74,550,422
	351	Engines and turbines	390	D	(50k-99999)	D
	352	Farm and garden machinery	1,656	D	(50k-99999)	D
	353	Construction and related machinery	3,523	47,935,156	213,334	8,081,030
	354	Metalworking machinery	11,706	39,692,950	296,489	11,812,262
	355	Special industry machinery	4,781	D	(100,000+)	D
	356	General industrial machinery	4,479	44,080,890	265,359	9,752,818
	357	Computer and office equipment	2,181	D	(100,000+)	D
	358	Refrigeration and service machinery	2,277	39,317,539	204,675	6,800,658
	359	Industrial machinery, n.e.c.	25,390	38,647,841	368,481	12,360,014

N=Comparable data not available D=Withheld to avoid disclosure

SIC 35: Industrial machinery and equipment - 4-digit SIC to 6-digit NAICS

Includes only establishments with payroll. Introductory text includes scope and methodology. Figures to the left of NAICS codes indicate the percent of NAICS receipts represented by this part; and link to Table 1 where other parts of the NAICS are shown. 97/92 links to 1997 and 1992 Comparative Statistics for whole SICs.

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
351	97/92		**Engines and turbines**	**390**	**D**	**(50k-99999)**	**D**
3511			Turbines & turbine generator sets	86	5,783,057	19,529	910,316

	333611		Turbine & turbine generator set unit mfg	86	5,783,057	19,529	910,316
3519			Internal combustion engines, n.e.c.	304	D	(50k-99999)	D
	D 333618	10	Other engine equipment mfg (pt)	297	D	(50k-99999)	D
	0% of 336399	10	All other motor vehicle parts mfg (pt)	7	123,954	896	24,247
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
352	9/32		**Farm and garden machinery**	**1,656**	**D**	**(50k-99999)**	**D**
3523			Farm machinery & equipment	1,508	D	(50k-99999)	D
	D 332212	20	Hand & edge tool mfg (pt)	1	D	(20-99)	D
	10% of 332323	30	Ornamental & architectural metal work mfg (pt)	140	380,152	3,082	86,294
	333111		Farm machinery & equipment mfg	1,339	15,921,455	66,370	2,370,599
	1% of 333922	10	Conveyor & conveying equipment mfg (pt)	28	33,377	320	6,663
3524			Lawn & garden equipment	148	D	(25k-49999)	D
	D 332212	30	Hand & edge tool mfg (pt)	3	D	(20-99)	D
	333112		Lawn & garden tractor & home lawn & garden equipment mfg	145	7,454,511	28,617	739,727
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
353	9/32		**Construction and related machinery**	**3,523**	**47,935,156**	**213,334**	**8,081,030**
3531			Construction machinery	897	24,117,413	87,607	3,374,527
	333120		Construction machinery mfg	785	21,965,455	74,965	2,998,967
	57% of 333923	10	Overhead traveling crane, hoist, & monorail system mfg (pt)	87	1,805,198	10,263	290,989
	4% of 336510	10	Railroad rolling stock mfg (pt)	25	346,760	2,379	84,571
3532			Mining machinery	292	2,710,923	13,547	486,496
	333131		Mining machinery & equipment mfg	292	2,710,923	13,547	486,496
3533			Oil field machinery	563	6,240,079	29,451	1,166,759
	333132		Oil & gas field machinery & equipment mfg	563	6,240,079	29,451	1,166,759
3534			Elevators & moving stairways	196	1,607,066	9,442	340,525
	333921		Elevator & moving stairway mfg	196	1,607,066	9,442	340,525
3535			Conveyors & conveying equipment	871	6,346,525	39,279	1,531,625
	100% of 333922	20	Conveyor & conveying equipment mfg (pt)	871	6,346,525	39,279	1,531,625
3536			Hoists, cranes, & monorails	220	1,340,561	7,751	278,899

	43% of 333923	20	Overhead traveling crane, hoist, & monorail system mfg (pt)	220	1,340,561	7,751	278,899
3537			Industrial trucks & tractors	484	5,572,589	26,257	902,199
	0% of 332439	50	Other metal container mfg (pt)	4	6,775	64	1,492
	0% of 332999	60	All other miscellaneous fabricated metal product mfg (pt)	19	27,488	240	6,939
	333924		Industrial truck, tractor, trailer, & stacker machinery mfg	461	5,538,326	25,953	893,768

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
354	9/32		**Metalworking machinery**	**11,706**	**39,692,950**	**296,489**	**11,812,262**
3541			Machine tools, metal cutting types	393	5,183,521	28,849	1,241,372
	97% of 333512	10	Machine tool (metal cutting types) mfg (pt)	393	5,183,521	28,849	1,241,372
3542			Machine tools, metal forming types	225	2,255,011	14,185	598,606
	333513		Machine tool (metal forming types) mfg	225	2,255,011	14,185	598,606
3543			Industrial patterns	673	623,927	7,959	285,038
	332997		Industrial pattern mfg	673	623,927	7,959	285,038
3544			Special dies, tools, jigs, & fixtures	7,275	13,361,490	128,770	5,318,715
	333511		Industrial mold mfg	2,529	5,116,635	48,657	2,088,950
	333514		Special die & tool, die set, jig, & fixture mfg	4,746	8,244,855	80,113	3,229,765
3545			Machine tool accessories	2,105	6,061,450	54,304	1,897,399
	11% of 332212	40	Hand & edge tool mfg (pt)	185	714,277	6,379	254,257
	333515		Cutting tool & machine tool accessory mfg	1,920	5,347,173	47,925	1,643,142
3546			Power-driven handtools	217	3,609,779	16,816	531,378
	333991		Power-driven handtool mfg	217	3,609,779	16,816	531,378
3547			Rolling mill machinery	100	700,084	4,149	167,312
	333516		Rolling mill machinery & equipment mfg	100	700,084	4,149	167,312
3548			Welding apparatus	244	4,433,877	22,434	915,152
	100% of 333992	10	Welding & soldering equipment mfg (pt)	244	4,433,877	22,434	915,152
	0% of 335311	10	Power, distribution, & specialty transformer mfg (pt)	0	0	0	0
3549			Metalworking machinery, n.e.c.	474	3,463,811	19,023	857,290
	333518		Other metalworking machinery mfg	474	3,463,811	19,023	857,290
SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments	Paid employees	Annual payroll

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
355	9/32		**Special industry machinery**	**4,781**	**D**	**(100,000+)**	**D**
3552			Textile machinery	478	1,779,034	13,600	449,014
	100% of 333292	10	Textile machinery mfg (pt)	478	1,779,034	13,600	449,014
3553			Woodworking machinery	327	1,321,752	9,117	302,233
	333210		Sawmill & woodworking machinery mfg	327	1,321,752	9,117	302,233
3554			Paper industries machinery	366	3,438,235	18,594	772,659
	333291		Paper industry machinery mfg	366	3,438,235	18,594	772,659
3555			Printing trades machinery	546	D	(10k-24999)	D
	D 333293	10	Printing machinery & equipment mfg (pt)	546	D	(10k-24999)	D
3556			Food products machinery	597	2,877,841	19,026	715,068
	333294		Food product machinery mfg	597	2,877,841	19,026	715,068
3559			Special industry machinery, n.e.c.	2,467	D	(100,000+)	D
	333220		Plastics & rubber industry machinery mfg	455	3,584,992	18,574	743,901
	333295		Semiconductor machinery mfg	257	11,158,627	40,087	1,701,669
	D 333298	10	All other industrial machinery mfg (pt)	1,677	D	(50k-99999)	D
	7% of 333319	10	Other commercial & service industry machinery mfg (pt)	78	644,019	2,890	96,069
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
356	9/32		**General industrial machinery**	**4,479**	**44,080,890**	**265,359**	**9,752,818**
3561			Pumps & pumping equipment	489	6,826,043	36,552	1,422,919
	100% of 333911	10	Pump & pumping equipment mfg (pt)	489	6,826,043	36,552	1,422,919
3562			Ball & roller bearings	185	6,120,940	36,991	1,386,126
	332991		Ball & roller bearing mfg	185	6,120,940	36,991	1,386,126
3563			Air & gas compressors	314	5,633,008	24,821	940,349
	333912		Air & gas compressor mfg	314	5,633,008	24,821	940,349
3564			Blowers & fans	574	4,075,925	29,906	902,298
	333411		Air purification equipment mfg	370	2,174,729	16,183	470,103
	333412		Industrial & commercial fan & blower mfg	204	1,901,196	13,723	432,195
3565			Packaging machinery	689	4,858,270	31,581	1,255,960
	333993		Packaging machinery mfg	689	4,858,270	31,581	1,255,960
3566			Speed changers, drives, & gears	268	2,402,392	16,231	597,248

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
	333612		Speed changer, industrial high-speed drive, & gear mfg	268	2,402,392	16,231	597,248
3567			Industrial furnaces & ovens	404	2,871,475	17,585	657,191
	333994		Industrial process furnace & oven mfg	404	2,871,475	17,585	657,191
3568			Power transmission equipment, n.e.c.	299	3,301,091	21,604	770,962
	333613		Mechanical power transmission equipment mfg	299	3,301,091	21,604	770,962
3569			General industrial machinery, n.e.c.	1,257	7,991,746	50,088	1,819,765
	88% of 333999	10	All other miscellaneous general-purpose machinery mfg (pt)	1,257	7,991,746	50,088	1,819,765
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
357	9/32		**Computer and office equipment**	**2,181**	**D**	**(100,000+)**	**D**
3571			Electronic computers	563	66,331,909	100,115	4,282,451
	334111		Electronic computer mfg	563	66,331,909	100,115	4,282,451
3572			Computer storage devices	211	13,907,367	42,364	1,950,230
	334112		Computer storage device mfg	211	13,907,367	42,364	1,950,230
3575			Computer terminals	142	1,483,460	5,764	253,087
	334113		Computer terminal mfg	142	1,483,460	5,764	253,087
3577			Computer peripheral equipment, n.e.c.	1,006	25,130,308	87,253	4,337,970
	93% of 334119	10	Other computer peripheral equipment mfg (pt)	1,006	25,130,308	87,253	4,337,970
3578			Calculating & accounting equipment	96	2,014,806	7,683	275,962
	5% of 333313	10	Office machinery mfg (pt)	35	144,380	966	30,889
	7% of 334119	20	Other computer peripheral equipment mfg (pt)	61	1,870,426	6,717	245,073
3579			Office machines, n.e.c.	163	D	(10k-24999)	D
	96% of 333313	20	Office machinery mfg (pt)	134	3,047,549	13,865	427,315
	D 334518	20	Watch, clock, & part mfg (pt)	16	D	(500-999)	D
	21% of 339942	20	Lead pencil & art good mfg (pt)	13	257,020	1,234	30,572
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
358	9/32		**Refrigeration and service machinery**	**2,277**	**39,317,539**	**204,675**	**6,800,658**
3581			Automatic merchandising machines	121	1,325,960	8,178	215,627
	333311		Automatic vending machine mfg	121	1,325,960	8,178	215,627
3582							

			Commercial laundry equipment	68	604,966	4,523	136,783
	333312		Commercial laundry, drycleaning, & pressing machine mfg	68	604,966	4,523	136,783
3585			Refrigeration & heating equipment	852	28,473,461	140,978	4,736,239
	100% of 333415	20	AC & warm air heating & commercial/industrial refrig equip mfg (p	792	22,846,865	119,456	3,682,296
	336391		Motor vehicle air-conditioning mfg	60	5,626,596	21,522	1,053,943
3586			Measuring & dispensing pumps	71	1,316,899	6,824	251,438
	333913		Measuring & dispensing pump mfg	71	1,316,899	6,824	251,438
3589			Service industry machinery, n.e.c.	1,165	7,596,253	44,172	1,460,571
	81% of 333319	20	Other commercial & service industry machinery mfg (pt)	1,165	7,596,253	44,172	1,460,571
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
359	97/92		**Industrial machinery, n.e.c.**	**25,390**	**38,647,841**	**368,481**	**12,360,014**
3592			Carburetors, pistons, rings, & valves	141	2,755,311	17,518	672,786
	336311		Carburetor, piston, piston ring, & valve mfg	141	2,755,311	17,518	672,786
3593			Fluid power cylinders & actuators	320	3,528,906	23,062	900,438
	100% of 333995	10	Fluid power cylinder & actuator mfg (pt)	320	3,528,906	23,062	900,438
3594			Fluid power pumps & motors	170	2,712,058	15,482	605,485
	100% of 333996	10	Fluid power pump & motor mfg (pt)	170	2,712,058	15,482	605,485
3596			Scales & balances, except laboratory	122	682,940	4,871	148,755
	333997		Scale & balance (except laboratory) mfg	122	682,940	4,871	148,755
3599			Industrial machinery, n.e.c.	24,637	28,968,626	307,548	10,032,550
	332710		Machine shops	23,619	27,143,131	290,951	9,497,047
	5% of 332999	70	All other miscellaneous fabricated metal product mfg (pt)	132	506,611	4,199	136,429
	2% of 333319	30	Other commercial & service industry machinery mfg (pt)	50	172,536	1,335	35,719
	13% of 333999	20	All other miscellaneous general-purpose machinery mfg (pt)	836	1,146,348	11,063	363,355

N=Comparable data not available D=Withheld to avoid disclosure

Σ=sum of NAICS parts listed below the symbol 97/92 links to Comparative Statistics for 1992 and 1997

(Bridge complete.) Comparable SIC derivable from NAICS data.

(Drawbridge slightly open.) Almost comparable Sales or receipts from NAICS are within 3% of SIC sales or receipts.

(Drawbridge open.) Not comparable SIC sales or receipts cannot be estimated within 3% from NAICS data.

U.S. Census Bureau

1997 Economic Census: Bridge Between SIC and NAICS

SIC: Manufacturing

SIC 36: Electronic and other electric equipment - Finder by 3-digit SIC

Includes only establishments with payroll. Introductory text includes scope and methodology.

Go to bridge	SIC	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
	36	Electronic and other electric equipment	17,104	348,559,508	1,582,348	58,256,420
	361	Electric distribution equipment	901	12,325,326	67,929	2,276,264
	362	Electrical industrial apparatus	2,388	28,643,846	169,046	5,474,383
	363	Household appliances	356	D	(100,000+)	D
	364	Electric lighting and wiring equipment	2,106	26,197,139	158,615	4,888,856
	365	Household audio and video equipment	834	10,699,568	48,325	1,438,451
	366	Communications equipment	2,213	80,949,148	283,751	13,272,409
	367	Electronic components and accessories	6,605	141,997,578	611,693	22,958,642
	369	Miscellaneous electrical equipment and supplies	1,701	D	(100,000+)	D

N=Comparable data not available D=Withheld to avoid disclosure

SIC 36: Electronic and other electric equipment - 4-digit SIC to 6-digit NAICS

Includes only establishments with payroll. Introductory text includes scope and methodology. Figures to the left of NAICS codes indicate the percent of NAICS receipts represented by this part; and link to Table 1 where other parts of the NAICS are shown. 97/92 links to 1997 and 1992 Comparative Statistics for whole SICs.

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)

361		97/92	**Electric distribution equipment**	**901**	**12,325,326**	**67,929**	**2,276,264**
3612			Transformers	318	4,716,162	26,638	822,096
	100% of 335311	20	Power, distribution, & specialty transformer mfg (pt)	318	4,716,162	26,638	822,096
3613			Switchgear & switchboard apparatus	583	7,609,164	41,291	1,454,168
	335313		Switchgear & switchboard apparatus mfg	583	7,609,164	41,291	1,454,168
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
362		97/92	**Electrical industrial apparatus**	**2,388**	**28,643,846**	**169,046**	**5,474,383**
3621			Motors & generators	528	11,788,281	71,112	2,072,046
	96% of 335312	10	Motor & generator mfg (pt)	528	11,788,281	71,112	2,072,046
3624			Carbon & graphite products	126	2,254,410	10,887	407,987
	335991		Carbon & graphite product mfg	126	2,254,410	10,887	407,987
3625			Relays & industrial controls	1,321	11,762,789	68,365	2,429,039
	335314		Relay & industrial control mfg	1,321	11,762,789	68,365	2,429,039
3629			Electrical industrial apparatus, n.e.c.	413	2,838,366	18,682	565,311
	41% of 335999	10	All other miscellaneous electrical equipment & component mfg (pt)	413	2,838,366	18,682	565,311
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
363		97/92	**Household appliances**	**356**	**D**	**(100,000+)**	**D**
3631			Household cooking equipment	84	3,543,231	17,543	480,836
	335221		Household cooking appliance mfg	84	3,543,231	17,543	480,836
3632			Household refrigerators & freezers	27	4,887,364	24,597	801,717
	335222		Household refrigerator & home freezer mfg	27	4,887,364	24,597	801,717
3633			Household laundry equipment	17	3,723,375	14,801	480,076
	335224		Household laundry equipment mfg	17	3,723,375	14,801	480,076
3634			Electric housewares & fans	154	3,817,521	19,229	458,176
	9% of 333414	20	Heating equipment (except warm air furnaces) mfg (pt)	16	329,270	2,171	46,787
	335211		Electric housewares & household fan mfg	138	3,488,251	17,058	411,389
3635			Household vacuum cleaners	34	2,399,206	10,537	340,498
	100% of 335212	10	Household vacuum cleaner mfg (pt)	34	2,399,206	10,537	340,498
3639			Household appliances, n.e.c.	40	D	(10k-	D

						24999)	
D	333298	20	All other industrial machinery mfg (pt)	4	D	(20-99)	D
0% of	335212	20	Household vacuum cleaner mfg (pt)	0	0	0	0
	335228		Other major household appliance mfg	36	3,300,662	13,309	425,991

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
364	97/92		**Electric lighting and wiring equipment**	**2,106**	**26,197,139**	**158,615**	**4,888,856**
3641			Electric lamps	82	3,306,009	15,903	574,696
	335110		Electric lamp bulb & part mfg	82	3,306,009	15,903	574,696
3643			Current-carrying wiring devices	519	5,877,522	44,907	1,293,583
	335931		Current-carrying wiring device mfg	519	5,877,522	44,907	1,293,583
3644			Noncurrent-carrying wiring devices	219	4,451,186	23,540	787,075
	335932		Noncurrent-carrying wiring device mfg	219	4,451,186	23,540	787,075
3645			Residential lighting fixtures	497	2,177,355	16,395	406,444
97% of	335121	20	Residential electric lighting fixture mfg (pt)	497	2,177,355	16,395	406,444
3646			Commercial lighting fixtures	356	4,047,437	23,090	657,341
	335122		Commercial/industrial/institutional electric lighting fixture mfg	356	4,047,437	23,090	657,341
3647			Vehicular lighting equipment	106	3,282,824	16,506	628,534
	336321		Vehicular lighting equipment mfg	106	3,282,824	16,506	628,534
3648			Lighting equipment, n.e.c.	327	3,054,806	18,274	541,183
100% of	335129	10	Other lighting equipment mfg (pt)	327	3,054,806	18,274	541,183

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
365	97/92		**Household audio and video equipment**	**834**	**10,699,568**	**48,325**	**1,438,451**
3651			Household audio & video equipment	554	8,454,194	31,727	944,647
	334310		Audio & video equipment mfg	554	8,454,194	31,727	944,647
3652			Prerecorded records & tapes	280	2,245,374	16,598	493,804
58% of	334612	10	Prerecorded CD (except software), tape, & record reproducing (pt)	280	2,245,374	16,598	493,804

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
366	97/92		**Communications equipment**	**2,213**	**80,949,148**	**283,751**	**13,272,409**
3661			Telephone & telegraph apparatus	625	39,673,619	110,408	5,591,933

		334210		Telephone apparatus mfg	598	38,300,044	104,262	5,329,203
1% of		334416	10	Electronic coil, transformer, & other inductor mfg (pt)	7	8,904	63	1,836
5% of		334418	10	Printed circuit assembly (electronic assembly) mfg (pt)	20	1,364,671	6,083	260,894
	3663			Radio & TV communications equipment	1,091	37,042,241	148,156	6,765,352
94% of		334220	10	Radio & TV broadcasting & wireless communications equipment mfg (	1,091	37,042,241	148,156	6,765,352
	3669			Communications equipment, n.e.c.	497	4,233,288	25,187	915,124
		334290		Other communications equipment mfg	497	4,233,288	25,187	915,124
	SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
	367	9/32		**Electronic components and accessories**	**6,605**	**141,997,578**	**611,693**	**22,958,642**
	3671			Electron tubes	159	3,858,499	21,976	742,074
		334411		Electron tube mfg	159	3,858,499	21,976	742,074
	3672			Printed circuit boards	1,401	9,787,576	76,702	2,313,578
		334412		Bare printed circuit board mfg	1,401	9,787,576	76,702	2,313,578
	3674			Semiconductors & related devices	1,099	78,539,562	199,497	10,112,757
		334413		Semiconductor & related device mfg	1,099	78,539,562	199,497	10,112,757
	3675			Electronic capacitors	129	2,482,163	18,882	531,259
		334414		Electronic capacitor mfg	129	2,482,163	18,882	531,259
	3676			Electronic resistors	119	1,280,527	11,964	314,045
		334415		Electronic resistor mfg	119	1,280,527	11,964	314,045
	3677			Electronic coils & transformers	426	1,512,232	19,178	450,160
98% of		334416	20	Electronic coil, transformer, & other inductor mfg (pt)	426	1,512,232	19,178	450,160
	3678			Electronic connectors	347	5,598,906	37,232	1,172,969
		334417		Electronic connector mfg	347	5,598,906	37,232	1,172,969
	3679			Electronic components, n.e.c.	2,925	38,938,113	226,262	7,321,800
6% of		334220	20	Radio & TV broadcasting & wireless communications equipment mfg (	126	2,265,873	16,305	606,528
95% of		334418	20	Printed circuit assembly (electronic assembly) mfg (pt)	695	24,704,154	104,971	3,582,172
		334419		Other electronic component mfg	1,851	10,547,090	92,200	2,769,216
8% of		336322	10	Other motor vehicle electrical & electronic equipment mfg (pt)	253	1,420,996	12,786	363,884
	SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**

369	97/92	**Miscellaneous electrical equipment and supplies**	**1,701**	**D**	**(100,000+)**	**D**
3691		Storage batteries	137	4,432,112	23,288	789,579
	335911	Storage battery mfg	137	4,432,112	23,288	789,579
3692		Primary batteries, dry & wet	45	2,322,896	8,917	281,467
	335912	Primary battery mfg	45	2,322,896	8,917	281,467
3694		Engine electrical equipment	569	9,074,335	52,216	1,642,014
	54% of 336322 20	Other motor vehicle electrical & electronic equipment mfg (pt)	569	9,074,335	52,216	1,642,014
3695		Magnetic & optical recording media	259	4,726,363	21,345	815,970
	334613	Magnetic & optical recording media mfg	259	4,726,363	21,345	815,970
3699		Electrical equipment & supplies, n.e.c.	691	D	(25k-49999)	D
	2% of 332212 50	Hand & edge tool mfg (pt)	4	140,811	424	32,361
	0% of 333292 20	Textile machinery mfg (pt)	0	0	0	0
	D 333293 20	Printing machinery & equipment mfg (pt)	5	D	(100-249)	D
	0% of 333314 10	Optical instrument & lens mfg (pt)	5	7,320	56	1,871
	0% of 333315 10	Photographic & photocopying equipment mfg (pt)	0	0	0	0
	10% of 333319 40	Other commercial & service industry machinery mfg (pt)	57	934,728	8,513	382,013
	3% of 333512 20	Machine tool (metal cutting types) mfg (pt)	8	151,363	522	27,050
	D 333618 20	Other engine equipment mfg (pt)	2	D	(1-19)	D
	0% of 333992 20	Welding & soldering equipment mfg (pt)	6	11,101	71	3,028
	0% of 334119 30	Other computer peripheral equipment mfg (pt)	0	0	0	0
	1% of 334510 10	Electromedical & electrotherapeutic apparatus mfg (pt)	11	52,855	542	20,770
	0% of 334511 10	Search, detection, navigation, & guidance instrument mfg (pt)	7	77,832	604	24,725
	1% of 334516 10	Analytical laboratory instrument mfg (pt)	10	36,473	159	7,518
	0% of 334519 10	Other measuring & controlling device mfg (pt)	5	6,174	29	1,621
	0% of 335129 20	Other lighting equipment mfg (pt)	4	859	8	180
	59% of 335999 20	All other miscellaneous electrical equipment & component mfg (pt)	567	4,051,267	26,072	923,183
	0% of 339114 10	Dental equipment & supplies mfg (pt)	0	0	0	0

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(Bridge complete.) Comparable SIC derivable from NAICS data.

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(Drawbridge open.) Not comparable SIC sales or receipts cannot be estimated within 3% from NAICS data.

Data in formats for

1997 Economic Census: Bridge Between SIC and NAICS

SIC: Manufacturing

SIC 37: Transportation equipment - Finder by 3-digit SIC

Includes only establishments with payroll. Introductory text includes scope and methodology.

Go to bridge	SIC	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
	37	Transportation equipment	12,387	515,881,602	1,561,662	68,298,623
	371	Motor vehicles and equipment	5,274	D	(100,000+)	D
	372	Aircraft and parts	1,711	98,963,996	411,247	20,703,396
	373	Ship and boat building and repairing	3,482	17,015,123	148,261	4,641,293
	374	Railroad equipment	207	7,916,635	31,633	1,234,564
	375	Motorcycles, bicycles, and parts	385	D	(10k-24999)	D
	376	Guided missiles, space vehicles, parts	99	18,929,257	76,808	4,500,660
	379	Miscellaneous transportation equipment	1,229	D	(50k-99999)	D

N=Comparable data not available D=Withheld to avoid disclosure

SIC 37: Transportation equipment - 4-digit SIC to 6-digit NAICS

Includes only establishments with payroll. Introductory text includes scope and methodology. Figures to the left of NAICS codes indicate the percent of NAICS receipts represented by this part; and link to Table 1 where other parts of the NAICS are shown. 97/92 links to 1997 and 1992 Comparative Statistics for whole SICs.

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
371	97/92		**Motor vehicles and equipment**	**5,274**	**D**	**(100,000+)**	**D**
3711			Motor vehicles & car bodies	472	D	(100,000+)	D
	336111		Automobile mfg	194	95,385,563	114,060	6,411,952
	336112		Light truck & utility vehicle mfg	112	110,400,169	94,033	5,361,980
	336120		Heavy duty truck mfg	84	14,490,344	28,214	1,212,651

	SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
1% of		336211	10	Motor vehicle body mfg (pt)	76	82,633	404	10,503
D		336992	10	Military armored vehicle, tank, & tank component mfg (pt)	6	D	(250-499)	D
	3713			Truck & bus bodies	715	8,719,326	41,779	1,189,519
96% of		336211	20	Motor vehicle body mfg (pt)	715	8,719,326	41,779	1,189,519
	3714			Motor vehicle parts & accessories	3,609	120,951,593	490,657	19,565,925
3% of		336211	30	Motor vehicle body mfg (pt)	23	265,552	1,201	40,558
		336312		Gasoline engine & engine parts mfg	881	25,974,369	81,368	3,555,964
38% of		336322	30	Other motor vehicle electrical & electronic equipment mfg (pt)	193	6,446,681	30,489	1,054,750
		336330		Motor vehicle steering & suspension component (except spring) mfg	212	10,750,312	48,944	2,336,212
100% of		336340	20	Motor vehicle brake system mfg (pt)	269	10,033,288	43,132	1,486,119
		336350		Motor vehicle transmission & power train parts mfg	523	33,288,093	111,954	5,564,722
100% of		336399	20	All other motor vehicle parts mfg (pt)	1,508	34,193,298	173,569	5,527,600
	3715			Truck trailers	390	5,507,768	30,678	836,590
		336212		Truck trailer mfg	390	5,507,768	30,678	836,590
	3716			Motor homes	88	3,943,709	18,086	507,700
		336213		Motor home mfg	88	3,943,709	18,086	507,700

	SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
	372			**Aircraft and parts**	**1,711**	**98,963,996**	**411,247**	**20,703,396**
	3721			Aircraft	204	56,273,651	200,961	10,733,030
		336411		Aircraft mfg	204	56,273,651	200,961	10,733,030
	3724			Aircraft engines & engine parts	369	22,617,284	82,557	4,223,020
		336412		Aircraft engine & engine parts mfg	369	22,617,284	82,557	4,223,020
	3728			Aircraft parts & equipment, n.e.c.	1,138	20,073,061	127,729	5,747,346
0% of		332912	20	Fluid power valve & hose fitting mfg (pt)	0	0	0	0
0% of		333995	20	Fluid power cylinder & actuator mfg (pt)	0	0	0	0
0% of		333996	20	Fluid power pump & motor mfg (pt)	0	0	0	0
		336413		Other aircraft part & auxiliary equipment mfg	1,138	20,073,061	127,729	5,747,346

	SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
	373			**Ship and boat building and repairing**	**3,482**	**17,015,123**	**148,261**	**4,641,293**
	3731			Ship building & repairing	700	10,571,810	97,385	3,366,404
		336611		Ship building & repairing	700	10,571,810	97,385	3,366,404

3732			Boat building & repairing	2,782	6,443,313	50,876	1,274,889
	336612		Boat building	1,043	5,622,040	41,422	1,033,974
	18% of 811490	20	Boat repair	1,739	821,273	9,454	240,915

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
374			**Railroad equipment**	**207**	**7,916,635**	**31,633**	**1,234,564**
3743			Railroad equipment	207	7,916,635	31,633	1,234,564
	0% of 333911	20	Pump & pumping equipment mfg (pt)	0	0	0	0
	96% of 336510	20	Railroad rolling stock mfg (pt)	207	7,916,635	31,633	1,234,564

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
375			**Motorcycles, bicycles, and parts**	**385**	**D**	**(10k-24999)**	**D**
3751			Motorcycles, bicycles, & parts	385	D	(10k-24999)	D
	D 336991	10	Motorcycle, bicycle, & parts mfg (pt)	385	D	(10k-24999)	D

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
376			**Guided missiles, space vehicles, parts**	**99**	**18,929,257**	**76,808**	**4,500,660**
3761			Guided missiles & space vehicles	22	14,791,466	52,158	3,156,221
	336414		Guided missile & space vehicle mfg	22	14,791,466	52,158	3,156,221
3764			Space propulsion units & parts	28	3,239,033	18,540	1,066,084
	336415		Guided missile & space vehicle propulsion unit & parts mfg	28	3,239,033	18,540	1,066,084
3769			Space vehicle equipment, n.e.c.	49	898,758	6,110	278,355
	336419		Other guided missile & space vehicle parts & auxiliary equip mfg	49	898,758	6,110	278,355

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
379			**Miscellaneous transportation equipment**	**1,229**	**D**	**(50k-99999)**	**D**
3792			Travel trailer & campers	315	3,076,049	20,112	506,058
	67% of 336214	10	Travel trailer & camper mfg (pt)	315	3,076,049	20,112	506,058
3795			Tanks & tank components	37	D	(5000-9999)	D
	D 336992	20	Military armored vehicle, tank, & tank component mfg (pt)	37	D	(5000-9999)	D
3799			Transportation equipment, n.e.c.	877	D	(25k-49999)	D

D 332212 60	Hand & edge tool mfg (pt)	1	D	(20-99)	D
33% of 336214 20	Travel trailer & camper mfg (pt)	498	1,485,367	13,240	299,845
336999	All other transportation equipment mfg	378	4,557,989	19,466	512,362

N=Comparable data not available D=Withheld to avoid disclosure

Σ=sum of NAICS parts listed below the symbol 97/92 links to Comparative Statistics for 1992 and 1997

(Bridge complete.)	Comparable	SIC derivable from NAICS data.
(Drawbridge slightly open.)	Almost comparable	Sales or receipts from NAICS are within 3% of SIC sales or receipts.
(Drawbridge open.)	Not comparable	SIC sales or receipts cannot be estimated within 3% from NAICS data.

All-sector menu   Menu of all 2-digit SICs   Data in formats for downloading   PDF report

Source: 1997 Economic Census, Comparative Statistics

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1997 Economic Census: Bridge Between SIC and NAICS

SIC: Manufacturing

SIC 38: Instruments and related products - Finder by 3-digit SIC

Includes only establishments with payroll. Introductory text includes scope and methodology.

Go to bridge	SIC	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
	38	Instruments and related products	11,727	D	(100,000+)	D
	381	Search and navigation equipment	680	32,497,776	187,557	9,958,084
	382	Measuring and controlling devices	4,787	46,449,122	263,237	11,037,829
	384	Medical instruments and supplies	4,818	D	(100,000+)	D
	385	Ophthalmic goods	575	3,607,813	26,366	814,242
	386	Photographic equipment and supplies	739	21,305,761	63,642	2,928,089
	387	Watches, clocks, watchcases, and parts	128	718,191	5,646	155,180

N=Comparable data not available D=Withheld to avoid disclosure

SIC 38: Instruments and related products - 4-digit SIC to 6-digit NAICS

Includes only establishments with payroll. Introductory text includes scope and methodology. Figures to the left of NAICS codes indicate the percent of NAICS receipts represented by this part; and link to Table 1 where other parts of the NAICS are shown. 97/92 links to 1997 and 1992 Comparative Statistics for whole SICs.

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
381	97/92		**Search and navigation equipment**	**680**	**32,497,776**	**187,557**	**9,958,084**
3812			Search & navigation equipment	680	32,497,776	187,557	9,958,084
	100% of 334511	20	Search, detection, navigation, & guidance instrument mfg (pt)	680	32,497,776	187,557	9,958,084

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
382	97/92		**Measuring and controlling devices**	**4,787**	**46,449,122**	**263,237**	**11,037,829**
3821							

			Laboratory apparatus & furniture	385	2,471,153	18,253	686,742
	339111		Laboratory apparatus & furniture mfg	385	2,471,153	18,253	686,742
3822			Environmental controls	317	2,935,692	21,450	664,820
	334512		Automatic environmental control mfg	317	2,935,692	21,450	664,820
3823			Process control instruments	1,002	7,890,923	49,196	2,004,259
	334513		Industrial process control instrument mfg	1,002	7,890,923	49,196	2,004,259
3824			Fluid meters & counting devices	222	3,765,769	17,390	683,294
	334514		Totalizing fluid meter & counting device mfg	222	3,765,769	17,390	683,294
3825			Instruments to measure electricity	843	13,877,200	63,522	3,008,675
	2% of 334416	30	Electronic coil, transformer, & other inductor mfg (pt)	17	24,303	190	6,985
	334515		Electricity measuring & testing instrument mfg	826	13,852,897	63,332	3,001,690
3826			Analytical instruments	664	7,157,038	38,200	1,782,600
	100% of 334516	20	Analytical laboratory instrument mfg (pt)	664	7,157,038	38,200	1,782,600
3827			Optical instruments & lenses	495	3,174,652	20,801	833,784
	100% of 333314	20	Optical instrument & lens mfg (pt)	495	3,174,652	20,801	833,784
3829			Measuring & controlling devices, n.e.c.	859	5,176,695	34,425	1,373,655
	100% of 334519	20	Other measuring & controlling device mfg (pt)	853	5,114,547	33,904	1,356,368
	0% of 339112	10	Surgical & medical instrument mfg (pt)	6	62,148	521	17,287
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
384	9/32		**Medical instruments and supplies**	**4,818**	**D**	**(100,000+)**	**D**
3841			Surgical & medical instruments	1,598	18,450,024	107,298	4,139,100
	100% of 339112	20	Surgical & medical instrument mfg (pt)	1,598	18,450,024	107,298	4,139,100
3842			Surgical appliances & supplies	1,728	D	(50k-99999)	D
	D 322121	30	Paper (except newsprint) mills (pt)	2	D	(250-499)	D
	7% of 322291	20	Sanitary paper product mfg (pt)	16	651,398	2,236	68,411
	7% of 334510	20	Electromedical & electrotherapeutic apparatus mfg (pt)	74	807,427	6,722	224,883
	96% of 339113	20	Surgical appliance & supplies mfg (pt)	1,636	14,743,779	82,390	2,865,055
3843			Dental equipment & supplies	877	2,699,867	18,072	613,286
	100% of 339114	20	Dental equipment & supplies mfg (pt)	877	2,699,867	18,072	613,286
3844			X-ray apparatus & tubes	155	3,942,256	14,276	664,233
	334517		Irradiation apparatus mfg	155	3,942,256	14,276	664,233

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
3845			Electromedical equipment	460	10,567,566	47,121	2,372,703
	92% of 334510	30	Electromedical & electrotherapeutic apparatus mfg (pt)	460	10,567,566	47,121	2,372,703
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
385	97/92		**Ophthalmic goods**	**575**	**3,607,813**	**26,366**	**814,242**
3851			Ophthalmic goods	575	3,607,813	26,366	814,242
	339115		Ophthalmic goods mfg	575	3,607,813	26,366	814,242
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
386	97/92		**Photographic equipment and supplies**	**739**	**21,305,761**	**63,642**	**2,928,089**
3861			Photographic equipment & supplies	739	21,305,761	63,642	2,928,089
	325992		Photographic film, paper, plate, & chemical mfg	311	12,895,637	38,935	1,828,139
	100% of 333315	20	Photographic & photocopying equipment mfg (pt)	428	8,410,124	24,707	1,099,950
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Value of Shipments ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
387	97/92		**Watches, clocks, watchcases, and parts**	**128**	**718,191**	**5,646**	**155,180**
3873			Watches, clocks, & watchcases	128	718,191	5,646	155,180
	78% of 334518	30	Watch, clock, & part mfg (pt)	128	718,191	5,646	155,180

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(Bridge complete.)	Comparable	SIC derivable from NAICS data.
(Drawbridge slightly open.)	Almost comparable	Sales or receipts from NAICS are within 3% of SIC sales or receipts.
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All-sector menu   Menu of all 2-digit SICs   Data in formats for downloading   PDF report

Source: 1997 Economic Census, Comparative Statistics

Last modified: 6/27/00

U.S. Census Bureau

1997 Economic Census: Bridge Between SIC and NAICS

SIC: Manufacturing

SIC 39: Miscellaneous manufacturing industries - Finder by 3-digit SIC

Includes only establishments with payroll. Introductory text includes scope and methodology.

Go to bridge	SIC	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
	39	Miscellaneous manufacturing industries	18,043	50,997,838	393,972	10,563,481
	391	Jewelry, silverware, and plated ware	2,828	7,243,618	46,547	1,208,070
	393	Musical instruments	576	1,356,651	13,411	363,022
	394	Toys and sporting goods	3,600	D	(100,000+)	D
	395	Pens, pencils, office, and art supplies	1,017	3,987,200	28,150	738,265
	396	Costume jewelry and notions	1,075	D	(10k-24999)	D
	399	Miscellaneous manufactures	8,947	D	(100,000+)	D

N=Comparable data not available D=Withheld to avoid disclosure

SIC 39: Miscellaneous manufacturing industries - 4-digit SIC to 6-digit NAICS

Includes only establishments with payroll. Introductory text includes scope and methodology. Figures to the left of NAICS codes indicate the percent of NAICS receipts represented by this part; and link to Table 1 where other parts of the NAICS are shown. 97/92 links to 1997 and 1992 Comparative Statistics for whole SICs.

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
391	97/92		**Jewelry, silverware, and plated ware**	**2,828**	**7,243,618**	**46,547**	**1,208,070**
3911			Jewelry, precious metal	2,272	5,416,836	34,694	884,942
	100% of 339911	20	Jewelry (except costume) mfg (pt)	2,272	5,416,836	34,694	884,942
3914			Silverware & plated ware	162	907,716	6,457	187,774
	0% of 332211	20	Cutlery & flatware (except precious) mfg (pt)	11	8,032	101	2,699
	99% of 339912	20	Silverware & plated ware mfg (pt)	151	899,684	6,356	185,075

3915			Jewelers' materials & lapidary work	394	919,066	5,396	135,354
	339913		Jewelers' material & lapidary work mfg	394	919,066	5,396	135,354

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
393	97/92		**Musical instruments**	**576**	**1,356,651**	**13,411**	**363,022**
3931			Musical instruments	576	1,356,651	13,411	363,022
	339992		Musical instrument mfg	576	1,356,651	13,411	363,022

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
394	97/92		**Toys and sporting goods**	**3,600**	**D**	**(100,000+)**	**D**
3942			Dolls	240	299,821	3,393	63,722
	339931		Doll & stuffed toy mfg	240	299,821	3,393	63,722
3944			Games, toys, & children's vehicles	789	D	(25k-49999)	D
	D 336991	20	Motorcycle, bicycle, & parts mfg (pt)	4	D	(20-99)	D
	339932		Game, toy, & children's vehicle mfg	785	4,534,497	29,622	773,459
3949			Sporting & athletic goods, n.e.c.	2,571	10,591,160	69,664	1,831,218
	339920		Sporting & athletic goods mfg	2,571	10,591,160	69,664	1,831,218

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
395	97/92		**Pens, pencils, office, and art supplies**	**1,017**	**3,987,200**	**28,150**	**738,265**
3951			Pens & mechanical pencils	112	1,590,770	8,394	261,580
	339941		Pen & mechanical pencil mfg	112	1,590,770	8,394	261,580
3952			Lead pencils & art goods	152	883,200	6,002	143,660
	0% of 325998	30	All other miscellaneous chemical product & preparation mfg (pt)	0	0	0	0
	0% of 337127	30	Institutional furniture mfg (pt)	9	16,749	187	5,901
	70% of 339942	30	Lead pencil & art good mfg (pt)	143	866,451	5,815	137,759
3953			Marking devices	634	643,007	7,831	185,316
	339943		Marking device mfg	634	643,007	7,831	185,316
3955			Carbon paper & inked ribbons	119	870,223	5,923	147,709
	339944		Carbon paper & inked ribbon mfg	119	870,223	5,923	147,709

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
396	97/92		**Costume jewelry and notions**	**1,075**	**D**	**(10k-24999)**	**D**
3961			Costume jewelry	826	1,223,475	13,976	314,581

	96% of 339914	30	Costume jewelry & novelty mfg (pt)	826	1,223,475	13,976	314,581
3965			Fasteners, buttons, needles, & pins	249	D	(5000-9999)	D
	D 339993	20	Fastener, button, needle, & pin mfg (pt)	249	D	(5000-9999)	D

SIC	NAICS	Pt	Description	Establish-ments	Value of Shipments ($1,000)	Paid employees	Annual payroll ($1,000)
399	97/92		**Miscellaneous manufactures**	**8,947**	**D**	**(100,000+)**	**D**
3991			Brooms & brushes	274	1,703,139	13,882	372,010
	84% of 339994	20	Broom, brush, & mop mfg (pt)	274	1,703,139	13,882	372,010
3993			Signs & advertising displays	5,709	7,910,809	82,956	2,382,461
	339950		Sign mfg	5,709	7,910,809	82,956	2,382,461
3995			Burial caskets	177	1,271,184	6,962	212,491
	339995		Burial casket mfg	177	1,271,184	6,962	212,491
3996			Hard surface floor coverings	26	1,819,931	5,614	255,635
	97% of 326192	20	Resilient floor covering mfg (pt)	26	1,819,931	5,614	255,635
3999			Mfg industries, n.e.c.	2,761	D	(50k-99999)	D
	3% of 314999	50	All other miscellaneous textile product mills (pt)	52	173,353	2,167	42,673
	1% of 316110	20	Leather & hide tanning & finishing (pt)	26	24,625	329	7,616
	0% of 321999	50	All other miscellaneous wood product mfg (pt)	0	0	0	0
	0% of 322299	30	All other converted paper product mfg (pt)	0	0	0	0
	0% of 323110	30	Commercial lithographic printing (pt)	0	0	0	0
	0% of 323111	30	Commercial gravure printing (pt)	0	0	0	0
	0% of 323112	30	Commercial flexographic printing (pt)	0	0	0	0
	0% of 323113	40	Commercial screen printing (pt)	0	0	0	0
	0% of 323119	30	Other commercial printing (pt)	0	0	0	0
	1% of 325998	40	All other miscellaneous chemical product & preparation mfg (pt)	9	80,624	572	18,596
	1% of 326199	20	All other plastics product mfg (pt)	140	319,241	3,141	77,397
	D 332212	70	Hand & edge tool mfg (pt)	7	D	(500-999)	D
	3% of 332999	80	All other miscellaneous fabricated metal product mfg (pt)	185	285,362	3,231	85,799
	3% of 335121	30	Residential electric lighting fixture mfg (pt)	53	69,864	1,216	22,121
	1% of 337127	40	Institutional furniture mfg (pt)	5	28,296	329	8,183
	85% of 339999	20	All other miscellaneous mfg (pt)	2,284	7,183,815	60,397	1,563,790

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Σ=sum of NAICS parts listed below the symbol 97/92 links to Comparative Statistics for 1992 and 1997

(Bridge complete.) Comparable SIC derivable from NAICS data.

(Drawbridge slightly open.) Almost comparable Sales or receipts from NAICS are within 3% of SIC sales or receipts.

1997 Economic Census: Bridge Between SIC and NAICS SIC: Transportation, communications, and utilities %% **

SIC 41: Local and interurban passenger transportation - Finder by 3-digit SIC

Includes only establishments with payroll. Introductory text includes scope and methodology.

Go to bridge	SIC	Description	Establish-ments	Revenue ($1,000)	Paid employees	Annual payroll ($1,000)
	41	Local and interurban passenger transportation	19,621	D	(100,000+)	D
	411	Local and suburban passenger transportation	10,147	D	(100,000+)	D
	412	Taxi service	3,184	1,280,597	27,850	392,759
	413	Interurban and rural bus transportation	407	1,147,432	19,900	549,727
	414	Charter bus service	1,531	1,768,199	31,483	548,026
	415	School bus service	4,326	4,233,836	147,441	1,810,695
	417	Bus terminal and service facilities	26	15,253	220	5,190

N=Comparable data not available D=Withheld to avoid disclosure

%% Data do not include large certificated passenger carriers that report to the Office of Airline Statistics, U.S. Department of Transportation

** Railroad transportation and U.S. Postal Service industries are out of scope for the 1997 Economic Ce

SIC 41: Local and interurban passenger transportation - 4-digit SIC to 6-digit NAICS

Includes only establishments with payroll. Introductory text includes scope and methodology. Figures to the left of NAICS codes indicate the percent of NAICS receipts represented by this part; and link to Table 1 where other parts of the NAICS are shown. 97/92 links to 1997 and 1992 Comparative Statistics for whole SICs.

SIC	NAICS	Pt	Description	Establish-ments	Revenue ($1,000)	Paid employees	Annual payroll ($1,000)
411	97/92		**Local and suburban passenger transportation**	**10,147**	**D**	**(100,000+)**	**D**
4111			Local & suburban transit	1,152	D	(25k-49999)	D
	485111		Mixed mode transit systems	28	51,567	759	24,112
	485112		Commuter rail systems	16	D	(2500-	D

SIC	NAICS	Pt	Description	Establish-ments	Revenue ($1,000)	Paid employees	Annual payroll ($1,000)
						4999)	
	485113		Bus & motor vehicle transit systems	542	1,152,525	27,448	744,397
	485119		Other urban transit systems	32	D	(500-999)	D
	90% of 485999	10	Scheduled airport shuttle service	534	601,988	13,435	217,633
4119			Other local passenger transportation	8,995	8,147,039	179,736	3,183,251
	485320		Limousine service	3,234	1,873,924	29,432	487,867
	4% of 485410	20	Employee bus service	158	158,947	4,223	67,261
	485991		Special needs transportation	1,789	1,141,413	31,791	486,676
	10% of 485999	20	All other passenger transportation	232	67,395	1,078	15,557
	83% of 487110	10	Sightseeing buses	307	462,186	6,858	145,734
	88% of 621910	90	Ambulance or rescue service (except by air)	3,275	4,443,174	106,354	1,980,156
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Revenue ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
412	97/92		**Taxi service**	**3,184**	**1,280,597**	**27,850**	**392,759**
4121			Taxi service	3,184	1,280,597	27,850	392,759
	485310		Taxi service	3,184	1,280,597	27,850	392,759
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Revenue ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
413	97/92		**Interurban and rural bus transportation**	**407**	**1,147,432**	**19,900**	**549,727**
4131			Interurban & rural bus transportation	407	1,147,432	19,900	549,727
	485210		Interurban & rural bus transportation	407	1,147,432	19,900	549,727
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Revenue ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
414	97/92		**Charter bus service**	**1,531**	**1,768,199**	**31,483**	**548,026**
4141			Charter bus service, local	482	459,953	8,694	143,572
	26% of 485510	10	Charter bus service, local	482	459,953	8,694	143,572
4142			Charter bus service, interstate/interurban	1,049	1,308,246	22,789	404,454
	74% of 485510	20	Charter bus service, interstate/interurban	1,049	1,308,246	22,789	404,454
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Revenue ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
415	97/92		**School bus service**	**4,326**	**4,233,836**	**147,441**	**1,810,695**
4151			School bus service	4,326	4,233,836	147,441	1,810,695
	96% of 485410	10	School bus service	4,326	4,233,836	147,441	1,810,695
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Revenue ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
417	97/92		**Bus terminal and service facilities**	**26**	**15,253**	**220**	**5,190**
4173			Bus terminal & service facilities	26	15,253	220	5,190

4% of 488490	10	Terminal or maintenance facilities for motor vehicle pass trans	26	15,253	220	5,190

N=Comparable data not available D=Withheld to avoid disclosure
%% Data do not include large certificated passenger carriers that report to the Office of Airline Statistics, U.S. Department of Transportation
** Railroad transportation and U.S. Postal Service industries are out of scope for the 1997 Economic Ce

Σ=sum of NAICS parts listed below the symbol 97/92 links to Comparative Statistics for 1992 and 1997

(Bridge complete.)	Comparable	SIC derivable from NAICS data.
(Drawbridge slightly open.)	Almost comparable	Sales or receipts from NAICS are within 3% of SIC sales or receipts.
(Drawbridge open.)	Not comparable	SIC sales or receipts cannot be estimated within 3% from NAICS data.

All-sector menu Menu of all 2-digit SICs Data in formats for downloading PDF report

Source: 1997 Economic Census, Comparative Statistics

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1997 Economic Census: Bridge Between SIC and NAICS SIC: Transportation, communications, and utilities %% **

SIC 42: Motor freight transportation and warehousing - Finder by 3-digit SIC

Includes only establishments with payroll. Introductory text includes scope and methodology.

Go to bridge	SIC	Description	Establish-ments	Revenue ($1,000)	Paid employees	Annual payroll ($1,000)
	42	Motor freight transportation and warehousing	133,373	197,375,341	1,960,130	55,739,452
	421	Trucking and courier services, except air	119,868	184,178,773	1,831,577	52,513,343
	422	Public warehousing and storage	13,491	13,183,579	128,433	3,222,154
	423	Trucking terminal facilities	14	12,989	120	3,955

N=Comparable data not available D=Withheld to avoid disclosure

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** Railroad transportation and U.S. Postal Service industries are out of scope for the 1997 Economic Ce

SIC 42: Motor freight transportation and warehousing - 4-digit SIC to 6-digit NAICS

Includes only establishments with payroll. Introductory text includes scope and methodology. Figures to the left of NAICS codes indicate the percent of NAICS receipts represented by this part; and link to Table 1 where other parts of the NAICS are shown. 97/92 links to 1997 and 1992 Comparative Statistics for whole SICs.

SIC	NAICS	Pt	Description	Establish-ments	Revenue ($1,000)	Paid employees	Annual payroll ($1,000)
421	97/92		**Trucking and courier services, except air**	**119,868**	**184,178,773**	**1,831,577**	**52,513,343**
4212			Local trucking without storage	61,063	51,384,852	473,694	12,642,812
90% of	484110	Σ	General freight trucking, local	14,545	11,108,345	73,967	3,166,529
	484110	10	General freight trucking without storage, local, truckload	10,296	7,783,545	73,967	1,934,702
	484110	20	General freight trucking w/o storage, local, less than truckload	4,249	3,324,800	47,246	1,231,827
10% of	484210	10	Used household & office goods moving, local, without storage	3,259	1,198,983	20,858	395,383
96% of	484220	Σ	Specialized freight (except used goods) trucking, local	34,935	18,932,851	10,951	4,514,945

	484220	10	Hazardous materials trucking (except waste), local	1,434	1,267,441	10,951	366,278
	484220	20	Agricultural products trucking without storage, local	8,065	2,785,495	29,925	629,234
	484220	30	Dump trucking	17,440	9,748,351	81,553	2,083,930
	484220	40	Specialized trucking without storage, local	7,996	5,131,564	56,450	1,435,503
	562111		Solid waste collection	7,083	18,211,495	137,049	4,048,032
	562112		Hazardous waste collection	414	1,095,553	8,468	317,464
	562119		Other waste collection	827	837,625	7,227	200,459
4213			Trucking, except local	47,315	105,764,108	915,091	28,992,807
	484121		General freight trucking, long-distance, truckload	23,111	51,142,148	425,758	12,690,093
	484122		General freight trucking, long-distance, less than truckload	6,210	25,010,091	258,972	9,509,916
	72% of 484210	20	Used household & office goods moving, long-distance	3,555	9,111,477	65,734	1,741,891
	100% of 484230	Σ	Specialized freight (except used goods) trucking, long-distance	14,439	20,500,392	28,396	5,050,907
	484230	10	Hazardous materials trucking (except waste), long-distance	2,043	3,840,724	28,396	918,360
	484230	20	Agricultural products trucking, long-distance	5,389	3,693,332	32,371	789,921
	484230	30	Other specialized trucking, long-distance	7,007	12,966,336	103,860	3,342,626
4214			Local trucking with storage	3,744	4,221,111	57,749	1,401,608
	10% of 484110	Σ	General freight trucking, local	915	1,164,931	7,468	355,591
	484110	30	General freight trucking with storage, local, truckload	542	678,272	7,468	199,953
	484110	40	General freight trucking with storage, local, less than truckload	373	486,659	6,096	155,638
	18% of 484210	30	Used household & office goods moving, local, with storage	2,286	2,273,241	34,958	806,674
	4% of 484220	50	Specialized trucking with storage, local	543	782,939	9,227	239,343
4215			Courier services, except by air	7,746	22,808,702	385,043	9,476,116
	53% of 492110	10	Courier services (except by air)	2,362	19,289,602	317,630	8,234,379
	492210		Local messengers & local delivery	5,384	3,519,100	67,413	1,241,737

SIC	NAICS	Pt	Description	Establishments	Revenue ($1,000)	Paid employees	Annual payroll ($1,000)
422			**Public warehousing and storage**	**13,491**	**13,183,579**	**128,433**	**3,222,154**
4221			Farm product warehousing & storage facilities	486	673,198	5,280	118,542
	493130		Farm product warehousing & storage	486	673,198	5,280	118,542
4222			Refrigerated products warehousing	872	2,268,823	22,109	609,335
	100% of 493120	10	Refrigerated products warehousing	872	2,268,823	22,109	609,335

SIC	NAICS	Pt	Description	Establish-ments	Revenue ($1,000)	Paid employees	Annual payroll ($1,000)
4225			General warehousing & storage	10,912	7,846,325	81,450	1,918,952
	100% of 493110	10	General warehousing & storage (except in foreign trade zones)	3,918	5,320,671	62,777	1,622,917
	531130		Lessors of miniwarehouses & self storage units	6,994	2,525,654	18,673	296,035
4226			Other special warehousing & storage	1,221	2,395,233	19,594	575,325
	0% of 493110	20	General warehousing & storage in foreign trade zones	3	718	7	111
	0% of 493120	20	Fur storage	5	1,504	12	249
	100% of 493190	Σ	Other warehousing & storage	1,213	2,393,011	6,158	574,965
	493190	10	Household goods warehousing & storage	317	451,574	6,158	141,630
	493190	20	Specialized goods warehousing & storage	896	1,941,437	13,417	433,335
SIC	**NAICS**	**Pt**	**Description**	**Establish-ments**	**Revenue ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
423	97/92		**Trucking terminal facilities**	**14**	**12,989**	**120**	**3,955**
4231			Trucking terminal facilities	14	12,989	120	3,955
	3% of 488490	20	Motor freight terminal & joint terminal maint facility trans	14	12,989	120	3,955

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1997 Economic Census: Bridge Between SIC and NAICS

SIC: Retail trade

SIC 55: Automotive dealers and gasoline service stations - Finder by 3-digit SIC

Includes only establishments with payroll. Introductory text includes scope and methodology.

Go to bridge	SIC	Description	Establish-ments	Sales ($1,000)	Paid employees	Annual payroll ($1,000)
	55	Automotive dealers and gasoline service stations	202,237	788,231,182	2,283,756	55,502,391
	551	Motor vehicle dealers (new and used)	25,897	518,971,824	1,046,243	35,202,751
	552	Motor vehicle dealers (used only)	23,340	34,680,468	92,752	2,197,396
	553	Auto and home supply stores	40,565	35,028,316	300,953	6,044,147
	554	Gasoline service stations	98,846	170,660,068	741,040	9,488,181
	555	Boat dealers	5,262	8,934,230	35,134	839,296
	556	Recreational vehicle dealers	3,014	10,069,749	29,463	813,962
	557	Motorcycle dealers	3,635	7,369,260	29,026	712,065
	559	Automotive dealers, not elsewhere classified	1,678	2,517,267	9,145	204,593

N=Comparable data not available D=Withheld to avoid disclosure

SIC 55: Automotive dealers and gasoline service stations - 4-digit SIC to 6-digit NAICS

Includes only establishments with payroll. Introductory text includes scope and methodology. Figures to the left of NAICS codes indicate the percent of NAICS receipts represented by this part; and link to Table 1 where other parts of the NAICS are shown. 97/92 links to 1997 and 1992 Comparative Statistics for whole SICs.

SIC	NAICS	Pt	Description	Establish-ments	Sales ($1,000)	Paid employees	Annual payroll ($1,000)
551	97/92		**Motor vehicle dealers (new and used)**	**25,897**	**518,971,824**	**1,046,243**	**35,202,751**
5511			Motor vehicle dealers (new & used)	25,897	518,971,824	1,046,243	35,202,751
	441110		New car dealers	25,897	518,971,824	1,046,243	35,202,751

SIC	NAICS	Pt	Description	Establish-ments	Sales ($1,000)	Paid employees	Annual payroll ($1,000)
552	97/32		**Motor vehicle dealers (used only)**	**23,340**	**34,680,468**	**92,752**	**2,197,396**
5521			Motor vehicle dealers (used only)	23,340	34,680,468	92,752	2,197,396
	441120		Used car dealers	23,340	34,680,468	92,752	2,197,396

SIC	NAICS	Pt	Description	Establish-ments	Sales ($1,000)	Paid employees	Annual payroll ($1,000)
553	97/32		**Auto and home supply stores**	**40,565**	**35,028,316**	**300,953**	**6,044,147**
5531			Auto & home supply stores	40,565	35,028,316	300,953	6,044,147
	47% of 441310	10	Auto supplies stores	24,508	20,143,722	175,587	3,096,231
	68% of 441320	10	New tire dealers	14,814	13,312,367	113,807	2,761,880
	6% of 452990	32	Other auto & home supplies stores	1,243	1,572,227	11,559	186,036

SIC	NAICS	Pt	Description	Establish-ments	Sales ($1,000)	Paid employees	Annual payroll ($1,000)
554	97/32		**Gasoline service stations**	**98,846**	**170,660,068**	**741,040**	**9,488,181**
5541			Gasoline service stations	98,846	170,660,068	741,040	9,488,181
	78% of 447110	20	Gasoline stations with convenience stores	53,641	100,103,399	432,935	5,234,676
	100% of 447190	Σ	Other gasoline stations	45,205	70,556,669	238,465	4,253,505
	447190	10	Gasoline stations with no convenience stores	42,270	55,523,140	238,465	3,338,637
	447190	20	Truck stops	2,935	15,033,529	69,640	914,868

SIC	NAICS	Pt	Description	Establish-ments	Sales ($1,000)	Paid employees	Annual payroll ($1,000)
555	97/32		**Boat dealers**	**5,262**	**8,934,230**	**35,134**	**839,296**
5551			Boat dealers	5,262	8,934,230	35,134	839,296
	441222		Boat dealers	5,262	8,934,230	35,134	839,296

SIC	NAICS	Pt	Description	Establish-ments	Sales ($1,000)	Paid employees	Annual payroll ($1,000)
556	97/32		**Recreational vehicle dealers**	**3,014**	**10,069,749**	**29,463**	**813,962**
5561			Recreational vehicle dealers	3,014	10,069,749	29,463	813,962
	441210		Recreational vehicle dealers	3,014	10,069,749	29,463	813,962

SIC	NAICS	Pt	Description	Establish-ments	Sales ($1,000)	Paid employees	Annual payroll ($1,000)
557	97/32		**Motorcycle dealers**	**3,635**	**7,369,260**	**29,026**	**712,065**
5571			Motorcycle dealers	3,635	7,369,260	29,026	712,065
	441221		Motorcycle dealers	3,635	7,369,260	29,026	712,065

SIC	NAICS	Pt	Description	Establish-	Sales	Paid	Annual payroll

			ments	($1,000)	employees	($1,000)
559	97/92	**Automotive dealers, not elsewhere classified**	**1,678**	**2,517,267**	**9,145**	**204,593**
5599		Automotive dealers, not elsewhere classified	1,678	2,517,267	9,145	204,593
441229		All other motor vehicle dealers	1,678	2,517,267	9,145	204,593

N=Comparable data not available D=Withheld to avoid disclosure

$$ 1992 sales data include sales from catalog order desks. 1997 sales data exclude sales from catalog order des
Σ=sum of NAICS parts listed below the symbol 97/92 links to Comparative Statistics for 1992 and 1997

(Bridge complete.)	Comparable	SIC derivable from NAICS data.
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1997 Economic Census: Bridge Between SIC and NAICS

SIC: Service industries

SIC 75: Truck rental services, without drivers - Finder by 3-digit SIC

Includes only establishments with payroll. Introductory text includes scope and methodology.

Go to bridge	SIC	Description		Establish-ments	Receipts ($1,000)	Paid employees	Annual payroll ($1,000)
	75	Automotive repair, services, and parking	Taxable	191,907	99,574,966	1,094,161	22,643,253
	751	Automotive rental and leasing, without drivers	Taxable	10,542	28,921,850	158,062	3,870,601
	752	Automobile parking	Taxable	10,358	5,174,724	76,166	967,701
	753	Automotive repair shops	Taxable	142,372	55,685,916	630,614	14,808,177
	754	Automotive services, except repair	Taxable	28,635	9,792,476	229,319	2,996,774

N=Comparable data not available D=Withheld to avoid disclosure

SIC 75: Truck rental services, without drivers - 4-digit SIC to 6-digit NAICS

Includes only establishments with payroll. Introductory text includes scope and methodology. Figures to the left of NAICS codes indicate the percent of NAICS receipts represented by this part; and link to Table 1 where other parts of the NAICS are shown. 97/92 links to 1997 and 1992 Comparative Statistics for whole SICs.

SIC	NAICS	Pt	Description		Establish-ments	Receipts ($1,000)	Paid employees	Annual payroll ($1,000)
751	97/92		**Automotive rental and leasing, without drivers**	Taxable	**10,542**	**28,921,850**	**158,062**	**3,870,601**
7513			Truck rental services, without drivers	Taxable	4,936	10,081,603	45,224	1,377,581
98% of	532120	Σ	Truck, utility trailer, & RV rental & leasing	Taxable	4,936	10,081,603	13,138	1,377,581
	532120	10	Truck rental	Taxable	2,498	2,420,548	13,138	296,754
	532120	20	Truck leasing	Taxable	2,438	7,661,055	32,086	1,080,827
7514			Passenger car rental	Taxable	4,367	14,783,704	102,623	2,129,602

SIC	NAICS	Pt	Description					
	532111		Passenger car rental	Taxable	4,367	14,783,704	102,623	2,129,602
7515			Passenger car leasing	Taxable	879	3,800,424	8,325	315,960
	532112		Passenger car leasing	Taxable	879	3,800,424	8,325	315,960
7519			Utility trailer & recreational vehicle rental	Taxable	360	256,119	1,890	47,458
	3% of 532120	90	Utility trailer & RV (recreational vehicle) rental & leasing	Taxable	360	256,119	1,890	47,458
SIC	**NAICS**	**Pt**	**Description**		**Establish-ments**	**Receipts ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
752	97/92		**Automobile parking**	Taxable	**10,358**	**5,174,724**	**76,166**	**967,701**
7521			Automobile parking	Taxable	10,358	5,174,724	76,166	967,701
	812930		Parking lots & garages	Taxable	10,358	5,174,724	76,166	967,701
SIC	**NAICS**	**Pt**	**Description**		**Establish-ments**	**Receipts ($1,000)**	**Paid employees**	**Annual payroll ($1,000)**
753	97/92		**Automotive repair shops**	Taxable	**142,372**	**55,685,916**	**630,614**	**14,808,177**
7532			Top, body, & upholstery repair shops & paint shops	Taxable	35,569	17,755,296	205,172	5,172,206
	100% of 811121	Σ	Automotive body, paint, & interior repair & maintenance	Taxable	35,569	17,755,296	192,853	5,172,206
	811121	10	Paint or body repair shops	Taxable	33,144	16,645,229	192,853	4,899,276
	811121	20	Van conversion services	Taxable	639	723,189	6,507	156,778
	811121	30	Upholstery & interior repair shops	Taxable	1,786	386,878	5,812	116,152
7533			Automotive exhaust system repair shops	Taxable	5,251	1,985,377	23,015	524,940
	811112		Automotive exhaust system repair	Taxable	5,251	1,985,377	23,015	524,940
7534			Tire retreading & repair shops	Taxable	1,760	1,270,577	10,930	248,727
	326212		Tire retreading	Taxable	754	982,607	7,939	192,387
	27% of 811198	10	Tire repair shops	Taxable	1,006	287,970	2,991	56,340
7536			Automotive glass replacement shops	Taxable	5,599	3,149,984	29,187	753,574
	811122		Automotive glass replacement shops	Taxable	5,599	3,149,984	29,187	753,574
7537			Automotive transmission repair shops	Taxable	6,768	2,431,584	29,442	709,254
	811113		Automotive transmission repair	Taxable	6,768	2,431,584	29,442	709,254
7538			General automotive repair shops	Taxable	77,751	25,598,455	290,634	6,438,842
	811111		General automotive repair	Taxable	77,751	25,598,455	290,634	6,438,842
7539			Automotive repair shops, n.e.c.	Taxable	9,674	3,494,643	42,234	960,634
	100% of 811118	Σ	Other automotive mechanical & electrical repair & maintenance	Taxable	9,674	3,494,643	4,802	960,634
	811118	10	Carburetor repair shops	Taxable	1,091	363,763	4,802	106,409

SIC	NAICS	Pt	Description		Establish-ments	Receipts ($1,000)	Paid employees	Annual payroll ($1,000)
	811118	20	Brake, front end, & wheel alignment	Taxable	3,741	1,553,732	18,216	449,563
	811118	30	Electrical repair shops, motor vehicle	Taxable	1,679	494,744	6,890	135,846
	811118	40	Radiator repair	Taxable	2,295	728,297	8,372	174,076
	811118	90	All other motor vehicle repair shops	Taxable	868	354,107	3,954	94,740
754	97/92		**Automotive services, except repair**	Taxable	**28,635**	**9,792,476**	**229,319**	**2,996,774**
7542			Carwashes	Taxable	13,683	3,911,344	123,602	1,252,587
	811192		Carwashes	Taxable	13,683	3,911,344	123,602	1,252,587
7549			Automotive services, except repair & carwashes	Taxable	14,952	5,881,132	105,717	1,744,187
	488410		Motor vehicle towing	Taxable	5,893	2,295,188	36,845	747,355
	811191		Automotive oil change & lubrication shops	Taxable	7,413	2,787,318	57,083	778,632
74% of	811198	20	All other motor vehicle services (except repair & carwashes)	Taxable	1,646	798,626	11,789	218,200

N=Comparable data not available D=Withheld to avoid disclosure

% Comparability may be limited because of changes in assignment of tax status by industry.
Σ=sum of NAICS parts listed below the symbol 97/92 links to Comparative Statistics for 1992 and 1997
(Bridge complete.) Comparable SIC derivable from NAICS data.
(Drawbridge slightly open.) Almost comparable Sales or receipts from NAICS are within 3% of SIC sales or receipts.
(Drawbridge open.) Not comparable SIC sales or receipts cannot be estimated within 3% from NAICS data.

All-sector menu Menu of all 2-digit SICs Data in formats for downloading PDF report

Source: 1997 Economic Census, Comparative Statistics

Last modified: 6/27/00

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8.2 FRACTION OF NAICS CODE EMPLOYMENT USED TO CREATE SIC EMPLOYMENT

SIC	NAICS	SIC Employees 1997	NAICS Employees '1997	Employee Fraction	NAICS description
Factory Finished Wood Surface Coating					
2426	321918	10521	38100	0.276	Other millwork (including flooring)
2426	337215	6310	75382	0.084	Showcase, partition, shelving, & locker mfg
2426	321912	17109	39763	0.430	Cut stock, resawing lumber, & planing
2429	321113	304	119760	0.003	Sawmills
2429	321920	684	51134	0.013	Wood container & pallet mfg
2429	321999	355	43839	0.008	All other miscellaneous wood product mfg
2431	321911	64771	64771	1.000	Wood window & door mfg
2431	321918	27488	38100	0.721	Other millwork (including flooring)
2434	337110	79579	99257	0.802	Wood kitchen cabinet & counter top mfg
2435	321211	22151	22151	1.000	Hardwood veneer & plywood mfg
2436	321212	28843	28843	1.000	Softwood veneer & plywood mfg
2439	321912	0	39763	0.000	Cut stock, resawing lumber, & planing
2439	321214	32522	32522	1.000	Truss mfg
2439	321113	0	119760	0.000	Sawmills
2439	321213	5372	5372	1.000	Engineered wood member (except truss) mfg
2441	321920	4885	51134	0.096	Wood container & pallet mfg
2448	321920	38994	51134	0.763	Wood container & pallet mfg
2449	321920	5701	51134	0.111	Wood container & pallet mfg
2451	321991	68269	68269	1.000	Manufactured home (mobile home) mfg
2452	321992	22965	22965	1.000	Prefabricated wood building mfg
2493	321219	25269	25269	1.000	Reconstituted wood product mfg
2499	339999	13740	74137	0.185	All other miscellaneous mfg
2499	332321	0	74944	0.000	Metal window & door mfg
2499	321920	870	51134	0.017	Wood container & pallet mfg
2499	321912	549	39763	0.014	Cut stock, resawing lumber, & planing
2499	321999	41844	43839	0.954	All other miscellaneous wood product mfg
Furniture & Fixtures Surface Coating and Part of Miscellaneous Degreasing					
2511	337122	123368	128248	0.962	Nonupholstered wood household furniture mfg
2512	337121	85258	90009	0.947	Upholstered household furniture mfg
2514	337124	22835	22835	1.000	Metal household furniture mfg
2515	337121	1601	90009	0.018	Upholstered household furniture mfg

SIC	NAICS	SIC Employees 1997	NAICS Employees '1997	Employee Fraction	NAICS description
2515	337910	23072	23072	1.000	Mattress mfg
2517	337129	4273	4273	1.000	Wood television, radio, & sewing machine cabinet mfg
2519	337125	4708	4708	1.000	Household furniture (except wood & metal) mfg
2521	337211	30641	30641	1.000	Wood office furniture mfg
2522	337214	44222	44222	1.000	Office furniture (except wood) mfg
2531	336360	20784	45600	0.456	Motor vehicle seating & interior trim mfg
2531	337127	15254	38218	0.399	Institutional furniture mfg
2531	339942	941	7990	0.118	Lead pencil & art good mfg
2541	337110	9785	99257	0.099	Wood kitchen cabinet & counter top mfg
2541	337212	24363	24363	1.000	Custom architectural woodwork & millwork mfg
2541	337215	23305	75382	0.309	Showcase, partition, shelving, & locker mfg
2542	337215	44472	75382	0.590	Showcase, partition, shelving, & locker mfg
2591	337920	19617	19617	1.000	Blind & shade mfg
2599	337127	22448	38218	0.587	Institutional furniture mfg
2599	339113	2925	85315	0.034	Surgical appliance & supplies mfg
Part of Misc. Degreasing					
3312	324199	1731	3671	0.472	All other petroleum & coal products mfg
3312	331111	144074	146514	0.983	Iron & steel mills
3313	331112	3724	3724	1.000	Electrometallurgical ferroalloy product mfg
3313	331492	311	11610	0.027	Other nonferrous metal secondary smelting, refining, & alloying
3315	331222	23489	23489	1.000	Steel wire drawing
3315	332618	2265	46174	0.049	Other fabricated wire product mfg
3316	331221	14362	14362	1.000	Cold-rolled steel shape mfg
3317	331210	27723	27723	1.000	Iron & steel pipes & tubes mfg from purchased steel
3321	331511	83570	86198	0.970	Iron foundries
3322	331511	2628	86198	0.030	Iron foundries
3324	331512	22673	22673	1.000	Steel investment foundries
3325	331513	23982	23982	1.000	Steel foundries (except investment)
3331	331411	7360	7360	1.000	Primary smelting & refining of copper
3334	331312	15763	15763	1.000	Primary aluminum production
3339	331419	10132	10132	1.000	Other nonferrous metal primary smelting & refining

SIC	NAICS	SIC Employees 1997	NAICS Employees '1997	Employee Fraction	NAICS description
3341	331423	1768	2333	0.758	Secondary smelting, refining, & alloying of copper
3341	331492	5485	11610	0.472	Other nonferrous metal secondary smelting, refining, & alloying
3341	331314	6226	6714	0.927	Secondary smelting & alloying of aluminum
3351	331421	21150	21150	1.000	Copper rolling, drawing, & extruding
3353	331315	25111	25111	1.000	Aluminum sheet, plate, & foil mfg
3353	332996	0	29364	0.000	Fabricated pipe & pipe fitting mfg
3354	331316	30357	30357	1.000	Aluminum extruded product mfg
3355	331319	2657	4306	0.617	Other aluminum rolling & drawing
3356	331491	17237	25872	0.666	Other nonferrous metal rolling, drawing, & extruding
Part of Misc. Degreasing and Part of Electrical Insulation Surface Coating					
3357	331319	1649	4306	0.383	Other aluminum rolling & drawing
3357	331422	4692	4692	1.000	Copper wire (except mechanical) drawing
3357	331491	8635	25872	0.334	Other nonferrous metal rolling, drawing, & extruding
3357	335921	8589	8589	1.000	Fiber optic cable mfg
3357	335929	46267	46267	1.000	Other communication & energy wire mfg
Part of Misc. Degreasing					
3363	331521	27717	27717	1.000	Aluminum die-casting foundries
3364	331522	17243	17243	1.000	Nonferrous (except aluminum) die-casting foundries
3365	331524	34098	34098	1.000	Aluminum foundries (except die-casting)
3366	331525	8909	8909	1.000	Copper foundries (except die-casting)
3369	331528	6529	6529	1.000	Other nonferrous foundries (except die-casting)
3398	332811	22674	22674	1.000	Metal heat treating
3399	331111	2440	146514	0.017	Iron & steel mills
3399	331314	488	6714	0.073	Secondary smelting & alloying of aluminum
3399	331423	565	2333	0.242	Secondary smelting, refining, & alloying of copper
3399	331492	5814	11610	0.501	Other nonferrous metal secondary smelting, refining, & alloying
3399	332618	2088	46174	0.045	Other fabricated wire product mfg
Part of Misc. Degreasing and Metal Containers Surface Coating					
3411	332431	27316	27316	1.000	Metal can mfg

SIC	NAICS	SIC Employees 1997	NAICS Employees '1997	Employee Fraction	NAICS description
3412	332439	6318	14922	0.423	Other metal container mfg
Part of Misc. Degreasing					
3421	332211	11129	11230	0.991	Cutlery & flatware (except precious) mfg
3423	332212	42947	50388	0.852	Hand & edge tool mfg
3425	332213	9149	9149	1.000	Saw blade & handsaw mfg
3429	332439	4135	14922	0.277	Other metal container mfg
3429	332510	70884	74285	0.954	Hardware mfg
3429	332919	750	18739	0.040	Other metal valve & pipe fitting mfg
3431	332998	9994	9994	1.000	Enameled iron & metal sanitary ware mfg
3432	332913	16202	16202	1.000	Plumbing fixture fitting & trim mfg
3432	332999	474	79070	0.006	All other miscellaneous fabricated metal product mfg
3433	333414	22495	24666	0.912	Heating equipment (except warm air furnaces) mfg
3441	332312	84704	93433	0.907	Fabricated structural metal mfg
3442	332321	72970	74944	0.974	Metal window & door mfg
3443	333415	339	119795	0.003	AC & warm air heating & commercial/industrial refrig equip mfg
3443	332420	33704	33704	1.000	Metal tank (heavy gauge) mfg
3443	332313	25453	25453	1.000	Plate work mfg
3443	332410	27542	27542	1.000	Power boiler & heat exchanger mfg
3444	332322	129826	129826	1.000	Sheet metal work mfg
3444	332439	2074	14922	0.139	Other metal container mfg
3446	332323	30960	34391	0.900	Ornamental & architectural metal work mfg
3448	332311	25946	25946	1.000	Prefabricated metal building & component mfg
3449	332114	15219	15219	1.000	Custom roll forming
3449	332312	8729	93433	0.093	Fabricated structural metal mfg
3449	332321	1974	74944	0.026	Metal window & door mfg
3449	332323	349	34391	0.010	Ornamental & architectural metal work mfg
3451	332721	80404	80404	1.000	Precision turned product mfg
3452	332722	52995	52995	1.000	Bolt, nut, screw, rivet, & washer mfg
3462	332111	26432	26432	1.000	Iron & steel forging
3463	332112	9129	9129	1.000	Nonferrous forging
3465	336370	126905	126905	1.000	Motor vehicle metal stamping
3466	332115	4682	4682	1.000	Crown & closure mfg
3469	332116	93086	93086	1.000	Metal stamping

SIC	NAICS	SIC Employees 1997	NAICS Employees ‘1997	Employee Fraction	NAICS description
3469	332214	7724	7724	1.000	Kitchen utensil, pot, & pan mfg
3471	332813	74640	74640	1.000	Electroplating, plating, polishing, anodizing, & coloring

Part of Misc. Degreasing and Sheet, Strip & Coil Surface Coating					
3479	332812	55904	55904	1.000	Metal coating/engraving (exc jewelry/silverware)/allied services
3479	339911	79	34773	0.002	Jewelry (except costume) mfg
3479	339912	103	6459	0.016	Silverware & plated ware mfg
3479	339914	29	14573	0.002	Costume jewelry & novelty mfg
Part of Misc. Degreasing					
3482	332992	6863	6863	1.000	Small arms ammunition mfg
3483	332993	9427	9427	1.000	Ammunition (except small arms) mfg
3484	332994	9907	9907	1.000	Small arms mfg
3489	332995	12285	12285	1.000	Other ordnance & accessories mfg
3491	332911	53459	53459	1.000	Industrial valve mfg
3492	332912	37132	37132	1.000	Fluid power valve & hose fitting mfg
3493	332611	5381	5381	1.000	Spring (heavy gauge) mfg
3494	332919	17652	18739	0.942	Other metal valve & pipe fitting mfg
3494	332999	564	79070	0.007	All other miscellaneous fabricated metal product mfg
3495	332612	18798	18798	1.000	Spring (light gauge) mfg
3495	334518	175	6333	0.028	Watch, clock, & part mfg
3496	332618	41821	46174	0.906	Other fabricated wire product mfg
3497	332999	5648	79070	0.071	All other miscellaneous fabricated metal product mfg
3497	322225	4967	4967	1.000	Laminated aluminum foil mfg for flexible packaging uses
3498	332996	29364	29364	1.000	Fabricated pipe & pipe fitting mfg
3499	332439	2331	14922	0.156	Other metal container mfg
3499	332510	3401	74285	0.046	Hardware mfg
3499	332919	375	18739	0.020	Other metal valve & pipe fitting mfg
3499	332999	63736	79070	0.806	All other miscellaneous fabricated metal product mfg
3499	337215	1295	75382	0.017	Showcase, partition, shelving, & locker mfg
3499	339914	568	14573	0.039	Costume jewelry & novelty mfg

SIC	NAICS	SIC Employees 1997	NAICS Employees '1997	Employee Fraction	NAICS description
3499	332117	10760	10760	1.000	Powder metallurgy part mfg
Part of Misc. Degreasing and Machinery & Equipment Surface Coating					
3511	333611	19529	19529	1.000	Turbine & turbine generator set unit mfg
3519	333618	56338	56348	1.000	Other engine equipment mfg
3519	336399	896	174465	0.005	All other motor vehicle parts mfg
3523	332212	60	50388	0.001	Hand & edge tool mfg
3523	333922	320	39599	0.008	Conveyor & conveying equipment mfg
3523	333111	66370	66370	1.000	Farm machinery & equipment mfg
3523	332323	3082	34391	0.090	Ornamental & architectural metal work mfg
3524	332212	60	50388	0.001	Hand & edge tool mfg
3524	333112	28617	28617	1.000	Lawn & garden tractor & home lawn & garden equipment mfg
3531	333120	74965	74965	1.000	Construction machinery mfg
3531	333923	10263	18014	0.570	Overhead traveling crane, hoist, & monorail system mfg
3531	336510	2379	34012	0.070	Railroad rolling stock mfg
3532	333131	13547	13547	1.000	Mining machinery & equipment mfg
3533	333132	29451	29451	1.000	Oil & gas field machinery & equipment mfg
3534	333921	9442	9442	1.000	Elevator & moving stairway mfg
3535	333922	39279	39599	0.992	Conveyor & conveying equipment mfg
3536	333923	7751	18014	0.430	Overhead traveling crane, hoist, & monorail system mfg
3537	333924	25953	25953	1.000	Industrial truck, tractor, trailer, & stacker machinery mfg
3537	332439	64	14922	0.004	Other metal container mfg
3537	332999	240	79070	0.003	All other miscellaneous fabricated metal product mfg
3541	333512	28849	29371	0.982	Machine tool (metal cutting types) mfg
3542	333513	14185	14185	1.000	Machine tool (metal forming types) mfg
3543	332997	7959	7959	1.000	Industrial pattern mfg
3544	333511	48657	48657	1.000	Industrial mold mfg
3544	333514	80113	80113	1.000	Special die & tool, die set, jig, & fixture mfg
3545	332212	6379	50388	0.127	Hand & edge tool mfg
3545	333515	47925	47925	1.000	Cutting tool & machine tool accessory mfg
3546	333991	16816	16816	1.000	Power-driven handtool mfg
3547	333516	4149	4149	1.000	Rolling mill machinery & equipment mfg
3548	335311	0	26638	0.000	Power, distribution, & specialty transformer

SIC	NAICS	SIC Employees 1997	NAICS Employees '1997	Employee Fraction	NAICS description
					mfg
3548	333992	22434	22505	0.997	Welding & soldering equipment mfg
3549	333518	19023	19023	1.000	Other metalworking machinery mfg
3552	333292	13600	13600	1.000	Textile machinery mfg
3553	333210	9117	9117	1.000	Sawmill & woodworking machinery mfg
3554	333291	18594	18594	1.000	Paper industry machinery mfg
3555	333293	17500	21000	0.833	Printing machinery & equipment mfg
3556	333294	19026	19026	1.000	Food product machinery mfg
3559	333319	2890	56910	0.051	Other commercial & service industry machinery mfg
3559	333220	18574	18574	1.000	Plastics & rubber industry machinery mfg
3559	333295	40087	40087	1.000	Semiconductor machinery mfg
3559	333298	53046	53106	0.999	All other industrial machinery mfg
3561	333911	36552	36552	1.000	Pump & pumping equipment mfg
3562	332991	36991	36991	1.000	Ball & roller bearing mfg
3563	333912	24821	24821	1.000	Air & gas compressor mfg
3564	333411	16183	16183	1.000	Air purification equipment mfg
3564	333412	13723	13723	1.000	Industrial & commercial fan & blower mfg
3565	333993	31581	31581	1.000	Packaging machinery mfg
3566	333612	16231	16231	1.000	Speed changer, industrial high-speed drive, & gear mfg
3567	333994	17585	17585	1.000	Industrial process furnace & oven mfg
3568	333613	21604	21604	1.000	Mechanical power transmission equipment mfg
3569	333999	50088	61151	0.819	All other miscellaneous general-purpose machinery mfg
3571	334111	100115	100115	1.000	Electronic computer mfg
3572	334112	42364	42364	1.000	Computer storage device mfg
3575	334113	5764	5764	1.000	Computer terminal mfg
3577	334119	87253	93970	0.929	Other computer peripheral equipment mfg
3578	333313	966	14831	0.065	Office machinery mfg
3578	334119	6717	93970	0.071	Other computer peripheral equipment mfg
3579	333313	13865	14831	0.935	Office machinery mfg
3579	334518	750	6333	0.118	Watch, clock, & part mfg
3579	339942	1234	7990	0.154	Lead pencil & art good mfg
3581	333311	8178	8178	1.000	Automatic vending machine mfg
3582	333312	4523	4523	1.000	Commercial laundry, drycleaning, & pressing

SIC	NAICS	SIC Employees 1997	NAICS Employees '1997	Employee Fraction	NAICS description
					machine mfg
3585	333415	119456	119795	0.997	AC & warm air heating & commercial/industrial refrig equip mfg
3585	336391	21522	21522	1.000	Motor vehicle air-conditioning mfg
3586	333913	6824	6824	1.000	Measuring & dispensing pump mfg
3589	333319	44172	56910	0.776	Other commercial & service industry machinery mfg
3592	336311	17518	17518	1.000	Carburetor, piston, piston ring, & valve mfg
3593	333995	23062	23062	1.000	Fluid power cylinder & actuator mfg
3594	333996	15482	15482	1.000	Fluid power pump & motor mfg
3596	333997	4871	4871	1.000	Scale & balance (except laboratory) mfg
3599	332710	290951	290951	1.000	Machine shops
3599	332999	4199	79070	0.053	All other miscellaneous fabricated metal product mfg
3599	333319	1335	56910	0.023	Other commercial & service industry machinery mfg
3599	333999	11063	61151	0.181	All other miscellaneous general-purpose machinery mfg
Part of Misc. & Electronic Degreasing and Part of Electrical Insulation Surface Coating					
3612	335311	26638	26638	1.000	Power, distribution, & specialty transformer mfg
Part of Misc. & Electronic Degreasing					
3613	335313	41291	41291	1.000	Switchgear & switchboard apparatus mfg
3621	335312	71112	74666	0.952	Motor & generator mfg
3624	335991	10887	10887	1.000	Carbon & graphite product mfg
3625	335314	68365	68365	1.000	Relay & industrial control mfg
3629	335999	18682	44754	0.417	All other miscellaneous electrical equipment & component mfg
Part of Misc. & Electronic Degreasing and Appliance Surface Coating					
3631	335221	17543	17543	1.000	Household cooking appliance mfg
3632	335222	24597	24597	1.000	Household refrigerator & home freezer mfg
3633	335224	14801	14801	1.000	Household laundry equipment mfg
3634	333414	2171	24666	0.088	Heating equipment (except warm air furnaces) mfg
3634	335211	17058	17058	1.000	Electric housewares & household fan mfg
3635	335212	10537	10537	1.000	Household vacuum cleaner mfg
3639	333298	60	53106	0.001	All other industrial machinery mfg
3639	335212	0	10537	0.000	Household vacuum cleaner mfg

SIC	NAICS	SIC Employees 1997	NAICS Employees '1997	Employee Fraction	NAICS description
3639	335228	13309	13309	1.000	Other major household appliance mfg
Part of Misc. & Electronic Degreasing					
3641	335110	15903	15903	1.000	Electric lamp bulb & part mfg
3643	335931	44907	44907	1.000	Current-carrying wiring device mfg
3644	335932	23540	23540	1.000	Noncurrent-carrying wiring device mfg
3645	335121	16395	17685	0.927	Residential electric lighting fixture mfg
3646	335122	23090	23090	1.000	Commercial/industrial/institutional electric lighting fixture mfg
3647	336321	16506	16506	1.000	Vehicular lighting equipment mfg
3648	335129	18274	18282	1.000	Other lighting equipment mfg
3651	334310	31727	31727	1.000	Audio & video equipment mfg
3652	334612	16598	25554	0.650	Prerecorded CD (except software), tape, & record reproducing
3661	334210	104262	104262	1.000	Telephone apparatus mfg
3661	334416	63	19431	0.003	Electronic coil, transformer, & other inductor mfg
3661	334418	6083	111054	0.055	Printed circuit assembly (electronic assembly) mfg
3663	334220	148156	164461	0.901	Radio & TV broadcasting & wireless communications equipment mfg
3669	334290	25187	25187	1.000	Other communications equipment mfg
3671	334411	21976	21976	1.000	Electron tube mfg
3672	334412	76702	76702	1.000	Bare printed circuit board mfg
3674	334413	199497	199497	1.000	Semiconductor & related device mfg
3675	334414	18882	18882	1.000	Electronic capacitor mfg
3676	334415	11964	11964	1.000	Electronic resistor mfg
3677	334416	19178	19431	0.987	Electronic coil, transformer, & other inductor mfg
3678	334417	37232	37232	1.000	Electronic connector mfg
3679	336322	12786	95491	0.134	Other motor vehicle electrical & electronic equipment mfg
3679	334220	16305	164461	0.099	Radio & TV broadcasting & wireless communications equipment mfg
3679	334418	104971	111054	0.945	Printed circuit assembly (electronic assembly) mfg
3679	334419	92200	92200	1.000	Other electronic component mfg
3691	335911	23288	23288	1.000	Storage battery mfg
3692	335912	8917	8917	1.000	Primary battery mfg

SIC	NAICS	SIC Employees 1997	NAICS Employees '1997	Employee Fraction	NAICS description
3694	336322	52216	95491	0.547	Other motor vehicle electrical & electronic equipment mfg
3695	334613	21345	21345	1.000	Magnetic & optical recording media mfg
3699	333992	71	22505	0.003	Welding & soldering equipment mfg
3699	335999	26072	44754	0.583	All other miscellaneous electrical equipment & component mfg
3699	335129	8	18282	0.000	Other lighting equipment mfg
3699	334519	29	33933	0.001	Other measuring & controlling device mfg
3699	334516	159	38359	0.004	Analytical laboratory instrument mfg
3699	334119	0	93970	0.000	Other computer peripheral equipment mfg
3699	334510	542	54385	0.010	Electromedical & electrotherapeutic apparatus mfg
3699	339114	0	18072	0.000	Dental equipment & supplies mfg
3699	333512	522	29371	0.018	Machine tool (metal cutting types) mfg
3699	333319	8513	56910	0.150	Other commercial & service industry machinery mfg
3699	333315	0	24707	0.000	Photographic & photocopying equipment mfg
3699	333314	56	20857	0.003	Optical instrument & lens mfg
3699	333293	175	21000	0.008	Printing machinery & equipment mfg
3699	333292	0	13600	0.000	Textile machinery mfg
3699	332212	424	50388	0.008	Hand & edge tool mfg
3699	334511	604	188161	0.003	Search, detection, navigation, & guidance instrument mfg
3699	333618	10	56348	0.000	Other engine equipment mfg
Part of Misc. Degreasing and New Automobile Surface Coating					
3711	336992	375	5788	0.065	Military armored vehicle, tank, & tank component mfg
3711	336111	114060	114060	1.000	Automobile mfg
3711	336112	94033	94033	1.000	Light truck & utility vehicle mfg
3711	336120	28214	28214	1.000	Heavy duty truck mfg
3711	336211	404	43384	0.009	Motor vehicle body mfg
Part of Misc. Degreasing and Part of Other Transportation Equipment Surface Coating					
3713	336211	41779	43384	0.963	Motor vehicle body mfg
3714	336312	81368	81368	1.000	Gasoline engine & engine parts mfg
3714	336322	30489	95491	0.319	Other motor vehicle electrical & electronic equipment mfg
3714	336330	48944	48944	1.000	Motor vehicle steering & suspension component (except spring) mfg

SIC	NAICS	SIC Employees 1997	NAICS Employees '1997	Employee Fraction	NAICS description
3714	336340	43132	43132	1.000	Motor vehicle brake system mfg
3714	336350	111954	111954	1.000	Motor vehicle transmission & power train parts mfg
3714	336399	173569	174465	0.995	All other motor vehicle parts mfg
3714	336211	1201	43384	0.028	Motor vehicle body mfg
3715	336212	30678	30678	1.000	Truck trailer mfg
3716	336213	18086	18086	1.000	Motor home mfg
3721	336411	200961	200961	1.000	Aircraft mfg
3724	336412	82557	82557	1.000	Aircraft engine & engine parts mfg
3728	332912	0	37132	0.000	Fluid power valve & hose fitting mfg
3728	336413	127729	127729	1.000	Other aircraft part & auxiliary equipment mfg
3728	333995	0	23062	0.000	Fluid power cylinder & actuator mfg
3728	333996	0	15482	0.000	Fluid power pump & motor mfg
Part of Misc. Degreasing and Marine Surface Coating					
3731	336611	97385	97385	1.000	Ship building & repairing
3732	336612	41422	41422	1.000	Boat building
3732	811490	9454	65213	0.145	Other personal & household goods repair & maintenance
Part of Misc. Degreasing and Part of Other Transportation Equipment Surface Coating					
3743	333911	0	36552	0.000	Pump & pumping equipment mfg
3743	336510	31633	34012	0.930	Railroad rolling stock mfg
3751	336991	17158	17218	0.997	Motorcycle, bicycle, & parts mfg
3761	336414	52158	52158	1.000	Guided missile & space vehicle mfg
3764	336415	18540	18540	1.000	Guided missile & space vehicle propulsion unit & parts mfg
3769	336419	6110	6110	1.000	Other guided missile & space vehicle parts & auxiliary equip mfg
3792	336214	20112	33352	0.603	Travel trailer & camper mfg
3795	336992	5415	5788	0.936	Military armored vehicle, tank, & tank component mfg
3799	336214	13240	33352	0.397	Travel trailer & camper mfg
3799	336999	19466	19466	1.000	All other transportation equipment mfg
3799	332212	60	50388	0.001	Hand & edge tool mfg
Part of Misc. Degreasing					
3812	334511	187557	188161	0.997	Search, detection, navigation, & guidance instrument mfg
3821	339111	18253	18253	1.000	Laboratory apparatus & furniture mfg

SIC	NAICS	SIC Employees 1997	NAICS Employees ‘1997	Employee Fraction	NAICS description
3822	334512	21450	21450	1.000	Automatic environmental control mfg
3823	334513	49196	49196	1.000	Industrial process control instrument mfg
3824	334514	17390	17390	1.000	Totalizing fluid meter & counting device mfg
3825	334416	190	19431	0.010	Electronic coil, transformer, & other inductor mfg
3825	334515	63332	63332	1.000	Electricity measuring & testing instrument mfg
3826	334516	38200	38359	0.996	Analytical laboratory instrument mfg
3827	333314	20801	20857	0.997	Optical instrument & lens mfg
3829	339112	521	107819	0.005	Surgical & medical instrument mfg
3829	334519	33904	33933	0.999	Other measuring & controlling device mfg
3841	339112	107298	107819	0.995	Surgical & medical instrument mfg
3842	322121	375	120176	0.003	Paper (except newsprint) mills
3842	322291	2236	21791	0.103	Sanitary paper product mfg
3842	334510	6722	54385	0.124	Electromedical & electrotherapeutic apparatus mfg
3842	339113	82390	85315	0.966	Surgical appliance & supplies mfg
3843	339114	18072	18072	1.000	Dental equipment & supplies mfg
3844	334517	14276	14276	1.000	Irradiation apparatus mfg
3845	334510	47121	54385	0.866	Electromedical & electrotherapeutic apparatus mfg
3851	339115	26366	26366	1.000	Ophthalmic goods mfg
3861	325992	38935	38935	1.000	Photographic film, paper, plate, & chemical mfg
3861	333315	24707	24707	1.000	Photographic & photocopying equipment mfg
3873	334518	5646	6333	0.892	Watch, clock, & part mfg
3911	339911	34694	34773	0.998	Jewelry (except costume) mfg
3914	332211	101	11230	0.009	Cutlery & flatware (except precious) mfg
3914	339912	6356	6459	0.984	Silverware & plated ware mfg
3915	339913	5396	5396	1.000	Jewelers' material & lapidary work mfg
3931	339992	13411	13411	1.000	Musical instrument mfg
3942	339931	3393	3393	1.000	Doll & stuffed toy mfg
3944	336991	60	17218	0.003	Motorcycle, bicycle, & parts mfg
3944	339932	29622	29622	1.000	Game, toy, & children's vehicle mfg
3949	339920	69664	69664	1.000	Sporting & athletic goods mfg
3951	339941	8394	8394	1.000	Pen & mechanical pencil mfg
3952	339942	5815	7990	0.728	Lead pencil & art good mfg

SIC	NAICS	SIC Employees 1997	NAICS Employees '1997	Employee Fraction	NAICS description
3952	337127	187	38218	0.005	Institutional furniture mfg
3952	325998	0	35915	0.000	All other miscellaneous chemical product & preparation mfg
3953	339943	7831	7831	1.000	Marking device mfg
3955	339944	5923	5923	1.000	Carbon paper & inked ribbon mfg
3961	339914	13976	14573	0.959	Costume jewelry & novelty mfg
3965	339993	7500	7842	0.956	Fastener, button, needle, & pin mfg
3991	339994	13882	16826	0.825	Broom, brush, & mop mfg
3993	339950	82956	82956	1.000	Sign mfg
3995	339995	6962	6962	1.000	Burial casket mfg
3996	326192	5614	6070	0.925	Resilient floor covering mfg
3999	323119	0	33016	0.000	Other commercial printing
3999	337127	329	38218	0.009	Institutional furniture mfg
3999	335121	1216	17685	0.069	Residential electric lighting fixture mfg
3999	332999	3231	79070	0.041	All other miscellaneous fabricated metal product mfg
3999	332212	750	50388	0.015	Hand & edge tool mfg
3999	326199	3141	526382	0.006	All other plastics product mfg
3999	325998	572	35915	0.016	All other miscellaneous chemical product & preparation mfg
3999	314999	2167	64480	0.034	All other miscellaneous textile product mills
3999	323113	0	72221	0.000	Commercial screen printing
3999	339999	60397	74137	0.815	All other miscellaneous mfg
3999	316110	329	15317	0.021	Leather & hide tanning & finishing
3999	321999	0	43839	0.000	All other miscellaneous wood product mfg
3999	322299	0	24302	0.000	All other converted paper product mfg
3999	323110	0	415117	0.000	Commercial lithographic printing
3999	323111	0	23260	0.000	Commercial gravure printing
3999	323112	0	30588	0.000	Commercial flexographic printing
Part of Misc. Open Top Degreasing & Auto Repair Cold Cleaning					
4173	488490	220	7480	0.029	Other support activities for road transportation
4231	488490	120	7480	0.016	Other support activities for road transportation
5511	441110	1046243	1046243	1.000	New car dealers
5521	441120	92752	92752	1.000	Used car dealers
5541	447190	69640	308105	0.226	Other gasoline stations

SIC	NAICS	SIC Employees 1997	NAICS Employees '1997	Employee Fraction	NAICS description
5541	447110	432935	613957	0.705	Gasoline stations with convenience stores
5541	447190	238465	308105	0.774	Other gasoline stations
5551	441222	35134	35134	1.000	Boat dealers
5561	441210	29463	29463	1.000	Recreational vehicle dealers
7532	811121	192853	205172	0.940	Automotive body, paint, & interior repair & maintenance
7532	811121	6507	205172	0.032	Automotive body, paint, & interior repair & maintenance
7532	811121	5812	205172	0.028	Automotive body, paint, & interior repair & maintenance
7533	811112	23015	23015	1.000	Automotive exhaust system repair
7534	811198	2991	14780	0.202	All other automotive repair & maintenance
7534	326212	7939	7939	1.000	Tire retreading
7536	811122	29187	29187	1.000	Automotive glass replacement shops
7537	811113	29442	29442	1.000	Automotive transmission repair
7538	811111	290634	290634	1.000	General automotive repair
7539	811118	3954	42234	0.094	Other automotive mechanical & electrical repair & maintenance
7539	811118	4802	42234	0.114	Other automotive mechanical & electrical repair & maintenance
7539	811118	18216	42234	0.431	Other automotive mechanical & electrical repair & maintenance
7539	811118	6890	42234	0.163	Other automotive mechanical & electrical repair & maintenance
7539	811118	8372	42234	0.198	Other automotive mechanical & electrical repair & maintenance
Dry Cleaning					
7215	812310	53023	53023	1.000	Dry cleaning, coin operated
7216	812320	166208	203777	0.816	Dry cleaning, commercial

Appendix F.3

On-Road Mobile Source Emissions Inventory Documentation

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1. INTRODUCTION

The attainment modeling for the Charlotte-Gastonia-Rock Hill, North Carolina-South Carolina nonattainment area (referred to as the Metrolina area) was performed in conjunction with the regional haze modeling being done by the Southeast Regional Planning Organization, Visibility Improvement State and Tribal Association of the Southeast (VISTAS) and the fine particulate matter (PM2.5) and ozone modeling being done by the Association of Southeastern Integrated Planning (ASIP). VISTAS and ASIP are run by the ten Southeast states (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia and West Virginia. Since the regional haze and PM2.5 modeling uses annual simulations and includes an intermediate year that is the attainment year required for the Metrolina nonattainment area, the North Carolina Division of Air Quality (NCDAQ) decided to use the this modeling for its attainment demonstration

On-road mobile sources are considered those vehicles that travel on the roadways. On-road mobile sources emissions comprise over 50 percent of the emissions of NOx for most of North Carolina. Emissions from motor vehicles occur throughout the day while the vehicle is in motion, at idle, parked, and during refueling. All of these emissions processes need to be estimated in order to properly reflect the total emissions from this source category. In its simplest terms, emissions from on-road mobile sources are calculated by multiplying an activity level, in this case daily vehicle miles traveled (VMT) as provided by the North Carolina Department of Transportation (NCDOT) and Metropolitan Planning Organization (MPOs), by an emission factor.

The US Environmental Protection Agency (USEPA) developed the MOBILE model to estimate emission factors based on information on the way vehicles are driven in a particular area. The newest version of the MOBILE model, MOBILE6.2, was used. In 2004, MOBILE6.2 was incorporated into SMOKEv2.1 which was used in the VISTAS/ASIP modeling. Key inputs for MOBILE6.2 include information on the age of vehicles on the roads, the average speed of those vehicles, what types of roads those vehicles are traveling on, any control technologies in place in an area to reduce emissions for motor vehicles (e.g., emissions inspection programs) and ambient temperature.

A very important component of the on-road mobile emissions estimation process is interagency consultation. The Metrolina transportation partners involved in attainment demonstration State Implementation Plan (SIP) and motor vehicle emission budget development included: USEPA, NCDOT, Federal Highway Administration (FHWA), Gaston Urban Area MPO (GUAMPO), Mecklenburg Union MPO (MUMPO), and Cabarrus Rowan MPO. Specifically the NCDOT, Charlotte Department of Transportation (CDOT) and MPOs were consulted on input data such as speeds and VMT derived from the Metrolina travel demand model (TDM).

The documentation for the on-road mobile sources is broken out into two components: 1) how the inventory was developed for the ozone modeling used for the attainment demonstration and 2) how the motor vehicle emission budgets were developed for the North Carolina counties in the Metrolina nonattainment area.

2. MOBILE6.2 INPUT ASSUMPTIONS FOR VISTAS/ASIP

The MOBILE6 module of SMOKE was used to develop the 2002 and 2009 on-road mobile source emissions estimates for carbon monoxide, ammonia, fine particulate matter, nitrogen oxides (NOx) and volatile organic compounds (VOCs). The MOBILE6 parameters, vehicle fleet descriptions, and VMT estimates were combined with gridded, episode-specific temperature data to calculate the gridded, temporalized emission estimates. Of note, whereas the on-network emissions estimates are spatially allocated based on link location and subsequently summed to the grid cell level, the off-network emissions estimates are spatially allocated based on a combination of the FHWA Version 2.0 highway networks and population. For the VISTAS/ASIP 36/12 km modeling, no link based data was used. The MOBILE6 emissions factors are based on episode-specific temperatures predicted by the meteorological model. Further, the MOBILE6 emissions factors model accounts for the following:

- Hourly and daily minimum/maximum temperatures, relative humidity and barometric pressure;
- Facility speeds;
- Locale-specific inspection/maintenance (I/M) control programs, if any;
- Adjustments for running losses;
- Splitting of evaporative and exhaust emissions into separate source categories;
- VMT, fleet turnover, and changes in fuel composition and Reid vapor pressure (RVP).

2.1 Speed Assumptions

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

The speeds for several urban counties covered by the MPOs were generated from their latest travel demand models and are differentiated into the morning rush hours (AM), the evening rush hours (PM) and off-peak (OP) speeds. NCDOT recommended using Wake County off-peak speeds for all remaining counties in North Carolina.

Interstates are modeled as “non-ramp” instead of “freeways” because both the speed and VMT for ramps are included in the functional classification for the major facility it is connected to in the travel demand model. This is consistent with the USEPA guidance.

2.2 Vehicle Age Distribution

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

2.3 Vehicle Mix Assumptions

2.3.1 North Carolina Statewide Vehicle Mix Development

The vehicle mix refers to the percentage of different vehicle types on each of the 12 FHWA road types. These road types are listed below in Table 2.3.1-1. It is critical for estimating mobile emissions in an area to use data that accurately reflects the vehicles types traveling on each of these different road types.

Table 2.3.1-1. Percentage of Vehicles Per Vehicle Type by Functional Road Class in NC

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

The NCDAQ created a statewide mix based on the methodology outlined in the August 2004 USEPA guidance document EPA420-R-04-013, *Technical Guidance on the Use of MOBILE6.2 for Emission Inventory Preparation*. Below is the methodology used to convert the 13 Highway Performance Monitoring System (HPMS) vehicle types count data reported to FHWA and generate a state specific vehicle mix.

The North Carolina HPMS data that was used to generate the statewide vehicle mix was based on 1999 through 2001 data counts. This was the latest available statewide count information at the time of the emissions modeling. Table 2.3.1-1 shows the percent of vehicles per vehicle type for each of the 12 road classes.

Disaggregating State Specific Information

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

HPMS Category	**General Category**
Motorcycle	Motorcycle (MC)
Passenger Car	Passenger Car (LDV)
Other 2-Axel, 4-Tire Vehicles	Light Truck (LDT)
Buses	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 2.3.1-1 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 2000 fractions were used since the state specific data is from 1999 through 2001. The national average data was obtained from Table 4.1.2 in *Technical Guidance on the Use of MOBILE6.2 for Emission Inventory Preparation*. An example for rural interstates is illustrated below:

From Table 2.3.1-1 above:

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

Therefore, the five general categories are:

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

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

Light Duty Trucks

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

Buses

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

Heavy Duty Trucks

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

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

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

Table 2.3.1-2 displays the calculation for each vehicle type for the 2000 rural interstate vehicle mix.

Table 2.3.1-2. Calculation of New 2000 Statewide Rural Interstate Vehicle Mix

Vehicle Type		Calculation		New 2000 Mix
LDV	=	LDV	=	0.5693
MC	=	MC	=	0.0049
Light Duty Trucks				
LDT1	=	0.0655 x (0.1080/0.3815)	=	0.0185
LDT2	=	0.2179 x (0.1080/0.3815)	=	0.0617
LDT3	=	0.0672 x (0.1080/0.3815)	=	0.0190
LDT4	=	0.0309 x (0.1080/0.3815)	=	0.0087
Total Light Duty Vehicles				0.6822
Heavy Duty Vehicles				
HDV2B	=	0.0380 x (0.3073/0.1143)	=	0.1022
HDV3	=	0.0038 x (0.3073/0.1143)	=	0.0102
HDV4	=	0.0029 x (0.3073/0.1143)	=	0.0078
HDV5	=	0.0022 x (0.3073/0.1143)	=	0.0059
HDV6	=	0.0082 x (0.3073/0.1143)	=	0.0220
HDV7	=	0.0098 x (0.3073/0.1143)	=	0.0263
HDV8A	=	0.0108 x (0.3073/0.1143)	=	0.0290
HDV8B	=	0.0386 x (0.3073/0.1143)	=	0.1038
Buses				
HDBS	=	0.0019 x (0.0106/0.0028)	=	0.0072
HDBT	=	0.0009 x (0.0106/0.0028)	=	0.0034
Total Heavy Duty Vehicles				0.3178

2002 NC Statewide Vehicle Mix

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

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

The MOBILE6.2 vehicle mix fractions for the year being developed were obtained from Table 4.1.2 in Technical Guidance on the Use of MOBILE6.2 for Emission Inventory Preparation. The MOBILE6.2 vehicle fractions for 2002 are listed below.

Light Duty Vehicles

LDV	=	0.4646
LDT1	=	0.0706
LDT2	=	0.2349
LDT3	=	0.0724
LDT4	=	0.0333
MC	=	0.006
Total	**=**	**0.8818**

Heavy Duty Vehicles

HDV2B	=	0.0382
HDV3	=	0.0038
HDV4	=	0.0030
HDV5	=	0.0022
HDV6	=	0.0084
HDV7	=	0.0100
HDV8A	=	0.0109
HDV8B	=	0.0390
HDBS	=	0.0019
HDBT	=	0.0009
Total	**=**	**0.1183**

The North Carolina 2002 vehicle mix was normalized to the MOBILE6.2 fractions using the following formula:

$$\text{Vehicle Type} = (\text{2002 M6 fraction for vehicle}) \times \frac{(\text{2000 State total for group})}{(\text{2002 M6 total for group})}$$

Table 2.3.1-3 below displays the calculations used to generate the 2002 North Carolina vehicle mix for rural interstate.

Table 2.3.1-3. Calculation of 2002 NC Statewide Rural Interstate Vehicle Mix

Vehicle Type		Calculation		2002 State Mix
Light Duty Vehicles				
LDV	=	0.4646 x (0.6822/0.8818)	=	0.3594
LDT1	=	0.0706 x (0.6822/0.8818)	=	0.0546
LDT2	=	0.2349 x (0.6822/0.8818)	=	0.1817
LDT3	=	0.0724 x (0.6822/0.8818)	=	0.0560
LDT4	=	0.0333 x (0.6822/0.8818)	=	0.0258
MC	=	0.006 x (0.6822/0.8818)		0.0046
Heavy Duty Vehicles				
HDV2B	=	0.0382 x (0.3178/0.1183)	=	0.1026
HDV3	=	0.0038 x (0.3178/0.1183)	=	0.0102
HDV4	=	0.0030 x (0.3178/0.1183)	=	0.0081
HDV5	=	0.0022 x (0.3178/0.1183)	=	0.0059
HDV6	=	0.0084 x (0.3178/0.1183)	=	0.0226
HDV7	=	0.0100 x (0.3178/0.1183)	=	0.0269
HDV8A	=	0.0109 x (0.3178/0.1183)	=	0.0293
HDV8B	=	0.0390 x (0.3178/0.1183)	=	0.1048
HDBS	=	0.0019 x (0.3178/0.1183)	=	0.0051
HDBT	=	0.0009 x (0.3178/0.1183)	=	0.0024

The North Carolina transportation partners recommended the use of the statewide vehicle mix for all counties in North Carolina with the exception of the Metrolina area where local vehicle count data was incorporated. The development of the Metrolina area vehicle mix is discussed below.

2.3.2 Metrolina Vehicle Mix Development

Based upon vehicle count data provided by CDOT, a vehicle mix for the Metrolina nonattainment area was developed. Vehicle classification counts in the Metrolina nonattainment area were gathered using NC-97 (Hi-Star) count machines. The raw counts from the Hi-Star count machines are categorized into eight vehicle lengths: less than 20 feet, 20 – 27 feet, 28 – 39 feet, 40 – 49 feet, 50 – 59 feet, 60 – 69 feet, 70 – 79 feet, 80 feet and greater. In MOBILE6.2, vehicles are categorized by weight rather than length. To correlate the vehicle lengths from the count data to the vehicle weight used in MOBILE6.2, a methodology employed by the Illinois

Department of Transportation (IDOT) and best engineering judgment was utilized. Table 2.3.2-1 illustrates the mapping between the count data and the 16 MOBILE6.2 vehicle classifications.

Table 2.3.2-1 Mapping Between Count Data Vehicle Lengths and MOBILE6.2 Vehicle Classes

Bin	Vehicle Length	Mobile 6 Vehicle Weight Classes	
1	< 20 ft	LDV	Light Duty Vehicles (passenger cars)
1	< 20 ft	LDT1	Light Duty Trucks 1 (0-6,000 lbs. GVWR, 0-3,750 lbs. LVW)
1	< 20 ft	LDT2	Light Duty Trucks 2 (0-6,000 lbs. GVWR, 3,751-5,750 LVW)
1	< 20 ft	LDT3	Light Duty Trucks 3 (6,001-8,500 lbs. GVWR, 0-5,750 lbs. ALVW)
1	< 20 ft	LDT4	Light Duty Trucks 4 (6,001-8,500 lbs. GVWR, 5,750 lbs. + ALVW)
2	21–39 ft	HDV2b	Class 2b Heavy Duty Vehicles (8,501-10,000 lbs. GVWR)
2	21-39 ft	HDV3	Class 3 Heavy Duty Vehicles (10,000-14,000 lbs. GVWR)
2	21-39 ft	HDV4	Class 4 Heavy Duty Vehicles (14,001-16,000 lbs. GVWR)
2	21-39 ft	HDV5	Class 5 Heavy Duty Vehicles (16,001-19,500 lbs. GVWR)
2	21-39 ft	HDV6	Class 6 Heavy Duty Vehicles (19,501-26,000 lbs. GVWR)
3	40+ ft	HDV7	Class 7 Heavy Duty Vehicles (26,001-33,000 lbs. GVWR)
3	40+ ft	HDV8a	Class 8a Heavy Duty Vehicles (33,001-60,000 lbs. GVWR)
3	40+ ft	HDV8b	Class 8b Heavy Duty Vehicles (>60,000 lbs. GVWR)
2	21-39 ft	HDBS	School Buses
2	21-39 ft	HDBT	Transit and Urban Buses
1	< 20 ft	MC	All Motorcycles

The three vehicle bins, based on vehicle lengths, were grouped into the following general categories: Bin 1-Passenger Cars, Light Duty Trucks and Motorcycles, Bin2-Medium Trucks and Buses and Bin 3-Heavy Duty Trucks.

The count data collected by CDOT did not include counts on interstates, freeways and local roads; therefore, for rural interstates, urban interstates and urban freeways/expressways, the statewide vehicle mix was used and collectors were used for local roads. The percentage of each vehicle bin per road type is shown below in Table 2.3.2-2.

Table 2.3.2-2 Percentage of Each Vehicle Bin per Road Type

Road Types	Bin 1	Bin 2	Bin 3
Rural	<20 feet	21-39 feet	40+ feet
Principal Arterial	85.16%	6.97%	7.87%
Minor Arterial	89.62%	6.63%	3.76%
Major Collector	90.68%	6.57%	2.75%
Minor Collector	89.98%	6.92%	3.10%
Urban			
Principal Arterial	93.94%	4.47%	1.59%
Minor Arterial	93.40%	5.15%	1.45%
Collector	93.53%	5.34%	1.13%

Using the *Technical Guidance on the Use of MOBILE6.2 for Emission Inventory Preparation*, Section 4.1.5, the Metrolina area vehicle mix was calculated using the following formula:

$$\text{Vehicle Type} = \frac{(\text{2009 State VMT fraction per vehicle}) \times (\text{2002 Metrolina total fraction per group})}{(\text{2002 State total fraction per group})}$$

Table 2.3.2-3 displays the calculation for each vehicle type for the 2009 Metrolina nonattainment area rural minor arterial vehicle mix.

Table 2.3.2-3 Calculation of 2009 Metrolina Rural Minor Arterial Vehicle Mix

Vehicle Type		Calculation		New 2009 Mix
Cars/Light Duty Trucks/Motorcycles				
LDV	=	0.3687 x (0.8962/0.0.8830)		0.3742
LDT1	=	0.0873 x (0.8962/0.0.8830)		0.0886
LDT2	=	0.2908 x (0.8962/0.0.8830)		0.2951
LDT3	=	0.0896 x (0.8962/0.0.8830)		0.0909
LDT4	=	0.0412 x (0.8962/0.0.8830)		0.0418
MC	=	0.0054 x (0.8962/0.0.8830)		0.0055
Medium Trucks				
HDV2b	=	0.0375 x (0.0663/0.0578)		0.0430
HDV3	=	0.0037 x (0.0663/0.0578)		0.0042
HDV4	=	0.0031 x (0.0663/0.0578)		0.0036
HDV5	=	0.0023 x (0.0663/0.0578)		0.0026
HDV6	=	0.0084 x (0.0663/0.0578)		0.0096
HDBS	=	0.0019 x (0.0663/0.0578)		0.0022
HDBT	=	0.0010 x (0.0663/0.0578)		0.0011
Heavy Trucks				
HDV7	=	0.0099 x (0.0376/0.0592)		0.0063
HDV8a	=	0.0108 x (0.0376/0.0592)		0.0069
HDV8b	=	0.0384 x (0.0376/0.0592)		0.0244

2.4 Temperature, Relative Humidity and Barometric Pressure Assumptions

MOBILE6.2 emission factors used by SMOKE are significantly influenced by temperature and to a lesser extent, humidity. The most desirable approach from an accuracy standpoint is to model on-road mobile emissions using gridded, temporalized data from the meteorological model. The VISTAS on-road mobile inventories were developed using this approach.

2.5 Vehicle Inspection and Maintenance Program Assumptions

In the early 1990's, North Carolina adopted emissions inspection requirements for vehicles in 9 urban counties. This program tested emissions at idle for 1975 and newer gasoline powered light duty vehicles. This "idle test" was assumed to have a compliance rate of 95 percent and covered Gaston, Mecklenburg, Union, Cabarrus Forsyth, Guilford, Orange, Durham and Wake Counties. In addition, the inspection stations are required to administer an anti-tampering check to ensure that emissions control equipment on any vehicle 35 years old and newer has not been altered.

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 the 9 counties that originally had the "idle test" and was expanded to include a total of 48 counties between July 2002 and January 2006. Because the OBDII program did not begin until midway through 2002, the 2002 annual on-road mobile inventory to support VISTAS/ASIP modeling was developed with an "idle test" in the 9 counties listed above plus the anti-tampering in all counties.

2.6 Reid Vapor Pressure Assumptions

The RVP is a measure of gasoline's volatility. The following reflects the RVP settings used in the development of the North Carolina on-road mobile inventory to support the VISTAS/ASIP regional modeling. An RVP of 7.8 pounds per square inch (psi) is required during May through September in the former 1-hour ozone nonattainment areas. The remainder of North Carolina is required to have an RVP of 9.0 psi during May through September.

2.7 Vehicle Miles Traveled Assumptions

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

For most counties in North Carolina, the 2002 VMT was derived from the 2002 Highway Performance Maintenance System (HPMS) data provided by NCDOT and the 2009 was grown based on a linear interpolation of the most recent 10 years (1995-2004) of HPMS data. Like with the speed data explained above, VMT from several urban counties travel demand models were used instead of HPMS VMT. Where this travel demand model data was available, it was the recommendation of the North Carolina transportation partners to use it instead of the HPMS data.

In situations where certain North Carolina counties are partially covered by a travel demand model, and the North Carolina transportation partners anticipate future versions of the travel models to cover the entire county, an adjusted HPMS VMT number was used. This upward adjustment (30%) of the countywide HPMS VMT data is based on an analysis by NCDAQ that shows that travel demand model VMT can be as much as 30% higher than the HPMS VMT. In some counties that the transportation partners felt were in high growth areas that may not be captured in the HPMS VMT growth process, an additional 10% growth was added to the 2009 projected HPMS VMT.

In the Metrolina area, all of the counties, with the exception of Iredell County, was fully covered by a TDM and TDM VMT was used in the attainment demonstration modeling. For Iredell County, only part of the county was covered by the regional TDM and therefore HPMS data was used. At the request of the transportation partners, during the interagency consultation process, the VMT used in the attainment demonstration for Iredell County was increased by 40%.

3. MOBILE6.2 INPUT ASSUMPTIONS FOR MOTOR VEHICLE EMISSION BUDGETS

The purpose of transportation conformity is to ensure that Federal transportation actions occurring in a nonattainment areas does not hinder the area from maintaining the 8-hour ozone standard. This means that the level of emissions estimated by the NCDOT or the MPOs for the Transportation Implementation Plan and Long Range Transportation Plan must not exceed the motor vehicle emission budgets (MVEBs) as defined in this attainment demonstration SIP.

The sections below describe the MOBILE6.2 input assumptions used to calculate the MVEBs. The MOBILE6.2 input files and output files used in the development of the on-road mobile source emissions for the attainment demonstration are compiled in Section 5.

As stated in the introduction, a very important component of the on-road mobile emissions estimation process is interagency consultation. The Metrolina transportation partners involved in attainment demonstration State Implementation Plan (SIP) and motor vehicle emission budget development included: USEPA, NCDOT, Federal Highway Administration (FHWA), Gaston Urban Area MPO (GUAMPO), Mecklenburg Union MPO (MUMPO), and Cabarrus Rowan MPO. Specifically the NCDOT, Charlotte Department of Transportation (CDOT) and MPOs were consulted on input data such as speeds and VMT derived from the Metrolina travel demand model (TDM), as well the other input parameters discussed below.

3.1 Speed Assumptions

The MOBILE6.2 command "AVEAGE SPEED" was used to enter the speeds. This command requires the average speed on a given roadway scenario. Interstates are modeled as "non-ramp" instead of "freeways" because both the speed and VMT for ramps are included in the functional classification for the major facility it is connected to in the travel demand model. This is consistent with the USEPA guidance.

In order to estimate emissions from vehicles for a typical day, CDOT and the MPOs provided speeds for their respective counties. The speeds were generated from their latest travel demand model at the time of the VISTAS/ASIP modeling. These speeds were provided based on a daily average.

As part of the public comment process, the NCDOT requested that four times a day speeds be used instead of average daily speeds since this would be consistent with how future transportation conformity regional emissions analyses will be performed. CDOT and MUMPO both commented on this inconsistency as well, especially for the motor vehicle emission budgets for Iredell, Mecklenburg and Union Counties. It did not appear that the other transportation partners were consulted about this request, therefore, the NCDAQ has decided to not to use the new data for setting the MVEBs. The NCDAQ will share this data with the transportation partners in an interagency consultation meeting, to be set at a later date. Additionally, there were a number of questions and concerns in the NCDAQ's initial review of the data. If the questions and concerns the NCDAQ have with the data are resolved and all transportation partners agree that the new data should be used in setting the MVEBs, then the NCDAQ will determine the effects of the new data on emissions, as well as on the attainment demonstration modeling. If the new data does not jeopardize the attainment demonstration modeling, the NCDAQ may start a SIP revision process, if deemed appropriate, to incorporate the new data into the MVEBs calculations.

Table 3.1-1 below provides a summary of the speeds used for the development of the MVEBs. These same speeds were used in the 2009 VISTAS/ASIP modeling for all counties except Iredell County. Only a small portion of Iredell County was designated nonattainment (Coddle Creek and Davidson Townships). For the VISTAS/ASIP modeling, average county-wide speeds were used, for the setting of the MVEBs, average speeds based on just the nonattainment area are used. The column headings in Table 3.1-1 represent the 12 FHWA road types used in the modeling and are listed below. The 12 FHWA road types are:

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

Table 3.1-1. Daily Speeds for Specific Counties Used In Setting 2009 MVEBs

County	RI	RPA	RMA	RMjC	RMiC	RL	UI	UF	UPA	UMiA	UC	UL
Mecklenburg	0	22	18	32	26	30	41	49	25	26	24	30
Cabarrus	0	46	41	38	34	30	35	0	28	29	30	30
Gaston	42	66	36	43	41	30	44	66	26	29	26	30
Lincoln	0	59	37	51	45	30	0	0	41	23	22	30
Rowan	0	45	49	50	50	30	57	0	38	39	36	30
Union	0	46	43	45	44	30	0	36	33	32	36	30
Iredell	38	54	11	24	24	20	55	0	18	22	23	18

3.2 Vehicle Age Distribution

The vehicle age distribution used in developing the MVEBs is the same as what was used in the VISTAS/ASIP modeling and is discussed in Section 2.2. A copy of this vehicle age distribution can be found in Section 5 of this document.

As part of the public comment process, the NCDOT requested that new vehicle age distribution data be used instead of the data used in the 2009 VISTAS/ASIP modeling. It did not appear that the other transportation partners were consulted about this request, therefore, the NCDAQ has decided to not to use the new data for setting the MVEBs. The NCDAQ will share this data with the transportation partners in an interagency consultation meeting, to be set at a later date. If all transportation partners agree that the new data should be used in setting the MVEBs, then the NCDAQ will determine the effects of the new data on emissions, as well as on the attainment demonstration modeling. If the new data does not jeopardize the attainment demonstration modeling, the NCDAQ may start a SIP revision process, if deemed appropriate, to incorporate the new data into the MVEBs calculations.

3.3 Development of Vehicle Mix

The vehicle mix used in the developing of the MVEBs is the Metrolina area vehicle mix discussed in Section 2.3.2.

As part of the public comment process, the NCDOT requested that new vehicle mix data be used instead of the data used in the 2009 VISTAS/ASIP modeling. It did not appear that the other transportation partners were consulted about this request, therefore, NCDAQ has decided to not to use the new data for setting the MVEBs. The NCDAQ will share this data with the transportation partners in an interagency consultation meeting, to be set at a later date. If all transportation partners agree that the new data should be used in setting the MVEBs, then the NCDAQ will determine the effects on the emissions as well as on the attainment demonstration modeling. If the new data does not jeopardize the attainment demonstration modeling, the NCDAQ may start a SIP revision process, if deemed appropriate, to incorporate the new data into the MVEBs calculations.

The Metrolina vehicle mix data used in setting the MVEBs can be found in Section 5 of this document.

3.4 Temperature, Relative Humidity and Barometric Pressure Assumptions

The MOBILE6.2 command "HOURLY TEMPERATURES" was used to enter temperatures to estimate mobile source emissions. This command requires the command name followed by the hourly temperatures in the data field in the RUN SECTION of the MOBILE6.2 input files. The relative humidity command used in MOBILE6.2 is "RELATIVE HUMIDITY" followed by the hourly relative humidity data. The "RELATIVE HUMIDITY" command is placed in each SCENARIO SECTION in the input files. For the Metrolina nonattainment area, the NCDAQ used an average July 2002 hourly temperature profile and relative humidity profile from the Charlotte-Douglas International Airport Meteorological Station. The hourly temperatures and relative humidity are shown in Tables 3.4-1.

Table 3.4-1 Metrolina Nonattainment Area Average Hourly Temperatures and RH

Hour	July 2002 Avg Temp	July 2002 Avg RH
0	75.0	79.4
1	74.0	82.8
2	73.2	85.1
3	72.3	87.0
4	71.6	88.5
5	71.0	90.6
6	71.0	91.0
7	73.8	85.7
8	77.0	78.5
9	80.3	70.8
10	82.5	65.5
11	85.4	59.3
12	87.3	52.9
13	88.5	50.1
14	89.1	48.5
15	88.5	51.0
16	89.6	47.2
17	89.2	47.1
18	86.3	52.6
19	82.6	60.7
20	77.8	70.1
21	77.5	70.5
22	76.2	76.2
23	75.9	77.3

3.5 Vehicle Inspection and Maintenance Program Assumptions

The ODBII program is administered in all of the counties in the Metrolina nonattainment area. Mecklenburg, Gaston, Union and Cabarrus Counties were four of the original nine counties that implemented the OBDII program. Iredell and Rowan Counties were phased-in in July 2003 and Lincoln County was phased-in in January 2004. All counties in North Carolina have a vehicle safety inspection program. Inspection stations are required to administer an anti-tampering check to ensure that emissions control equipment on any vehicle, less than 35 model years old, has not been altered.

3.6 Reid Vapor Pressure Assumptions

As discussed in Section 2.6, the RVP is required to be 7.8 psi during May through September in areas that were nonattainment for the 1-hour ozone standard, which includes Gaston and Mecklenburg Counties. The remaining counties in the Metrolina nonattainment area are required to have an RVP of 9.0 psi during May through September. These values were used in calculating the MVEBs for the Metrolina nonattainment area.

3.7 Vehicle Miles Traveled Assumptions

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

The daily VMT for the Metrolina nonattainment area was provided by CDOT on February 18, 2005. The 2009 VMT data used to calculate the MVEBs is the same data that was used in the Metrolina attainment demonstration SIP with the exception of Iredell County. The VMT used for Iredell County in the attainment demonstration was an adjusted HPMS, where the HPMS data was increased by 40% at the request of the transportation partners. Thirty percent was to make the VMT TDM-like and ten percent to account for the high growth in this area. As stated earlier, only part of Iredell County was designated nonattainment, so the VMT used to estimate the MVEB reflects TDM VMT associated with the nonattainment area only. This VMT was then increased by 10% to account for the high growth in this area per the interagency consultation process.

As part of the public comment process, the NCDOT requested that four times a day VMT be used instead of daily VMT since this would be consistent with how future transportation conformity regional emissions analyses will be performed. CDOT and MUMPO both commented on this inconsistency as well, especially for the motor vehicle emission budgets for Iredell, Mecklenburg and Union Counties. It did not appear that the other transportation partners were consulted about this request, therefore, the NCDAQ has decided to not to use the new data for setting the MVEBs. The NCDAQ will share this data with the transportation partners in an interagency consultation meeting, to be set at a later date. Additionally, there were a number of questions and concerns in the NCDAQ's initial review of the data. If the questions and concerns the NCDAQ have with the data are resolved and all transportation partners agree that the new data should be used in setting the MVEBs, then the NCDAQ will determine the effects of the new data on emissions, as well as on the attainment demonstration modeling. If the new data does not jeopardize the attainment demonstration modeling, the NCDAQ may start a SIP revision process, if deemed appropriate, to incorporate the new data into the MVEBs calculations.

Table 3.7-1 lists the VMT used in the MVEBs calculations.

Table 3.7-1. 2009 Daily VMT by County

Road Type	Cabarrus	Gaston	Iredell	Lincoln	Mecklenburg	Rowan	Union
Urban							
Interstate	1,602,005	2,723,477	9,900	0	8,917,313	1,770,281	0
Freeways	0	120,248	0	0	5,378,225	0	131,888
Other Prin. Arterial	1,120,379	1,510,449	105,600	103,693	4,367,496	477,996	612,816
Minor Arterial	944,990	1,183,697	202,400	46,769	5,086,069	833,736	779,316
Collector	748,220	325,861	72,600	29,300	3,420,326	518,445	228,372
Local	527,392	554,000	229,900	104,771	4,145,000	379,745	502,801
Rural							
Interstate	0	149,103	1,257,300	0	0	0	0
Other Prin. Arterial	277,914	365,159	6,600	565,584	168,247	138,430	372,635
Minor Arterial	286,075	413,253	231,000	633,517	126,654	118,512	139,296
Major Collector	577,434	468,575	283,800	251,698	13,251	644,672	941,745
Minor Collector	433,748	310,588	212,300	426,038	165,599	475,454	313,708
Local	393,054	333,699	564,300	525,446	276,955	474,587	844,106
Total VMT	**6,911,211**	**8,458,109**	**3,175,700**	**2,686,816**	**32,065,134**	**5,831,856**	**4,866,684**

4. MOTOR VEHICLE EMISSIONS BUDGETS FOR CONFORMITY

4.1 Transportation Conformity

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

One of the requirements is that the NCDAQ needs to consult with the transportation partners in the development of the SIP. The NCDAQ consulted the partners for the data used in the development of the MVEBs, as well as the data used in the VISTAS/ASIP modeling. Additionally, the NCDAQ sent out a request for comment on setting the geographic extent of the MVEBs to all of the transportation partners. A copy of the letter can be found in Appendix B. In the letter, NCDAQ expressed its preference for setting county level budgets and some of the reasons why NCDAQ believed county level budgets were appropriate.

The NCDAQ received comments from several of the transportation partners regarding the geographic extent of the MVEBs. Some of the partners wanted county-by-county budgets; others wanted regional budgets. Copies of the letters received can be found in Appendix B. Upon careful consideration of all arguments, the NCDAQ decided to move forward with setting county level MVEBs. The NCDAQ believes that since mobile source NOx emissions play a significant role in the ozone formation in the Metrolina nonattainment area, it is important that the larger, more urbanized counties in the area meet the county level NOx MVEBs that closely represents the emissions that were modeled for the attainment demonstration.

4.2 Highway Mobile Source VOC Insignificance

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

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

enough motor vehicle emissions growth in that pollutant/precursor for a NAAQS violation to occur.

The rule suggests that such a finding would be based on a number of factors, including the percentage of motor vehicle emissions in the context of the total SIP inventory, the current state of air quality as determined by monitoring data for that NAAQS, the absence of SIP motor vehicle control measures, and historical trends and future projections of the growth of motor vehicle emissions. Although there is a vehicle control measure in place in the Metrolina area, an inspection and maintenance program, the current program was established for additional reductions in NOx emissions. There are incidental VOC emission reductions as a result of this program (~ 8%), however, it is not believed the reduction of VOC emissions results in decreased ozone levels.

The NCDAQ has examined the sources of VOC emissions and their contribution to ozone formation in North Carolina. Due to the generally warm and moist climate of North Carolina, vegetation abounds in many forms, and forested lands naturally cover much of the state. The biogenic sector is the most abundant source of VOC emissions in North Carolina and accounts for approximately 90% of the total VOC emissions statewide. The overwhelming abundance of biogenic VOC emissions makes the majority of North Carolina a NOx limited environment for the formation of ozone. This holds true for the Metrolina nonattainment area counties. Summaries from the VISTAS/ASIP 2002 and 2009 regional modeling effort were used to illustrate the abundance of the biogenic VOC emissions. Figures 4.2-1 and 4.2-2 provides the percent contributions from point, on-road mobile, off-road mobile, area, and biogenic sources to the total VOC emissions in the Metrolina nonattainment area in 2002 and 2009, respectively. For the two partial counties in the Metrolina nonattainment area, Iredell and York Counties, the whole county emissions were used since the modeling inventories are for whole counties.

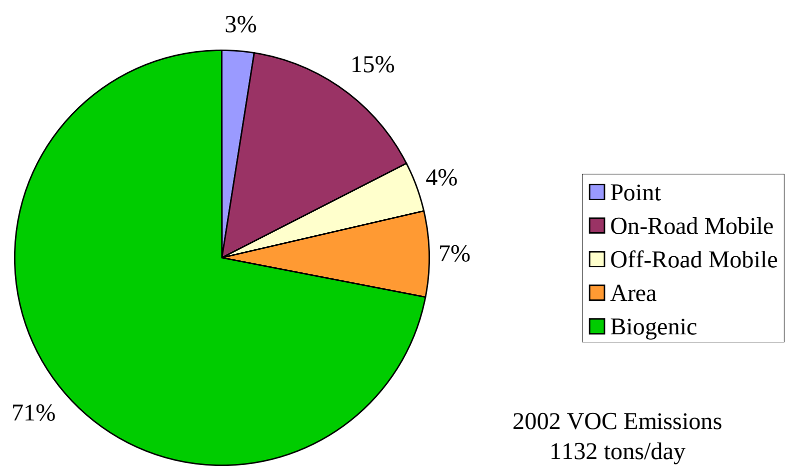


Figure 4.2-1 Metrolina Area 2002 Daily Summertime VOC Emissions

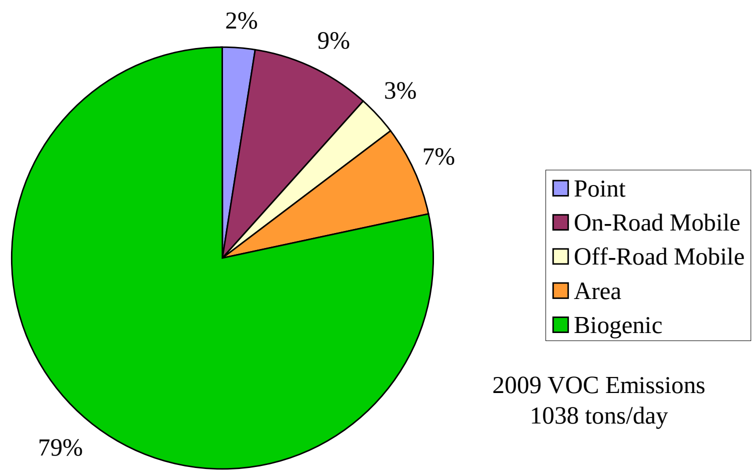


Figure 4.2-2 Metrolina Area 2009 Daily Summertime VOC Emissions

In the Metrolina nonattainment area, on-road mobile sources contribute only 15 and 9 percent of the 2002 and 2009 total VOC inventories, respectively.

Also noteworthy are the projected decreases in on-road mobile VOC emissions, notwithstanding VMT increases. These reductions are due mainly to the retirement of older vehicles and the growing fleet of Tier 2 vehicles on the roads in future years. Some additional reductions are attributable to North Carolina's I/M program in the Metrolina area.

A recent modeling sensitivity test was performed by ASIP that allows an analysis of VOC contributions to ozone concentrations in the Southeastern United States. One of the analyses conducted by ASIP is a series of emissions sensitivity modeling runs to quantify the contributions of various emission sources to ozone and fine particles. The modeling system used in this analysis consisted of 3 components: 1) the Penn State University/National Center for Atmospheric Research Mesoscale Model (MM5 version 3.6.1+), 2) the Sparse Matrix Operator Kernel Emissions Modeling System (SMOKE version 2.1), and 3) the Community Multiscale Air Quality (CMAQ version 4.4) model. Model configurations, input data, and modeling methods are consistent with those suggested by the USEPA in *Guidance on the Use of Models and Other Analyses in Attainment Demonstrations for the 8-hour Ozone NAAQS*.

The emissions sensitivities are calculated by taking the difference between two air quality model simulations: one with base case emissions and another with reduced emissions inputs. The emissions sensitivity discussed here reduces *all* anthropogenic VOCs in the modeling domain by 30% from 2009 emission levels. Translating this to the Metrolina nonattainment area emissions, this 30% anthropogenic VOC reduction is equivalent to about a 70% reduction of all on-road mobile VOC emissions in the Metrolina nonattainment area in 2009. This emissions sensitivity was run for a 39 day period (June 1-July 9). In all 39 days of the modeling simulation, the 8-hour ozone maximum concentrations were unchanged in the Metrolina nonattainment area – a clear indicator that on-road mobile VOC is an insignificant contributor to ozone formation in that area. In fact, there was not an 8-hour ozone response as high as 1 ppb anywhere in North Carolina during the sensitivity simulation. Figure 4.2-3 provides an example from the 30% anthropogenic VOC reduction modeling illustrating the lack of ozone response North Carolina.

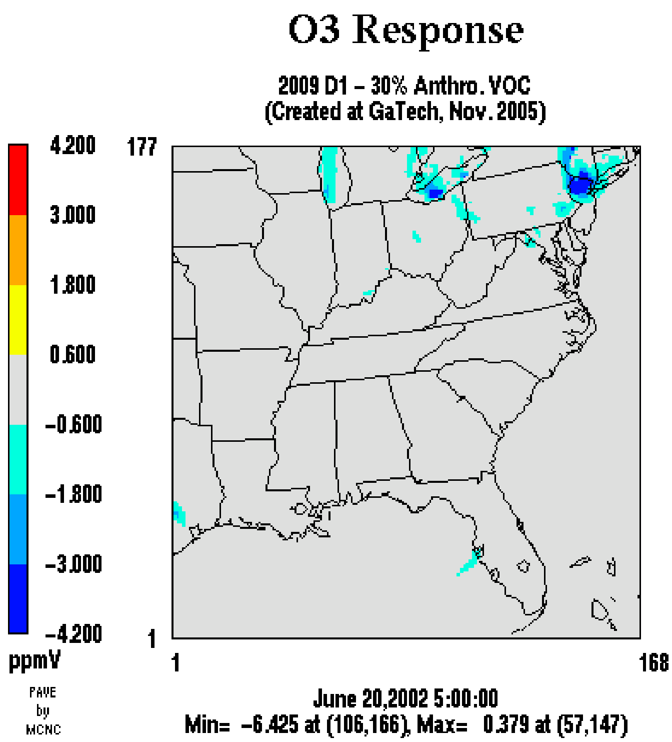
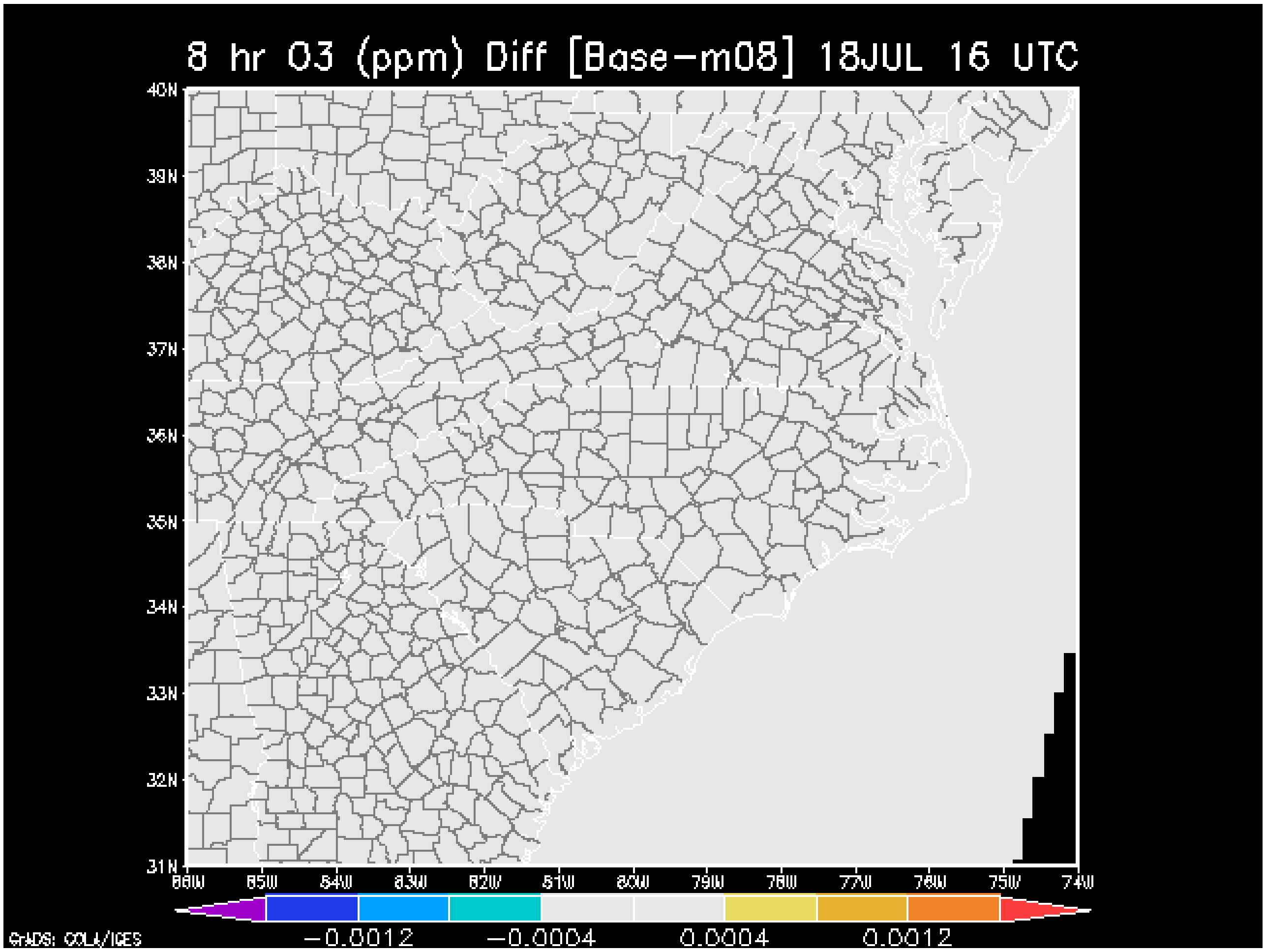


Figure 4.2-3 8-hour Ozone response to 30% anthropogenic VOC reductions in 2009

Additional mobile source sensitivity simulations have been conducted by the NCDAQ. These modeling runs focused specifically on the impact of mobile source VOC emissions on ozone. The sensitivity reduced mobile source VOC by 50% in the North Carolina counties in the Metrolina ozone nonattainment area (Cabarrus, Gaston, Iredell, Lincoln, Mecklenburg, Rowan and Union Counties) in the year 2008. This emissions sensitivity was run for a 7 day period

(July 13-19). In all 7 days of the modeling simulation, the 8-hour ozone maximum concentrations were unchanged in the Metrolina nonattainment area (and all of North Carolina),



a clear indicator that on-road mobile VOC is an insignificant contributor to ozone formation in that area. Figure 4.2-4 provides an example of the lack of an 8-hour ozone response from the 50% mobile VOC reduction sensitivity modeling.

Figure 4.2-4 8-hour Ozone Response to 50% mobile VOC decrease in 2008

Based on the information discussed above, the NCDAQ steadfastly believes on-road mobile VOCs are insignificant contributors to ozone formation in the Metrolina nonattainment area. Emission estimates indicate on-road mobile VOC is a small percentage of the total VOC emissions inventory. On-road mobile VOC emissions are projected to decrease into the future notwithstanding VMT increases. The area is currently below the NAAQS and emission sensitivity modeling performed by ASIP and the NCDAQ indicates no change in future ozone concentrations when VOC emissions are significantly changed. Further, the NCDAQ considers it unreasonable to expect that the Metrolina nonattainment area will experience enough motor vehicle VOC emissions growth for a future ozone violation to occur. For these reasons, the NCDAQ presented the VOC insignificance concept to the transportation partners and all agreed through the interagency consultation process that mobile source VOC emissions were insignificant. Therefore, the NCDAQ will not be setting MVEB for VOC for the Metrolina nonattainment area.

An affirmative insignificance finding from the USEPA only relieves the transportation partners from a regional emissions analysis for VOC emissions for this area and does not relieve them of the other transportation conformity requirements. The transportation partners will need to note the VOC insignificance finding (if found adequate and approved by the USEPA) in future conformity determinations.

4.3 Motor Vehicle Emission Budgets

As part of the consultation process on setting MVEBs, the NCDAQ sent out a request for comment on setting the geographic extent of the MVEBs to all of the transportation partners. A copy of the letter can be found in Appendix B. In the letter, the NCDAQ expressed its preference for setting county level budgets and some of the reasons why the NCDAQ believed county level budgets were appropriate.

The NCDAQ received comments from several of the transportation partners regarding the geographic extent of the MVEBs. Some of the partners wanted county-by-county budgets; others wanted regional budgets. Copies of the letters received can be found in Appendix B. Upon careful consideration of all arguments, the NCDAQ decided to move forward with setting county level MVEBs. The NCDAQ believes that since mobile source NOx emissions play a significant role in the ozone formation in the Metrolina area, it is important that the large counties in the area meet the county level NOx MVEBs that closely represents the emissions that were modeled for the attainment demonstration.

The MVEBs will be set for the attainment year 2009. By the time the MVEBs are found adequate or approved by the USEPA, the next transportation conformity regional emissions analysis should be for years 2009 and beyond. Therefore, MVEBs will not be set for the baseline year 2002.

Although the emissions are usually 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 because the MOBILE model generates the emissions factors in grams per mile. In past conformity exercises, there have been some issues with conversion to tons per day, as well as concerns with how the MVEBs were rounded to the hundredth place. Setting MVEBs in kilograms per day will avoid these issues in future conformity determinations.

The table below shows the North Carolina counties with their on-road mobile NOx emissions expressed in tons per day and the corresponding kilograms per day values for 2009.

Table 4.3-1 On-Road Mobile Source NOx Emissions Metrolina Nonattainment Area

County	2009	
	Tons/day	Kg/day
Cabarrus	8.57	7,788
Gaston	9.48	8,602
Iredell*	5.61	5,094
Lincoln	3.65	3,317
Mecklenburg	32.27	29,270
Rowan	8.45	7,675
Union	5.57	5,070
Total	73.09	66,353

* Iredell County emissions for nonattainment area only.

The NCDAQ will set MVEB, for transportation conformity purposes, as county budgets within the Metrolina nonattainment area for 2009. Tables 4.3-2 below list out the NOx MVEBs in kilograms per day, for transportation conformity purposes, by county. Upon the USEPA's affirmative adequacy finding for these county level sub-area MVEBs, these MVEBs will become the applicable MVEBs for each county.

Table 4.3-2 County Level NOx MVEB for 2009

County	MVEB (Kilograms/day)
Cabarrus	7,788
Gaston	8,602
Iredell*	5,094
Lincoln	3,317
Mecklenburg	29,270
Rowan	7,675
Union	5,070

* Iredell County MVEB for nonattainment area only

5. MOBILE6.2 DATA USED IN SETTING MVEBs

5.1 MOBILE Input Files

MG09.IN

```
MOBILE6 INPUT FILE :

> Meck/Gaston I/M for 2009 using TDM Average Daily speeds
> with DAQ generated vehicle Mix

POLLUTANTS         : NOX HC
SPREADSHEET        : Meck/Gaston NOX VOC
RUN DATA           :
***************** RUN SECTION  **********
FUEL RVP           : 7.8
REG DIST           : mekage04.prn

HOURLY TEMPERATURES: 71.0 73.8 77.0 80.3 82.5 85.4 87.3 88.5 89.1 88.5 89.6 89.2
                     86.3 82.6 77.8 77.5 76.2 75.9 75.0 74.0 73.2 82.3 71.6 71.0

> OBDII

I/M PROGRAM        : 1 2003 2050 1 TRC OBD I/M
I/M MODEL YEARS    : 1 1996 2050
I/M VEHICLES       : 1 22222 11111111 1
I/M STRINGENCY     : 1 10.0
I/M COMPLIANCE     : 1 95.0
I/M WAIVER RATES   : 1 5.0 5.0

I/M PROGRAM        : 2 2003 2050 1 TRC EVAP OBD
I/M MODEL YEARS    : 2 1996 2050
I/M VEHICLES       : 2 22222 11111111 1
I/M STRINGENCY     : 2 10.0
I/M COMPLIANCE     : 2 95.0
I/M WAIVER RATES   : 2 5.0 5.0

ANTI-TAMP PROG     :
91 74 50 22222 22222222 2 11 095. 22212222
************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural principle arterial-Meck County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural other principle arterial mix and speeds

VMT FRACTIONS      :
0.3554   0.0843   0.2805   0.0865   0.0397   0.0453   0.0044   0.0037
0.0028   0.0101   0.0132   0.0144   0.0509   0.0023   0.0012   0.0053

AVERAGE SPEED      : 22 Non-Ramp 100.0 0.0 0.0 0.0


RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural minor arterial-Meck County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural minor arterial mix and speeds

VMT FRACTIONS      :
0.3742   0.0886   0.2951   0.0909   0.0418   0.0430   0.0042   0.0036
0.0026   0.0096   0.0063   0.0069   0.0244   0.0022   0.0011   0.0055
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AVERAGE SPEED      : 18 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural major collector-Meck County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural major collector mix and speeds

VMT FRACTIONS      :
0.3784   0.0897   0.2987   0.0921   0.0423   0.0426   0.0042   0.0036
0.0027   0.0095   0.0046   0.0050   0.0178   0.0022   0.0010   0.0056

AVERAGE SPEED      : 32 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural minor collector-Meck County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural minor collector mix and speeds

VMT FRACTIONS      :
0.3760   0.0889   0.2963   0.0913   0.0419   0.0449   0.0043   0.0037
0.0028   0.0101   0.0052   0.0056   0.0201   0.0023   0.0011   0.0055

AVERAGE SPEED      : 26 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural local-Meck County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural local mix and speeds

VMT FRACTIONS      :
0.3753   0.0889   0.2962   0.0913   0.0420   0.0451   0.0044   0.0037
0.0029   0.0102   0.0052   0.0057   0.0201   0.0024   0.0011   0.0055

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban interstate-Meck County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban interstate mix and speeds

VMT FRACTIONS      :
0.3418   0.0810   0.2696   0.0831   0.0382   0.0581   0.0057   0.0048
0.0036   0.0130   0.0154   0.0167   0.0595   0.0030   0.0015   0.0050

AVERAGE SPEED      : 41 Non-Ramp 100.0 0.0 0.0 0.0
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RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban freeway-Meck County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban freeway mix and speeds

VMT FRACTIONS      :
0.3718   0.0881   0.2934   0.0904   0.0416   0.0350   0.0034   0.0029
0.0022   0.0078   0.0093   0.0101   0.0358   0.0018   0.0009   0.0055

AVERAGE SPEED      : 49 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban principle arterial-Meck County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban principle arterial mix and speeds

VMT FRACTIONS      :
0.3919   0.0929   0.3092   0.0953   0.0438   0.0292   0.0029   0.0024
0.0018   0.0066   0.0027   0.0029   0.0103   0.0016   0.0008   0.0057

AVERAGE SPEED      : 25 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban minor arterial-Meck County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban minor arterial mix and speeds

VMT FRACTIONS      :
0.3898   0.0924   0.3076   0.0948   0.0436   0.0334   0.0032   0.0027
0.0021   0.0075   0.0024   0.0026   0.0094   0.0018   0.0009   0.0058

AVERAGE SPEED      : 26 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban collector-Meck County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban collector mix and speeds

VMT FRACTIONS      :
0.3906   0.0925   0.3080   0.0949   0.0436   0.0348   0.0034   0.0028
0.0021   0.0077   0.0019   0.0021   0.0073   0.0017   0.0009   0.0057

AVERAGE SPEED      : 24 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.
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BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban local-Meck County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban local mix and speeds

VMT FRACTIONS      :
0.3905   0.0925   0.3080   0.0949   0.0437   0.0347   0.0034   0.0028
0.0021   0.0077   0.0019   0.0021   0.0073   0.0018   0.0009   0.0057

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural Interstate - Gaston County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural interstate mix and speeds

VMT FRACTIONS      :
0.2848   0.0675   0.2247   0.0692   0.0318   0.1019   0.0100   0.0084
0.0063   0.0228   0.0270   0.0293   0.1043   0.0052   0.0026   0.0042

AVERAGE SPEED      : 42 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural principle arterial- Gaston County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural other principle arterial mix and speeds

VMT FRACTIONS      :
0.3554   0.0843   0.2805   0.0865   0.0397   0.0453   0.0044   0.0037
0.0028   0.0101   0.0132   0.0144   0.0509   0.0023   0.0012   0.0053

AVERAGE SPEED      : 66 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural minor arterial- Gaston County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural minor arterial mix and speeds

VMT FRACTIONS      :
0.3742   0.0886   0.2951   0.0909   0.0418   0.0430   0.0042   0.0036
0.0026   0.0096   0.0063   0.0069   0.0244   0.0022   0.0011   0.0055

AVERAGE SPEED      : 36 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
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```
SCENARIO RECORD    : Rural major collector- Gaston County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7


> Rural major collector mix and speeds

VMT FRACTIONS      :
0.3784   0.0897   0.2987   0.0921   0.0423   0.0426   0.0042   0.0036
0.0027   0.0095   0.0046   0.0050   0.0178   0.0022   0.0010   0.0056

AVERAGE SPEED      : 43 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural minor collector- Gaston County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural minor collector mix and speeds

VMT FRACTIONS      :
0.3760   0.0889   0.2963   0.0913   0.0419   0.0449   0.0043   0.0037
0.0028   0.0101   0.0052   0.0056   0.0201   0.0023   0.0011   0.0055

AVERAGE SPEED      : 41 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural local- Gaston County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural local mix and speeds

VMT FRACTIONS      :
0.3753   0.0889   0.2962   0.0913   0.0420   0.0451   0.0044   0.0037
0.0029   0.0102   0.0052   0.0057   0.0201   0.0024   0.0011   0.0055

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban interstate- Gaston County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban interstate mix and speeds

VMT FRACTIONS      :
0.3418   0.0810   0.2696   0.0831   0.0382   0.0581   0.0057   0.0048
0.0036   0.0130   0.0154   0.0167   0.0595   0.0030   0.0015   0.0050

AVERAGE SPEED      : 44 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban freeway- Gaston County
CALENDAR YEAR      : 2009
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```
EVALUATION MONTH   : 7

> Urban freeway mix and speeds

VMT FRACTIONS      :
0.3718   0.0881   0.2934   0.0904   0.0416   0.0350   0.0034   0.0029
0.0022   0.0078   0.0093   0.0101   0.0358   0.0018   0.0009   0.0055

AVERAGE SPEED      : 66 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban principle arterial- Gaston County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban principle arterial mix and speeds

VMT FRACTIONS      :
0.3919   0.0929   0.3092   0.0953   0.0438   0.0292   0.0029   0.0024
0.0018   0.0066   0.0027   0.0029   0.0103   0.0016   0.0008   0.0057

AVERAGE SPEED      : 26 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban minor arterial- Gaston County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban minor arterial mix and speeds

VMT FRACTIONS      :
0.3898   0.0924   0.3076   0.0948   0.0436   0.0334   0.0032   0.0027
0.0021   0.0075   0.0024   0.0026   0.0094   0.0018   0.0009   0.0058

AVERAGE SPEED      : 29 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30


************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban collector- Gaston County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban collector mix and speeds

VMT FRACTIONS      :
0.3906   0.0925   0.3080   0.0949   0.0436   0.0348   0.0034   0.0028
0.0021   0.0077   0.0019   0.0021   0.0073   0.0017   0.0009   0.0057

AVERAGE SPEED      : 26 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban local- Gaston County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7
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> Urban local mix and speeds

VMT FRACTIONS      :
0.3905   0.0925   0.3080   0.0949   0.0437   0.0347   0.0034   0.0028
0.0021   0.0077   0.0019   0.0021   0.0073   0.0018   0.0009   0.0057

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

END OF RUN         :
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MG09N.IN

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MOBILE6 INPUT FILE :

> Meck/Gaston I/M for 2009 using TDM Average Daily speeds
> with DAQ generated vehicle Mix

POLLUTANTS         : NOX HC
SPREADSHEET        : Meck/Gaston NOX VOC
RUN DATA           :
***************** RUN SECTION  **********
FUEL RVP           : 7.8
REG DIST           : mekage04.prn

HOURLY TEMPERATURES: 71.0 73.8 77.0 80.3 82.5 85.4 87.3 88.5 89.1 88.5 89.6 89.2
                     86.3 82.6 77.8 77.5 76.2 75.9 75.0 74.0 73.2 82.3 71.6 71.0

> OBDII

I/M PROGRAM        : 1 2003 2050 1 TRC OBD I/M
I/M MODEL YEARS    : 1 1996 2050
I/M VEHICLES       : 1 22222 11111111 1
I/M STRINGENCY     : 1 10.0
I/M COMPLIANCE     : 1 95.0
I/M WAIVER RATES   : 1 5.0 5.0

I/M PROGRAM        : 2 2003 2050 1 TRC EVAP OBD
I/M MODEL YEARS    : 2 1996 2050
I/M VEHICLES       : 2 22222 11111111 1
I/M STRINGENCY     : 2 10.0
I/M COMPLIANCE     : 2 95.0
I/M WAIVER RATES   : 2 5.0 5.0

ANTI-TAMP PROG     :
91 74 50 22222 22222222 2 11 095. 22212222
************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural principle arterial-Meck County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural other principle arterial mix and speeds

VMT FRACTIONS      :
0.3554   0.0843   0.2805   0.0865   0.0397   0.0453   0.0044   0.0037
0.0028   0.0101   0.0132   0.0144   0.0509   0.0023   0.0012   0.0053

AVERAGE SPEED      : 22 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural minor arterial-Meck County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural minor arterial mix and speeds

VMT FRACTIONS      :
0.3742   0.0886   0.2951   0.0909   0.0418   0.0430   0.0042   0.0036
0.0026   0.0096   0.0063   0.0069   0.0244   0.0022   0.0011   0.0055

AVERAGE SPEED      : 18 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
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************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural major collector-Meck County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural major collector mix and speeds

VMT FRACTIONS      :
0.3784   0.0897   0.2987   0.0921   0.0423   0.0426   0.0042   0.0036
0.0027   0.0095   0.0046   0.0050   0.0178   0.0022   0.0010   0.0056

AVERAGE SPEED      : 32 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural minor collector-Meck County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural minor collector mix and speeds

VMT FRACTIONS      :
0.3760   0.0889   0.2963   0.0913   0.0419   0.0449   0.0043   0.0037
0.0028   0.0101   0.0052   0.0056   0.0201   0.0023   0.0011   0.0055

AVERAGE SPEED      : 26 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural local-Meck County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural local mix and speeds

VMT FRACTIONS      :
0.3753   0.0889   0.2962   0.0913   0.0420   0.0451   0.0044   0.0037
0.0029   0.0102   0.0052   0.0057   0.0201   0.0024   0.0011   0.0055

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban interstate-Meck County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban interstate mix and speeds

VMT FRACTIONS      :
0.3418   0.0810   0.2696   0.0831   0.0382   0.0581   0.0057   0.0048
0.0036   0.0130   0.0154   0.0167   0.0595   0.0030   0.0015   0.0050

AVERAGE SPEED      : 41 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban freeway-Meck County
CALENDAR YEAR      : 2009
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EVALUATION MONTH   : 7

> Urban freeway mix and speeds

VMT FRACTIONS      :
0.3718   0.0881   0.2934   0.0904   0.0416   0.0350   0.0034   0.0029
0.0022   0.0078   0.0093   0.0101   0.0358   0.0018   0.0009   0.0055

AVERAGE SPEED      : 49 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban principle arterial-Meck County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban principle arterial mix and speeds

VMT FRACTIONS      :
0.3919   0.0929   0.3092   0.0953   0.0438   0.0292   0.0029   0.0024
0.0018   0.0066   0.0027   0.0029   0.0103   0.0016   0.0008   0.0057

AVERAGE SPEED      : 25 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban minor arterial-Meck County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban minor arterial mix and speeds

VMT FRACTIONS      :
0.3898   0.0924   0.3076   0.0948   0.0436   0.0334   0.0032   0.0027
0.0021   0.0075   0.0024   0.0026   0.0094   0.0018   0.0009   0.0058

AVERAGE SPEED      : 26 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban collector-Meck County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban collector mix and speeds

VMT FRACTIONS      :
0.3906   0.0925   0.3080   0.0949   0.0436   0.0348   0.0034   0.0028
0.0021   0.0077   0.0019   0.0021   0.0073   0.0017   0.0009   0.0057

AVERAGE SPEED      : 24 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban local-Meck County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban local mix and speeds
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VMT FRACTIONS      :
0.3905   0.0925   0.3080   0.0949   0.0437   0.0347   0.0034   0.0028
0.0021   0.0077   0.0019   0.0021   0.0073   0.0018   0.0009   0.0057

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural Interstate - Gaston County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural interstate mix and speeds

VMT FRACTIONS      :
0.2848   0.0675   0.2247   0.0692   0.0318   0.1019   0.0100   0.0084
0.0063   0.0228   0.0270   0.0293   0.1043   0.0052   0.0026   0.0042

AVERAGE SPEED      : 42 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural principle arterial- Gaston County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural other principle arterial mix and speeds

VMT FRACTIONS      :
0.3554   0.0843   0.2805   0.0865   0.0397   0.0453   0.0044   0.0037
0.0028   0.0101   0.0132   0.0144   0.0509   0.0023   0.0012   0.0053

AVERAGE SPEED      : 66 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural minor arterial- Gaston County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural minor arterial mix and speeds

VMT FRACTIONS      :
0.3742   0.0886   0.2951   0.0909   0.0418   0.0430   0.0042   0.0036
0.0026   0.0096   0.0063   0.0069   0.0244   0.0022   0.0011   0.0055

AVERAGE SPEED      : 36 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural major collector- Gaston County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural major collector mix and speeds

VMT FRACTIONS      :
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0.3784   0.0897   0.2987   0.0921   0.0423   0.0426   0.0042   0.0036
0.0027   0.0095   0.0046   0.0050   0.0178   0.0022   0.0010   0.0056

AVERAGE SPEED      : 43 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural minor collector- Gaston County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural minor collector mix and speeds

VMT FRACTIONS      :
0.3760   0.0889   0.2963   0.0913   0.0419   0.0449   0.0043   0.0037
0.0028   0.0101   0.0052   0.0056   0.0201   0.0023   0.0011   0.0055

AVERAGE SPEED      : 41 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural local- Gaston County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural local mix and speeds

VMT FRACTIONS      :
0.3753   0.0889   0.2962   0.0913   0.0420   0.0451   0.0044   0.0037
0.0029   0.0102   0.0052   0.0057   0.0201   0.0024   0.0011   0.0055

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban interstate- Gaston County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban interstate mix and speeds

VMT FRACTIONS      :
0.3418   0.0810   0.2696   0.0831   0.0382   0.0581   0.0057   0.0048
0.0036   0.0130   0.0154   0.0167   0.0595   0.0030   0.0015   0.0050

AVERAGE SPEED      : 44 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban freeway- Gaston County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban freeway mix and speeds

VMT FRACTIONS      :
0.3718   0.0881   0.2934   0.0904   0.0416   0.0350   0.0034   0.0029
0.0022   0.0078   0.0093   0.0101   0.0358   0.0018   0.0009   0.0055
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AVERAGE SPEED      : 66 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban principle arterial- Gaston County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban principle arterial mix and speeds

VMT FRACTIONS      :
0.3919   0.0929   0.3092   0.0953   0.0438   0.0292   0.0029   0.0024
0.0018   0.0066   0.0027   0.0029   0.0103   0.0016   0.0008   0.0057

AVERAGE SPEED      : 26 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban minor arterial- Gaston County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban minor arterial mix and speeds

VMT FRACTIONS      :
0.3898   0.0924   0.3076   0.0948   0.0436   0.0334   0.0032   0.0027
0.0021   0.0075   0.0024   0.0026   0.0094   0.0018   0.0009   0.0058

AVERAGE SPEED      : 29 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban collector- Gaston County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban collector mix and speeds

VMT FRACTIONS      :
0.3906   0.0925   0.3080   0.0949   0.0436   0.0348   0.0034   0.0028
0.0021   0.0077   0.0019   0.0021   0.0073   0.0017   0.0009   0.0057

AVERAGE SPEED      : 26 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban local- Gaston County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban local mix and speeds

VMT FRACTIONS      :
0.3905   0.0925   0.3080   0.0949   0.0437   0.0347   0.0034   0.0028
0.0021   0.0077   0.0019   0.0021   0.0073   0.0018   0.0009   0.0057

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
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                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.
BAROMETRIC PRES    : 30
END OF RUN         :
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RIL09.IN

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MOBILE6 INPUT FILE :

> Rowan/Iredell/Lincoln I/M for 2009 using TDM Average Daily speeds
> with DAQ generated vehicle Mix

POLLUTANTS         : NOX HC
SPREADSHEET        : Rowan/Iredell/Lincoln NOX VOC
RUN DATA           :

***************** RUN SECTION  **********

FUEL RVP           : 9.0
REG DIST           : ncage04.prn

HOURLY TEMPERATURES: 71.0 73.8 77.0 80.3 82.5 85.4 87.3 88.5 89.1 88.5 89.6 89.2
                     86.3 82.6 77.8 77.5 76.2 75.9 75.0 74.0 73.2 82.3 71.6 71.0

> OBDII

I/M PROGRAM        : 1 2004 2050 1 TRC OBD I/M
I/M MODEL YEARS    : 1 1996 2050
I/M VEHICLES       : 1 22222 11111111 1
I/M STRINGENCY     : 1 10.0
I/M COMPLIANCE     : 1 95.0
I/M WAIVER RATES   : 1 5.0 5.0

I/M PROGRAM        : 2 2004 2050 1 TRC EVAP OBD
I/M MODEL YEARS    : 2 1996 2050
I/M VEHICLES       : 2 22222 11111111 1
I/M STRINGENCY     : 2 10.0
I/M COMPLIANCE     : 2 95.0
I/M WAIVER RATES   : 2 5.0 5.0

ANTI-TAMP PROG     :
91 74 50 22222 22222222 2 11 095. 22212222

************  SCENARIO SECTION ********

SCENARIO RECORD    : Rural principle arterial- Rowan County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural other principle arterial mix and speeds

VMT FRACTIONS      :
0.3554   0.0843   0.2805   0.0865   0.0397   0.0453   0.0044   0.0037
0.0028   0.0101   0.0132   0.0144   0.0509   0.0023   0.0012   0.0053

AVERAGE SPEED      : 45 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural minor arterial- Rowan County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural minor arterial mix and speeds

VMT FRACTIONS      :
0.3742   0.0886   0.2951   0.0909   0.0418   0.0430   0.0042   0.0036
0.0026   0.0096   0.0063   0.0069   0.0244   0.0022   0.0011   0.0055

AVERAGE SPEED      : 49 Arterial 0.0 100.0 0.0 0.0
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RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural major collector- Rowan County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural major collector mix and speeds

VMT FRACTIONS      :
0.3784   0.0897   0.2987   0.0921   0.0423   0.0426   0.0042   0.0036
0.0027   0.0095   0.0046   0.0050   0.0178   0.0022   0.0010   0.0056

AVERAGE SPEED      : 50 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural minor collector- Rowan County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural minor collector mix and speeds

VMT FRACTIONS      :
0.3760   0.0889   0.2963   0.0913   0.0419   0.0449   0.0043   0.0037
0.0028   0.0101   0.0052   0.0056   0.0201   0.0023   0.0011   0.0055

AVERAGE SPEED      : 50 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural local- Rowan County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural local mix and speeds

VMT FRACTIONS      :
0.3753   0.0889   0.2962   0.0913   0.0420   0.0451   0.0044   0.0037
0.0029   0.0102   0.0052   0.0057   0.0201   0.0024   0.0011   0.0055

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban interstate- Rowan County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban interstate mix and speeds

VMT FRACTIONS      :
0.3418   0.0810   0.2696   0.0831   0.0382   0.0581   0.0057   0.0048
0.0036   0.0130   0.0154   0.0167   0.0595   0.0030   0.0015   0.0050
```

```
AVERAGE SPEED      : 57 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban principle arterial- Rowan County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban principle arterial mix and speeds

VMT FRACTIONS      :
0.3919   0.0929   0.3092   0.0953   0.0438   0.0292   0.0029   0.0024
0.0018   0.0066   0.0027   0.0029   0.0103   0.0016   0.0008   0.0057

AVERAGE SPEED      : 38 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban minor arterial- Rowan County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban minor arterial mix and speeds

VMT FRACTIONS      :
0.3898   0.0924   0.3076   0.0948   0.0436   0.0334   0.0032   0.0027
0.0021   0.0075   0.0024   0.0026   0.0094   0.0018   0.0009   0.0058

AVERAGE SPEED      : 39 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban collector- Rowan County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban collector mix and speeds

VMT FRACTIONS      :
0.3906   0.0925   0.3080   0.0949   0.0436   0.0348   0.0034   0.0028
0.0021   0.0077   0.0019   0.0021   0.0073   0.0017   0.0009   0.0057

AVERAGE SPEED      : 36 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban local- Rowan County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban local mix and speeds

VMT FRACTIONS      :
0.3905   0.0925   0.3080   0.0949   0.0437   0.0347   0.0034   0.0028
0.0021   0.0077   0.0019   0.0021   0.0073   0.0018   0.0009   0.0057
```

```
AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural Interstate - Iredell County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural interstate mix and speeds

VMT FRACTIONS      :
0.2848   0.0675   0.2247   0.0692   0.0318   0.1019   0.0100   0.0084
0.0063   0.0228   0.0270   0.0293   0.1043   0.0052   0.0026   0.0042

AVERAGE SPEED      : 57 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural principle arterial- Iredell County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural other principle arterial mix and speeds

VMT FRACTIONS      :
0.3554   0.0843   0.2805   0.0865   0.0397   0.0453   0.0044   0.0037
0.0028   0.0101   0.0132   0.0144   0.0509   0.0023   0.0012   0.0053

AVERAGE SPEED      : 66 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural minor arterial- Iredell County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural minor arterial mix and speeds

VMT FRACTIONS      :
0.3742   0.0886   0.2951   0.0909   0.0418   0.0430   0.0042   0.0036
0.0026   0.0096   0.0063   0.0069   0.0244   0.0022   0.0011   0.0055

AVERAGE SPEED      : 26 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural major collector- Iredell County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural major collector mix and speeds

VMT FRACTIONS      :
0.3784   0.0897   0.2987   0.0921   0.0423   0.0426   0.0042   0.0036
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0.0027   0.0095   0.0046   0.0050   0.0178   0.0022   0.0010   0.0056

AVERAGE SPEED      : 32 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural minor collector- Iredell County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural minor collector mix and speeds

VMT FRACTIONS      :
0.3760   0.0889   0.2963   0.0913   0.0419   0.0449   0.0043   0.0037
0.0028   0.0101   0.0052   0.0056   0.0201   0.0023   0.0011   0.0055

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural local- Iredell County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural local mix and speeds

VMT FRACTIONS      :
0.3753   0.0889   0.2962   0.0913   0.0420   0.0451   0.0044   0.0037
0.0029   0.0102   0.0052   0.0057   0.0201   0.0024   0.0011   0.0055

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban interstate- Iredell County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban interstate mix and speeds

VMT FRACTIONS      :
0.3418   0.0810   0.2696   0.0831   0.0382   0.0581   0.0057   0.0048
0.0036   0.0130   0.0154   0.0167   0.0595   0.0030   0.0015   0.0050

AVERAGE SPEED      : 60 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban principle arterial- Iredell County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban principle arterial mix and speeds

VMT FRACTIONS      :
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0.3919   0.0929   0.3092   0.0953   0.0438   0.0292   0.0029   0.0024
0.0018   0.0066   0.0027   0.0029   0.0103   0.0016   0.0008   0.0057

AVERAGE SPEED      : 27 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban minor arterial- Iredell County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban minor arterial mix and speeds

VMT FRACTIONS      :
0.3898   0.0924   0.3076   0.0948   0.0436   0.0334   0.0032   0.0027
0.0021   0.0075   0.0024   0.0026   0.0094   0.0018   0.0009   0.0058

AVERAGE SPEED      : 26 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban collector- Iredell County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban collector mix and speeds

VMT FRACTIONS      :
0.3906   0.0925   0.3080   0.0949   0.0436   0.0348   0.0034   0.0028
0.0021   0.0077   0.0019   0.0021   0.0073   0.0017   0.0009   0.0057

AVERAGE SPEED      : 28 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban local- Iredell County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban local mix and speeds

VMT FRACTIONS      :
0.3905   0.0925   0.3080   0.0949   0.0437   0.0347   0.0034   0.0028
0.0021   0.0077   0.0019   0.0021   0.0073   0.0018   0.0009   0.0057

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural principle arterial- Lincoln County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural other principle arterial mix and speeds
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VMT FRACTIONS      :
0.3554   0.0843   0.2805   0.0865   0.0397   0.0453   0.0044   0.0037
0.0028   0.0101   0.0132   0.0144   0.0509   0.0023   0.0012   0.0053

AVERAGE SPEED      : 59 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural minor arterial- Lincoln County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural minor arterial mix and speeds

VMT FRACTIONS      :
0.3742   0.0886   0.2951   0.0909   0.0418   0.0430   0.0042   0.0036
0.0026   0.0096   0.0063   0.0069   0.0244   0.0022   0.0011   0.0055

AVERAGE SPEED      : 37 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural major collector- Lincoln County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural major collector mix and speeds

VMT FRACTIONS      :
0.3784   0.0897   0.2987   0.0921   0.0423   0.0426   0.0042   0.0036
0.0027   0.0095   0.0046   0.0050   0.0178   0.0022   0.0010   0.0056

AVERAGE SPEED      : 51 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

********  SCENARIO SECTION ********
SCENARIO RECORD    : Rural minor collector- Lincoln County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural minor collector mix and speeds

VMT FRACTIONS      :
0.3760   0.0889   0.2963   0.0913   0.0419   0.0449   0.0043   0.0037
0.0028   0.0101   0.0052   0.0056   0.0201   0.0023   0.0011   0.0055

AVERAGE SPEED      : 45 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural local- Lincoln County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural local mix and speeds
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VMT FRACTIONS      :
0.3753   0.0889   0.2962   0.0913   0.0420   0.0451   0.0044   0.0037
0.0029   0.0102   0.0052   0.0057   0.0201   0.0024   0.0011   0.0055

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban principle arterial- Lincoln County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban principle arterial mix and speeds

VMT FRACTIONS      :
0.3919   0.0929   0.3092   0.0953   0.0438   0.0292   0.0029   0.0024
0.0018   0.0066   0.0027   0.0029   0.0103   0.0016   0.0008   0.0057

AVERAGE SPEED      : 41 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban minor arterial- Lincoln County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban minor arterial mix and speeds

VMT FRACTIONS      :
0.3898   0.0924   0.3076   0.0948   0.0436   0.0334   0.0032   0.0027
0.0021   0.0075   0.0024   0.0026   0.0094   0.0018   0.0009   0.0058

AVERAGE SPEED      : 23 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban collector- Lincoln County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban collector mix and speeds

VMT FRACTIONS      :
0.3906   0.0925   0.3080   0.0949   0.0436   0.0348   0.0034   0.0028
0.0021   0.0077   0.0019   0.0021   0.0073   0.0017   0.0009   0.0057

AVERAGE SPEED      : 22 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban local- Lincoln County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7
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> Urban local mix and speeds

VMT FRACTIONS      :
0.3905   0.0925   0.3080   0.0949   0.0437   0.0347   0.0034   0.0028
0.0021   0.0077   0.0019   0.0021   0.0073   0.0018   0.0009   0.0057

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

END OF RUN         :
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RIL09N.IN

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MOBILE6 INPUT FILE :

> Rowan/Iredell/Lincoln NonI/M for 2009 using TDM Average Daily speeds
> with DAQ generated vehicle Mix

POLLUTANTS         : NOX HC
SPREADSHEET        : Rowan/Iredell/Lincoln NOX VOC
RUN DATA           :

***************** RUN SECTION  **********

FUEL RVP           : 9.0
REG DIST           : ncage04.prn

HOURLY TEMPERATURES: 71.0 73.8 77.0 80.3 82.5 85.4 87.3 88.5 89.1 88.5 89.6 89.2
                     86.3 82.6 77.8 77.5 76.2 75.9 75.0 74.0 73.2 82.3 71.6 71.0

ANTI-TAMP PROG     :
91 74 50 22222 22222222 2 11 095. 22212222

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural principle arterial- Rowan County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural other principle arterial mix and speeds

VMT FRACTIONS      :
0.3554   0.0843   0.2805   0.0865   0.0397   0.0453   0.0044   0.0037
0.0028   0.0101   0.0132   0.0144   0.0509   0.0023   0.0012   0.0053

AVERAGE SPEED      : 45 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural minor arterial- Rowan County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural minor arterial mix and speeds

VMT FRACTIONS      :
0.3742   0.0886   0.2951   0.0909   0.0418   0.0430   0.0042   0.0036
0.0026   0.0096   0.0063   0.0069   0.0244   0.0022   0.0011   0.0055

AVERAGE SPEED      : 49 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural major collector- Rowan County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural major collector mix and speeds

VMT FRACTIONS      :
0.3784   0.0897   0.2987   0.0921   0.0423   0.0426   0.0042   0.0036
0.0027   0.0095   0.0046   0.0050   0.0178   0.0022   0.0010   0.0056
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AVERAGE SPEED      : 50 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural minor collector- Rowan County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural minor collector mix and speeds

VMT FRACTIONS      :
0.3760   0.0889   0.2963   0.0913   0.0419   0.0449   0.0043   0.0037
0.0028   0.0101   0.0052   0.0056   0.0201   0.0023   0.0011   0.0055

AVERAGE SPEED      : 50 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural local- Rowan County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural local mix and speeds

VMT FRACTIONS      :
0.3753   0.0889   0.2962   0.0913   0.0420   0.0451   0.0044   0.0037
0.0029   0.0102   0.0052   0.0057   0.0201   0.0024   0.0011   0.0055

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban interstate- Rowan County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban interstate mix and speeds

VMT FRACTIONS      :
0.3418   0.0810   0.2696   0.0831   0.0382   0.0581   0.0057   0.0048
0.0036   0.0130   0.0154   0.0167   0.0595   0.0030   0.0015   0.0050

AVERAGE SPEED      : 57 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban principle arterial- Rowan County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban principle arterial mix and speeds

VMT FRACTIONS      :
0.3919   0.0929   0.3092   0.0953   0.0438   0.0292   0.0029   0.0024
0.0018   0.0066   0.0027   0.0029   0.0103   0.0016   0.0008   0.0057
```

```
AVERAGE SPEED      : 38 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban minor arterial- Rowan County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban minor arterial mix and speeds

VMT FRACTIONS      :
0.3898   0.0924   0.3076   0.0948   0.0436   0.0334   0.0032   0.0027
0.0021   0.0075   0.0024   0.0026   0.0094   0.0018   0.0009   0.0058

AVERAGE SPEED      : 39 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban collector- Rowan County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban collector mix and speeds

VMT FRACTIONS      :
0.3906   0.0925   0.3080   0.0949   0.0436   0.0348   0.0034   0.0028
0.0021   0.0077   0.0019   0.0021   0.0073   0.0017   0.0009   0.0057

AVERAGE SPEED      : 36 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban local- Rowan County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban local mix and speeds

VMT FRACTIONS      :
0.3905   0.0925   0.3080   0.0949   0.0437   0.0347   0.0034   0.0028
0.0021   0.0077   0.0019   0.0021   0.0073   0.0018   0.0009   0.0057

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural Interstate - Iredell County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural interstate mix and speeds

VMT FRACTIONS      :
0.2848   0.0675   0.2247   0.0692   0.0318   0.1019   0.0100   0.0084
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0.0063   0.0228   0.0270   0.0293   0.1043   0.0052   0.0026   0.0042

AVERAGE SPEED      : 57 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural principle arterial- Iredell County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural other principle arterial mix and speeds

VMT FRACTIONS      :
0.3554   0.0843   0.2805   0.0865   0.0397   0.0453   0.0044   0.0037
0.0028   0.0101   0.0132   0.0144   0.0509   0.0023   0.0012   0.0053

AVERAGE SPEED      : 66 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural minor arterial- Iredell County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural minor arterial mix and speeds

VMT FRACTIONS      :
0.3742   0.0886   0.2951   0.0909   0.0418   0.0430   0.0042   0.0036
0.0026   0.0096   0.0063   0.0069   0.0244   0.0022   0.0011   0.0055

AVERAGE SPEED      : 26 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural major collector- Iredell County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural major collector mix and speeds

VMT FRACTIONS      :
0.3784   0.0897   0.2987   0.0921   0.0423   0.0426   0.0042   0.0036
0.0027   0.0095   0.0046   0.0050   0.0178   0.0022   0.0010   0.0056

AVERAGE SPEED      : 32 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural minor collector- Iredell County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural minor collector mix and speeds

VMT FRACTIONS      :
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0.3760   0.0889   0.2963   0.0913   0.0419   0.0449   0.0043   0.0037
0.0028   0.0101   0.0052   0.0056   0.0201   0.0023   0.0011   0.0055

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural local- Iredell County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural local mix and speeds

VMT FRACTIONS      :
0.3753   0.0889   0.2962   0.0913   0.0420   0.0451   0.0044   0.0037
0.0029   0.0102   0.0052   0.0057   0.0201   0.0024   0.0011   0.0055

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban interstate- Iredell County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban interstate mix and speeds

VMT FRACTIONS      :
0.3418   0.0810   0.2696   0.0831   0.0382   0.0581   0.0057   0.0048
0.0036   0.0130   0.0154   0.0167   0.0595   0.0030   0.0015   0.0050

AVERAGE SPEED      : 60 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban principle arterial- Iredell County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban principle arterial mix and speeds

VMT FRACTIONS      :
0.3919   0.0929   0.3092   0.0953   0.0438   0.0292   0.0029   0.0024
0.0018   0.0066   0.0027   0.0029   0.0103   0.0016   0.0008   0.0057

AVERAGE SPEED      : 27 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban minor arterial- Iredell County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban minor arterial mix and speeds
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VMT FRACTIONS      :
0.3898   0.0924   0.3076   0.0948   0.0436   0.0334   0.0032   0.0027
0.0021   0.0075   0.0024   0.0026   0.0094   0.0018   0.0009   0.0058

AVERAGE SPEED      : 26 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban collector- Iredell County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban collector mix and speeds

VMT FRACTIONS      :
0.3906   0.0925   0.3080   0.0949   0.0436   0.0348   0.0034   0.0028
0.0021   0.0077   0.0019   0.0021   0.0073   0.0017   0.0009   0.0057

AVERAGE SPEED      : 28 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban local- Iredell County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban local mix and speeds

VMT FRACTIONS      :
0.3905   0.0925   0.3080   0.0949   0.0437   0.0347   0.0034   0.0028
0.0021   0.0077   0.0019   0.0021   0.0073   0.0018   0.0009   0.0057

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural principle arterial- Lincoln County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural other principle arterial mix and speeds

VMT FRACTIONS      :
0.3554   0.0843   0.2805   0.0865   0.0397   0.0453   0.0044   0.0037
0.0028   0.0101   0.0132   0.0144   0.0509   0.0023   0.0012   0.0053

AVERAGE SPEED      : 59 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural minor arterial- Lincoln County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural minor arterial mix and speeds
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VMT FRACTIONS      :
0.3742   0.0886   0.2951   0.0909   0.0418   0.0430   0.0042   0.0036
0.0026   0.0096   0.0063   0.0069   0.0244   0.0022   0.0011   0.0055

AVERAGE SPEED      : 37 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural major collector- Lincoln County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural major collector mix and speeds

VMT FRACTIONS      :
0.3784   0.0897   0.2987   0.0921   0.0423   0.0426   0.0042   0.0036
0.0027   0.0095   0.0046   0.0050   0.0178   0.0022   0.0010   0.0056

AVERAGE SPEED      : 51 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural minor collector- Lincoln County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural minor collector mix and speeds

VMT FRACTIONS      :
0.3760   0.0889   0.2963   0.0913   0.0419   0.0449   0.0043   0.0037
0.0028   0.0101   0.0052   0.0056   0.0201   0.0023   0.0011   0.0055

AVERAGE SPEED      : 45 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural local- Lincoln County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural local mix and speeds

VMT FRACTIONS      :
0.3753   0.0889   0.2962   0.0913   0.0420   0.0451   0.0044   0.0037
0.0029   0.0102   0.0052   0.0057   0.0201   0.0024   0.0011   0.0055

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban principle arterial- Lincoln County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7
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> Urban principle arterial mix and speeds

VMT FRACTIONS      :
0.3919   0.0929   0.3092   0.0953   0.0438   0.0292   0.0029   0.0024
0.0018   0.0066   0.0027   0.0029   0.0103   0.0016   0.0008   0.0057

AVERAGE SPEED      : 41 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban minor arterial- Lincoln County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban minor arterial mix and speeds

VMT FRACTIONS      :
0.3898   0.0924   0.3076   0.0948   0.0436   0.0334   0.0032   0.0027
0.0021   0.0075   0.0024   0.0026   0.0094   0.0018   0.0009   0.0058

AVERAGE SPEED      : 23 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban collector- Lincoln County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban collector mix and speeds

VMT FRACTIONS      :
0.3906   0.0925   0.3080   0.0949   0.0436   0.0348   0.0034   0.0028
0.0021   0.0077   0.0019   0.0021   0.0073   0.0017   0.0009   0.0057

AVERAGE SPEED      : 22 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban local- Lincoln County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban local mix and speeds

VMT FRACTIONS      :
0.3905   0.0925   0.3080   0.0949   0.0437   0.0347   0.0034   0.0028
0.0021   0.0077   0.0019   0.0021   0.0073   0.0018   0.0009   0.0057

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30


END OF RUN         :
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UC09.IN

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MOBILE6 INPUT FILE :

> Cabarrus/Union I/M for 2009 using TDM Average Daily speeds
> with DAQ generated vehicle Mix

POLLUTANTS          : NOX HC
SPREADSHEET         : Cabarrus/Union NOX VOC
RUN DATA            :
***************** RUN SECTION  **********
FUEL RVP            : 9.0
REG DIST            : ncage04.prn

HOURLY TEMPERATURES: 71.0 73.8 77.0 80.3 82.5 85.4 87.3 88.5 89.1 88.5 89.6 89.2
                     86.3 82.6 77.8 77.5 76.2 75.9 75.0 74.0 73.2 82.3 71.6 71.0

> OBDII

I/M PROGRAM         : 1 2003 2050 1 TRC OBD I/M
I/M MODEL YEARS     : 1 1996 2050
I/M VEHICLES        : 1 22222 11111111 1
I/M STRINGENCY      : 1 10.0
I/M COMPLIANCE      : 1 95.0
I/M WAIVER RATES    : 1 5.0 5.0

I/M PROGRAM         : 2 2003 2050 1 TRC EVAP OBD
I/M MODEL YEARS     : 2 1996 2050
I/M VEHICLES        : 2 22222 11111111 1
I/M STRINGENCY      : 2 10.0
I/M COMPLIANCE      : 2 95.0
I/M WAIVER RATES    : 2 5.0 5.0

ANTI-TAMP PROG      :
91 74 50 22222 22222222 2 11 095. 22212222

************  SCENARIO SECTION ********
SCENARIO RECORD     : Rural principle arterial- Cabarrus County
CALENDAR YEAR       : 2009
EVALUATION MONTH    : 7

> Rural other principle arterial mix and speeds

VMT FRACTIONS       :
0.3554   0.0843   0.2805   0.0865   0.0397   0.0453   0.0044   0.0037
0.0028   0.0101   0.0132   0.0144   0.0509   0.0023   0.0012   0.0053

AVERAGE SPEED       : 46 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY   : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                      53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES     : 30

************  SCENARIO SECTION ********
SCENARIO RECORD     : Rural minor arterial- Cabarrus County
CALENDAR YEAR       : 2009
EVALUATION MONTH    : 7

> Rural minor arterial mix and speeds

VMT FRACTIONS       :
0.3742   0.0886   0.2951   0.0909   0.0418   0.0430   0.0042   0.0036
0.0026   0.0096   0.0063   0.0069   0.0244   0.0022   0.0011   0.0055

AVERAGE SPEED       : 41 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY   : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                      53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.
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BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural major collector- Cabarrus County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural major collector mix and speeds

VMT FRACTIONS      :
0.3784   0.0897   0.2987   0.0921   0.0423   0.0426   0.0042   0.0036
0.0027   0.0095   0.0046   0.0050   0.0178   0.0022   0.0010   0.0056

AVERAGE SPEED      : 38 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural minor collector- Cabarrus County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural minor collector mix and speeds

VMT FRACTIONS      :
0.3760   0.0889   0.2963   0.0913   0.0419   0.0449   0.0043   0.0037
0.0028   0.0101   0.0052   0.0056   0.0201   0.0023   0.0011   0.0055

AVERAGE SPEED      : 34 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural local- Cabarrus County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural local mix and speeds

VMT FRACTIONS      :
0.3753   0.0889   0.2962   0.0913   0.0420   0.0451   0.0044   0.0037
0.0029   0.0102   0.0052   0.0057   0.0201   0.0024   0.0011   0.0055

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban interstate- Cabarrus County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban interstate mix and speeds

VMT FRACTIONS      :
0.3418   0.0810   0.2696   0.0831   0.0382   0.0581   0.0057   0.0048
0.0036   0.0130   0.0154   0.0167   0.0595   0.0030   0.0015   0.0050

AVERAGE SPEED      : 35 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
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************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban principle arterial- Cabarrus County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban principle arterial mix and speeds

VMT FRACTIONS      :
0.3919   0.0929   0.3092   0.0953   0.0438   0.0292   0.0029   0.0024
0.0018   0.0066   0.0027   0.0029   0.0103   0.0016   0.0008   0.0057

AVERAGE SPEED      : 28 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban minor arterial- Cabarrus County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban minor arterial mix and speeds

VMT FRACTIONS      :
0.3898   0.0924   0.3076   0.0948   0.0436   0.0334   0.0032   0.0027
0.0021   0.0075   0.0024   0.0026   0.0094   0.0018   0.0009   0.0058

AVERAGE SPEED      : 29 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban collector- Cabarrus County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban collector mix and speeds

VMT FRACTIONS      :
0.3906   0.0925   0.3080   0.0949   0.0436   0.0348   0.0034   0.0028
0.0021   0.0077   0.0019   0.0021   0.0073   0.0017   0.0009   0.0057

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban local- Cabarrus County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban local mix and speeds

VMT FRACTIONS      :
0.3905   0.0925   0.3080   0.0949   0.0437   0.0347   0.0034   0.0028
0.0021   0.0077   0.0019   0.0021   0.0073   0.0018   0.0009   0.0057

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
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SCENARIO RECORD    : Rural principle arterial- Union County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural other principle arterial mix and speeds

VMT FRACTIONS      :
0.3554   0.0843   0.2805   0.0865   0.0397   0.0453   0.0044   0.0037
0.0028   0.0101   0.0132   0.0144   0.0509   0.0023   0.0012   0.0053

AVERAGE SPEED      : 46 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural minor arterial- Union County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural minor arterial mix and speeds

VMT FRACTIONS      :
0.3742   0.0886   0.2951   0.0909   0.0418   0.0430   0.0042   0.0036
0.0026   0.0096   0.0063   0.0069   0.0244   0.0022   0.0011   0.0055

AVERAGE SPEED      : 43 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural major collector- Union County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural major collector mix and speeds

VMT FRACTIONS      :
0.3784   0.0897   0.2987   0.0921   0.0423   0.0426   0.0042   0.0036
0.0027   0.0095   0.0046   0.0050   0.0178   0.0022   0.0010   0.0056

AVERAGE SPEED      : 45 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural minor collector- Union County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural minor collector mix and speeds

VMT FRACTIONS      :
0.3760   0.0889   0.2963   0.0913   0.0419   0.0449   0.0043   0.0037
0.0028   0.0101   0.0052   0.0056   0.0201   0.0023   0.0011   0.0055

AVERAGE SPEED      : 44 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural local- Union County
CALENDAR YEAR      : 2009
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EVALUATION MONTH   : 7

> Rural local mix and speeds

VMT FRACTIONS      :
0.3753   0.0889   0.2962   0.0913   0.0420   0.0451   0.0044   0.0037
0.0029   0.0102   0.0052   0.0057   0.0201   0.0024   0.0011   0.0055

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban freeway- Union County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban freeway mix and speeds

VMT FRACTIONS      :
0.3718   0.0881   0.2934   0.0904   0.0416   0.0350   0.0034   0.0029
0.0022   0.0078   0.0093   0.0101   0.0358   0.0018   0.0009   0.0055

AVERAGE SPEED      : 36 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban principle arterial- Union County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban principle arterial mix and speeds

VMT FRACTIONS      :
0.3919   0.0929   0.3092   0.0953   0.0438   0.0292   0.0029   0.0024
0.0018   0.0066   0.0027   0.0029   0.0103   0.0016   0.0008   0.0057

AVERAGE SPEED      : 33 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban minor arterial- Union County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban minor arterial mix and speeds

VMT FRACTIONS      :
0.3898   0.0924   0.3076   0.0948   0.0436   0.0334   0.0032   0.0027
0.0021   0.0075   0.0024   0.0026   0.0094   0.0018   0.0009   0.0058

AVERAGE SPEED      : 32 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30
************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban collector- Union County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7
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> Urban collector mix and speeds

VMT FRACTIONS      :
0.3906   0.0925   0.3080   0.0949   0.0436   0.0348   0.0034   0.0028
0.0021   0.0077   0.0019   0.0021   0.0073   0.0017   0.0009   0.0057

AVERAGE SPEED      : 36 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban local- Union County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban local mix and speeds

VMT FRACTIONS      :
0.3905   0.0925   0.3080   0.0949   0.0437   0.0347   0.0034   0.0028
0.0021   0.0077   0.0019   0.0021   0.0073   0.0018   0.0009   0.0057

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

END OF RUN         :
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UC09N.IN

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MOBILE6 INPUT FILE :

> Cabarrus/Union Non I/M for 2009 using TDM Average Daily speeds
> with DAQ generated vehicle Mix

POLLUTANTS          : NOX HC
SPREADSHEET         : Cabarrus/Union NOX VOC
RUN DATA            :

***************** RUN SECTION  **********

FUEL RVP            : 9.0
REG DIST            : ncage04.prn

HOURLY TEMPERATURES: 71.0 73.8 77.0 80.3 82.5 85.4 87.3 88.5 89.1 88.5 89.6 89.2
                     86.3 82.6 77.8 77.5 76.2 75.9 75.0 74.0 73.2 82.3 71.6 71.0

ANTI-TAMP PROG      :
91 74 50 22222 22222222 2 11 095. 22212222

************  SCENARIO SECTION ********
SCENARIO RECORD     : Rural principle arterial- Cabarrus County
CALENDAR YEAR       : 2009
EVALUATION MONTH    : 7

> Rural other principle arterial mix and speeds

VMT FRACTIONS       :
0.3554   0.0843   0.2805   0.0865   0.0397   0.0453   0.0044   0.0037
0.0028   0.0101   0.0132   0.0144   0.0509   0.0023   0.0012   0.0053

AVERAGE SPEED       : 46 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY   : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES     : 30

************  SCENARIO SECTION ********
SCENARIO RECORD     : Rural minor arterial- Cabarrus County
CALENDAR YEAR       : 2009
EVALUATION MONTH    : 7

> Rural minor arterial mix and speeds

VMT FRACTIONS       :
0.3742   0.0886   0.2951   0.0909   0.0418   0.0430   0.0042   0.0036
0.0026   0.0096   0.0063   0.0069   0.0244   0.0022   0.0011   0.0055

AVERAGE SPEED       : 41 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY   : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES     : 30

************  SCENARIO SECTION ********
SCENARIO RECORD     : Rural major collector- Cabarrus County
CALENDAR YEAR       : 2009
EVALUATION MONTH    : 7

> Rural major collector mix and speeds

VMT FRACTIONS       :
0.3784   0.0897   0.2987   0.0921   0.0423   0.0426   0.0042   0.0036
0.0027   0.0095   0.0046   0.0050   0.0178   0.0022   0.0010   0.0056
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AVERAGE SPEED      : 38 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural minor collector- Cabarrus County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural minor collector mix and speeds

VMT FRACTIONS      :
0.3760   0.0889   0.2963   0.0913   0.0419   0.0449   0.0043   0.0037
0.0028   0.0101   0.0052   0.0056   0.0201   0.0023   0.0011   0.0055

AVERAGE SPEED      : 34 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural local- Cabarrus County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural local mix and speeds

VMT FRACTIONS      :
0.3753   0.0889   0.2962   0.0913   0.0420   0.0451   0.0044   0.0037
0.0029   0.0102   0.0052   0.0057   0.0201   0.0024   0.0011   0.0055

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban interstate- Cabarrus County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban interstate mix and speeds

VMT FRACTIONS      :
0.3418   0.0810   0.2696   0.0831   0.0382   0.0581   0.0057   0.0048
0.0036   0.0130   0.0154   0.0167   0.0595   0.0030   0.0015   0.0050

AVERAGE SPEED      : 35 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban principle arterial- Cabarrus County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban principle arterial mix and speeds

VMT FRACTIONS      :
0.3919   0.0929   0.3092   0.0953   0.0438   0.0292   0.0029   0.0024
0.0018   0.0066   0.0027   0.0029   0.0103   0.0016   0.0008   0.0057
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AVERAGE SPEED      : 28 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban minor arterial- Cabarrus County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban minor arterial mix and speeds

VMT FRACTIONS      :
0.3898   0.0924   0.3076   0.0948   0.0436   0.0334   0.0032   0.0027
0.0021   0.0075   0.0024   0.0026   0.0094   0.0018   0.0009   0.0058

AVERAGE SPEED      : 29 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban collector- Cabarrus County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban collector mix and speeds

VMT FRACTIONS      :
0.3906   0.0925   0.3080   0.0949   0.0436   0.0348   0.0034   0.0028
0.0021   0.0077   0.0019   0.0021   0.0073   0.0017   0.0009   0.0057

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban local- Cabarrus County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban local mix and speeds

VMT FRACTIONS      :
0.3905   0.0925   0.3080   0.0949   0.0437   0.0347   0.0034   0.0028
0.0021   0.0077   0.0019   0.0021   0.0073   0.0018   0.0009   0.0057

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural principle arterial- Union County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural other principle arterial mix and speeds

VMT FRACTIONS      :
0.3554   0.0843   0.2805   0.0865   0.0397   0.0453   0.0044   0.0037
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0.0028   0.0101   0.0132   0.0144   0.0509   0.0023   0.0012   0.0053

AVERAGE SPEED      : 46 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural minor arterial- Union County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural minor arterial mix and speeds

VMT FRACTIONS      :
0.3742   0.0886   0.2951   0.0909   0.0418   0.0430   0.0042   0.0036
0.0026   0.0096   0.0063   0.0069   0.0244   0.0022   0.0011   0.0055

AVERAGE SPEED      : 43 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural major collector- Union County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural major collector mix and speeds

VMT FRACTIONS      :
0.3784   0.0897   0.2987   0.0921   0.0423   0.0426   0.0042   0.0036
0.0027   0.0095   0.0046   0.0050   0.0178   0.0022   0.0010   0.0056

AVERAGE SPEED      : 45 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural minor collector- Union County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural minor collector mix and speeds

VMT FRACTIONS      :
0.3760   0.0889   0.2963   0.0913   0.0419   0.0449   0.0043   0.0037
0.0028   0.0101   0.0052   0.0056   0.0201   0.0023   0.0011   0.0055

AVERAGE SPEED      : 44 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Rural local- Union County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Rural local mix and speeds

VMT FRACTIONS      :
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0.3753   0.0889   0.2962   0.0913   0.0420   0.0451   0.0044   0.0037
0.0029   0.0102   0.0052   0.0057   0.0201   0.0024   0.0011   0.0055

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban freeway- Union County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban freeway mix and speeds

VMT FRACTIONS      :
0.3718   0.0881   0.2934   0.0904   0.0416   0.0350   0.0034   0.0029
0.0022   0.0078   0.0093   0.0101   0.0358   0.0018   0.0009   0.0055

AVERAGE SPEED      : 36 Non-Ramp 100.0 0.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban principle arterial- Union County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban principle arterial mix and speeds

VMT FRACTIONS      :
0.3919   0.0929   0.3092   0.0953   0.0438   0.0292   0.0029   0.0024
0.0018   0.0066   0.0027   0.0029   0.0103   0.0016   0.0008   0.0057

AVERAGE SPEED      : 33 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban minor arterial- Union County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban minor arterial mix and speeds

VMT FRACTIONS      :
0.3898   0.0924   0.3076   0.0948   0.0436   0.0334   0.0032   0.0027
0.0021   0.0075   0.0024   0.0026   0.0094   0.0018   0.0009   0.0058

AVERAGE SPEED      : 32 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban collector- Union County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban collector mix and speeds
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VMT FRACTIONS      :
0.3906   0.0925   0.3080   0.0949   0.0436   0.0348   0.0034   0.0028
0.0021   0.0077   0.0019   0.0021   0.0073   0.0017   0.0009   0.0057

AVERAGE SPEED      : 36 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30

************  SCENARIO SECTION ********
SCENARIO RECORD    : Urban local- Union County
CALENDAR YEAR      : 2009
EVALUATION MONTH   : 7

> Urban local mix and speeds

VMT FRACTIONS      :
0.3905   0.0925   0.3080   0.0949   0.0437   0.0347   0.0034   0.0028
0.0021   0.0077   0.0019   0.0021   0.0073   0.0018   0.0009   0.0057

AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

RELATIVE HUMIDITY  : 91. 86. 78. 71. 65. 59. 53. 50. 48. 51. 47. 47.
                     53. 61. 70. 71. 76. 77. 79. 83. 85. 87. 88. 91.

BAROMETRIC PRES    : 30


END OF RUN         :
```

5.2 MOBILE Output Files

```
***************************************************************************
* MOBILE6.2.03 (24-Sep-2003)                                              *
* Input file: MG09.IN (file 1, run 1).                                    *
***************************************************************************

* Reading Registration Distributions from the following external
* data file: MEKAGE04.PRN
  M 49 Warning:
                0.999     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
* OBDII

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural principle arterial-Meck County
* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural other principle arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M581 Warning:
            The user supplied freeway average speed of 22.0
            will be used for all hours of the day. 100% of VMT
            has been assigned to the freeway roadway type for
            all hours of the day and all vehicle types.
*** I/M credits for Tech1&2 vehicles were read from the following external
    data file: TECH12.D
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3551  0.3648  0.1243           0.0412  0.0003  0.0019  0.1071  0.0053  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.602   0.988   0.750   0.928   0.948    0.261   0.414   0.474    3.13   0.775
Composite NOX:    0.382   0.615   0.617   0.616   1.926    0.423   0.548   6.140    0.93   1.180
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor arterial-Meck County
* File 1, Run 1, Scenario 2.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
```

```
  M583 Warning:
            The user supplied arterial average speed of 18.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3738  0.3837  0.1307           0.0386  0.0004  0.0020  0.0653  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.673   1.083   0.832   1.019   1.077    0.289   0.462   0.507    3.36   0.870
Composite NOX:    0.461   0.714   0.717   0.715   1.853    0.455   0.590   5.652    0.89   0.987
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural major collector-Meck County
* File 1, Run 1, Scenario 3.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural major collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 32.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3780  0.3884  0.1324           0.0381  0.0004  0.0020  0.0551  0.0056  1.0000
```

```
-----------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.542   0.911   0.693   0.855   0.756    0.214   0.334   0.308    2.76   0.712
Composite NOX:    0.380   0.623   0.624   0.624   2.081    0.387   0.501   4.575    1.03   0.807
-----------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor collector-Meck County
* File 1, Run 1, Scenario 4.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 26.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3756  0.3852  0.1312          0.0402  0.0004  0.0020  0.0599  0.0055  1.0000
-----------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.578   0.957   0.730   0.899   0.849    0.239   0.376   0.371    2.96   0.755
Composite NOX:    0.404   0.649   0.650   0.649   1.981    0.402   0.520   4.808    0.97   0.861
-----------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural local-Meck County
* File 1, Run 1, Scenario 5.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural local mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 30.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
```

```
                Nominal Fuel RVP:   7.8 psi
                   Weathered RVP:   7.5 psi
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  Yes
                Evap I/M Program:  Yes
                     ATP Program:  Yes
                Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3749  0.3851  0.1313          0.0404  0.0004  0.0020  0.0604  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.553   0.925   0.705   0.869   0.783    0.222   0.346   0.329    2.82   0.724
Composite NOX:    0.386   0.629   0.629   0.629   2.046    0.389   0.503   4.644    1.01   0.839
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban interstate-Meck County
* File 1, Run 1, Scenario 6.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban interstate mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M581 Warning:
            The user supplied freeway average speed of 41.0
            will be used for all hours of the day. 100% of VMT
            has been assigned to the freeway roadway type for
            all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                   Calendar Year:  2009
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  71.0 (F)
             Maximum Temperature:  89.6 (F)
               Minimum Rel. Hum.:  47.0 (%)
               Maximum Rel. Hum.:  91.0 (%)
             Barometric Pressure: 30.00 (inches Hg)
                Nominal Fuel RVP:   7.8 psi
                   Weathered RVP:   7.5 psi
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  Yes
                Evap I/M Program:  Yes
                     ATP Program:  Yes
                Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3415  0.3506  0.1195          0.0528  0.0003  0.0018  0.1285  0.0050  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.509   0.870   0.663   0.817   0.677    0.190   0.293   0.280    2.57   0.643
Composite NOX:    0.378   0.628   0.628   0.628   2.238    0.400   0.518   5.757    1.08   1.289
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban freeway-Meck County
* File 1, Run 1, Scenario 7.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban freeway mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M581 Warning:
            The user supplied freeway average speed of 49.0
            will be used for all hours of the day. 100% of VMT
```

```
            has been assigned to the freeway roadway type for
            all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3714  0.3815  0.1301          0.0318  0.0004  0.0020  0.0774  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.489   0.845   0.644   0.794   0.634    0.178   0.272   0.248    2.51   0.641
Composite NOX:    0.388   0.647   0.646   0.646   2.370    0.452   0.586   6.468    1.15   1.059
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban principle arterial-Meck County
* File 1, Run 1, Scenario 8.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban principle arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 25.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3915  0.4021  0.1371          0.0261  0.0004  0.0021  0.0351  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.586   0.967   0.737   0.908   0.869    0.244   0.385   0.372    3.00   0.773
```

```
Composite NOX:    0.409   0.655   0.656   0.655   1.962    0.406   0.525   4.709    0.96   0.737
-----------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban minor arterial-Meck County
* File 1, Run 1, Scenario 9.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban minor arterial mix and speeds
  M615 Comment:
                User supplied VMT mix.
  M583 Warning:
             The user supplied arterial average speed of 26.0
             will be used for all hours of the day.  100% of VMT
             has been assigned to the arterial/collector roadway
             type for all hours of the day and all vehicle types.
  M 48 Warning:
               there are no sales for vehicle class HDGV8b

                     Calendar Year:  2009
                             Month:  July
                          Altitude:  Low
               Minimum Temperature:  71.0 (F)
               Maximum Temperature:  89.6 (F)
                 Minimum Rel. Hum.:  47.0 (%)
                 Maximum Rel. Hum.:  91.0 (%)
               Barometric Pressure: 30.00 (inches Hg)
                  Nominal Fuel RVP:   7.8 psi
                     Weathered RVP:   7.5 psi
               Fuel Sulfur Content:   30. ppm

               Exhaust I/M Program:  Yes
                  Evap I/M Program:  Yes
                       ATP Program:  Yes
                  Reformulated Gas:  No

Vehicle Type:     LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:      <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3894  0.4000  0.1364           0.0298  0.0004  0.0021  0.0362  0.0058  1.0000
-----------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.578   0.957   0.730   0.899   0.848    0.239   0.376   0.348    2.96   0.763
Composite NOX:    0.404   0.649   0.650   0.649   1.980    0.402   0.520   4.516    0.97   0.735
-----------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban collector-Meck County
* File 1, Run 1, Scenario 10.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban collector mix and speeds
  M615 Comment:
                User supplied VMT mix.
  M583 Warning:
             The user supplied arterial average speed of 24.0
             will be used for all hours of the day.  100% of VMT
             has been assigned to the arterial/collector roadway
             type for all hours of the day and all vehicle types.
  M 48 Warning:
               there are no sales for vehicle class HDGV8b

                     Calendar Year:  2009
                             Month:  July
                          Altitude:  Low
               Minimum Temperature:  71.0 (F)
               Maximum Temperature:  89.6 (F)
                 Minimum Rel. Hum.:  47.0 (%)
                 Maximum Rel. Hum.:  91.0 (%)
               Barometric Pressure: 30.00 (inches Hg)
                  Nominal Fuel RVP:   7.8 psi
                     Weathered RVP:   7.5 psi
               Fuel Sulfur Content:   30. ppm
```

```
              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3902  0.4005  0.1365           0.0309  0.0004  0.0021  0.0338  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.594   0.978   0.746   0.919   0.887    0.250   0.394   0.356    3.04   0.783
Composite NOX:    0.415   0.661   0.663   0.662   1.944    0.411   0.532   4.424    0.95   0.733
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban local-Meck County
* File 1, Run 1, Scenario 11.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban local mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 30.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3901  0.4005  0.1366           0.0308  0.0004  0.0021  0.0339  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.553   0.925   0.705   0.869   0.779    0.222   0.346   0.297    2.82   0.733
Composite NOX:    0.386   0.629   0.629   0.629   2.041    0.389   0.503   4.183    1.01   0.700
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural Interstate - Gaston County
* File 1, Run 1, Scenario 12.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural interstate mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M581 Warning:
            The user supplied freeway average speed of 42.0
            will be used for all hours of the day. 100% of VMT
            has been assigned to the freeway roadway type for
            all hours of the day and all vehicle types.
  M 48 Warning:
```

```
               there are no sales for vehicle class HDGV8b

                     Calendar Year:  2009
                             Month:  July
                          Altitude:  Low
               Minimum Temperature:  71.0 (F)
               Maximum Temperature:  89.6 (F)
                 Minimum Rel. Hum.:  47.0 (%)
                 Maximum Rel. Hum.:  91.0 (%)
               Barometric Pressure: 30.00 (inches Hg)
                  Nominal Fuel RVP:   7.8 psi
                     Weathered RVP:   7.5 psi
               Fuel Sulfur Content:   30. ppm

               Exhaust I/M Program:  Yes
                  Evap I/M Program:  Yes
                       ATP Program:  Yes
                  Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.2845  0.2922  0.0995          0.0926  0.0003  0.0015  0.2252  0.0042  1.0000
-----------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.506   0.867   0.660   0.814   0.671    0.188   0.289   0.275    2.56   0.598
Composite NOX:    0.379   0.630   0.630   0.630   2.255    0.405   0.525   5.825    1.09   1.881
-----------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural principle arterial- Gaston County
* File 1, Run 1, Scenario 13.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural other principle arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M 96 Warning:
                 66.0     speed reduced to 65 mph maximum
  M581 Warning:
            The user supplied freeway average speed of 65.0
            will be used for all hours of the day. 100% of VMT
            has been assigned to the freeway roadway type for
            all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                     Calendar Year:  2009
                             Month:  July
                          Altitude:  Low
               Minimum Temperature:  71.0 (F)
               Maximum Temperature:  89.6 (F)
                 Minimum Rel. Hum.:  47.0 (%)
                 Maximum Rel. Hum.:  91.0 (%)
               Barometric Pressure: 30.00 (inches Hg)
                  Nominal Fuel RVP:   7.8 psi
                     Weathered RVP:   7.5 psi
               Fuel Sulfur Content:   30. ppm

               Exhaust I/M Program:  Yes
                  Evap I/M Program:  Yes
                       ATP Program:  Yes
                  Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3551  0.3648  0.1243          0.0412  0.0003  0.0019  0.1071  0.0053  1.0000
-----------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.464   0.805   0.616   0.757   0.604    0.171   0.260   0.231    3.18   0.602
Composite NOX:    0.410   0.687   0.684   0.686   2.636    0.748   0.973  10.637    1.52   1.739
```

```
------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor arterial- Gaston County
* File 1, Run 1, Scenario 14.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 36.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:     LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:      <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3738  0.3837  0.1307          0.0386  0.0004  0.0020  0.0653  0.0055  1.0000
------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.525   0.888   0.676   0.834   0.713    0.202   0.313   0.291    2.66   0.687
Composite NOX:    0.374   0.619   0.619   0.619   2.148    0.388   0.502   4.788    1.06   0.861
------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural major collector- Gaston County
* File 1, Run 1, Scenario 15.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural major collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 43.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm
```

```
              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:     LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:      <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3780  0.3884  0.1324          0.0381  0.0004  0.0020  0.0551  0.0056  1.0000
---------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.504   0.864   0.658   0.811   0.658    0.186   0.286   0.242    2.55   0.666
Composite NOX:    0.381   0.633   0.632   0.632   2.262    0.410   0.531   4.855    1.09   0.834
---------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor collector- Gaston County
* File 1, Run 1, Scenario 16.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 41.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:     LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:      <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3756  0.3852  0.1312          0.0402  0.0004  0.0020  0.0599  0.0055  1.0000
---------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.509   0.870   0.663   0.817   0.671    0.190   0.293   0.254    2.57   0.670
Composite NOX:    0.378   0.628   0.628   0.628   2.229    0.400   0.518   4.790    1.08   0.850
---------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural local- Gaston County
* File 1, Run 1, Scenario 17.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural local mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 30.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
```

```
                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3749  0.3851  0.1313           0.0404  0.0004  0.0020  0.0604  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.553   0.925   0.705   0.869   0.783    0.222   0.346   0.329    2.82   0.724
Composite NOX:    0.386   0.629   0.629   0.629   2.046    0.389   0.503   4.644    1.01   0.839
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban interstate- Gaston County
* File 1, Run 1, Scenario 18.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban interstate mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M581 Warning:
            The user supplied freeway average speed of 44.0
            will be used for all hours of the day. 100% of VMT
            has been assigned to the freeway roadway type for
            all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3415  0.3506  0.1195           0.0528  0.0003  0.0018  0.1285  0.0050  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.501   0.861   0.656   0.809   0.659    0.185   0.283   0.266    2.54   0.633
Composite NOX:    0.382   0.635   0.634   0.635   2.287    0.415   0.537   5.953    1.09   1.321
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
```

```
* Urban freeway- Gaston County
* File 1, Run 1, Scenario 19.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban freeway mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M 96 Warning:
                 66.0     speed reduced to 65 mph maximum
  M581 Warning:
            The user supplied freeway average speed of 65.0
            will be used for all hours of the day. 100% of VMT
            has been assigned to the freeway roadway type for
            all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3714  0.3815  0.1301          0.0318  0.0004  0.0020  0.0774  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.464   0.805   0.616   0.757   0.603    0.171   0.260   0.229    3.18   0.615
Composite NOX:    0.410   0.687   0.684   0.686   2.635    0.748   0.973  10.525    1.52   1.412
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban principle arterial- Gaston County
* File 1, Run 1, Scenario 20.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban principle arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 26.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
```

```
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3915  0.4021  0.1371           0.0261  0.0004  0.0021  0.0351  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.578   0.957   0.730   0.899   0.849    0.239   0.376   0.359    2.96   0.764
Composite NOX:    0.404   0.649   0.650   0.649   1.981    0.402   0.520   4.662    0.97   0.730
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban minor arterial- Gaston County
* File 1, Run 1, Scenario 21.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban minor arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 29.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3894  0.4000  0.1364           0.0298  0.0004  0.0021  0.0362  0.0058  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.559   0.932   0.710   0.876   0.796    0.225   0.353   0.318    2.85   0.740
Composite NOX:    0.390   0.633   0.634   0.633   2.029    0.392   0.507   4.398    1.00   0.718
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban collector- Gaston County
* File 1, Run 1, Scenario 22.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 26.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
```

```
                   Calendar Year:  2009
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  71.0 (F)
             Maximum Temperature:  89.6 (F)
               Minimum Rel. Hum.:  47.0 (%)
               Maximum Rel. Hum.:  91.0 (%)
             Barometric Pressure: 30.00 (inches Hg)
                Nominal Fuel RVP:   7.8 psi
                   Weathered RVP:   7.5 psi
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  Yes
                Evap I/M Program:  Yes
                     ATP Program:  Yes
                Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3902  0.4005  0.1365          0.0309  0.0004  0.0021  0.0338  0.0057  1.0000
------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.578   0.957   0.730   0.899   0.845    0.239   0.376   0.334    2.96   0.764
Composite NOX:    0.404   0.649   0.650   0.649   1.977    0.402   0.520   4.320    0.97   0.720
------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban local- Gaston County
* File 1, Run 1, Scenario 23.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban local mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 30.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                   Calendar Year:  2009
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  71.0 (F)
             Maximum Temperature:  89.6 (F)
               Minimum Rel. Hum.:  47.0 (%)
               Maximum Rel. Hum.:  91.0 (%)
             Barometric Pressure: 30.00 (inches Hg)
                Nominal Fuel RVP:   7.8 psi
                   Weathered RVP:   7.5 psi
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  Yes
                Evap I/M Program:  Yes
                     ATP Program:  Yes
                Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3901  0.4005  0.1366          0.0308  0.0004  0.0021  0.0339  0.0057  1.0000
------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.553   0.925   0.705   0.869   0.779    0.222   0.346   0.297    2.82   0.733
Composite NOX:    0.386   0.629   0.629   0.629   2.041    0.389   0.503   4.183    1.01   0.700
------------------------------------------------------------------------------------------
```

```
*************************************************************************
* MOBILE6.2.03 (24-Sep-2003)                                            *
* Input file: MG09N.IN (file 1, run 1).                                 *
*************************************************************************

* Reading Registration Distributions from the following external
* data file: MEKAGE04.PRN
  M 49 Warning:
              0.999     MYR sum not = 1. (will normalize)
  M 49 Warning:
               1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
               1.00     MYR sum not = 1. (will normalize)

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural principle arterial-Meck County
* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural other principle arterial mix and speeds
  M615 Comment:
             User supplied VMT mix.
  M581 Warning:
            The user supplied freeway average speed of 22.0
            will be used for all hours of the day. 100% of VMT
            has been assigned to the freeway roadway type for
            all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3551  0.3648  0.1243          0.0412  0.0003  0.0019  0.1071  0.0053  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.678   1.103   0.848   1.038   0.948    0.261   0.414   0.474    3.13   0.856
Composite NOX:    0.454   0.724   0.710   0.721   1.926    0.423   0.548   6.140    0.93   1.257
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor arterial-Meck County
* File 1, Run 1, Scenario 2.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor arterial mix and speeds
  M615 Comment:
             User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 18.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
```

```
                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3738  0.3837  0.1307          0.0386  0.0004  0.0020  0.0653  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.759   1.214   0.943   1.145   1.077    0.289   0.462   0.507    3.36   0.967
Composite NOX:    0.542   0.835   0.820   0.832   1.853    0.455   0.590   5.652    0.89   1.077
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural major collector-Meck County
* File 1, Run 1, Scenario 3.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural major collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 32.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3780  0.3884  0.1324          0.0381  0.0004  0.0020  0.0551  0.0056  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.610   1.013   0.780   0.954   0.756    0.214   0.334   0.308    2.76   0.789
Composite NOX:    0.451   0.732   0.717   0.728   2.081    0.387   0.501   4.575    1.03   0.888
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor collector-Meck County
```

```
* File 1, Run 1, Scenario 4.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 26.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3756  0.3852  0.1312          0.0402  0.0004  0.0020  0.0599  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.651   1.068   0.823   1.006   0.849    0.239   0.376   0.371    2.96   0.837
Composite NOX:    0.478   0.761   0.745   0.757   1.981    0.402   0.520   4.808    0.97   0.944
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural local-Meck County
* File 1, Run 1, Scenario 5.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural local mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 30.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No
```

```
Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3749  0.3851  0.1313          0.0404  0.0004  0.0020  0.0604  0.0055  1.0000
------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.623   1.031   0.794   0.971   0.783    0.222   0.346   0.329    2.82   0.802
Composite NOX:    0.457   0.738   0.723   0.734   2.046    0.389   0.503   4.644    1.01   0.920
------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban interstate-Meck County
* File 1, Run 1, Scenario 6.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban interstate mix and speeds
  M615 Comment:
             User supplied VMT mix.
  M581 Warning:
            The user supplied freeway average speed of 41.0
            will be used for all hours of the day. 100% of VMT
            has been assigned to the freeway roadway type for
            all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3415  0.3506  0.1195          0.0528  0.0003  0.0018  0.1285  0.0050  1.0000
------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.572   0.965   0.742   0.908   0.677    0.190   0.293   0.280    2.57   0.707
Composite NOX:    0.447   0.735   0.719   0.731   2.238    0.400   0.518   5.757    1.08   1.361
------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban freeway-Meck County
* File 1, Run 1, Scenario 7.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban freeway mix and speeds
  M615 Comment:
             User supplied VMT mix.
  M581 Warning:
            The user supplied freeway average speed of 49.0
            will be used for all hours of the day. 100% of VMT
            has been assigned to the freeway roadway type for
            all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
```

```
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3714  0.3815  0.1301          0.0318  0.0004  0.0020  0.0774  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.548   0.934   0.719   0.879   0.634    0.178   0.272   0.248    2.51   0.707
Composite NOX:    0.457   0.755   0.737   0.750   2.370    0.452   0.586   6.468    1.15   1.137
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban principle arterial-Meck County
* File 1, Run 1, Scenario 8.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban principle arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 25.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3915  0.4021  0.1371          0.0261  0.0004  0.0021  0.0351  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.659   1.079   0.832   1.016   0.869    0.244   0.385   0.372    3.00   0.860
Composite NOX:    0.484   0.767   0.752   0.764   1.962    0.406   0.525   4.709    0.96   0.824
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban minor arterial-Meck County
* File 1, Run 1, Scenario 9.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban minor arterial mix and speeds
```

```
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 26.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:     LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:      <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3894  0.4000  0.1364          0.0298  0.0004  0.0021  0.0362  0.0058  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:     0.651   1.068   0.823   1.006   0.848    0.239   0.376   0.348    2.96   0.849
Composite NOX:     0.478   0.761   0.745   0.757   1.980    0.402   0.520   4.516    0.97   0.821
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban collector-Meck County
* File 1, Run 1, Scenario 10.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 24.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:     LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:      <6000   >6000   (All)
```

```
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3902  0.4005  0.1365          0.0309  0.0004  0.0021  0.0338  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.669   1.092   0.843   1.029   0.887    0.250   0.394   0.356    3.04   0.871
Composite NOX:    0.490   0.775   0.760   0.771   1.944    0.411   0.532   4.424    0.95   0.821
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban local-Meck County
* File 1, Run 1, Scenario 11.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban local mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 30.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3901  0.4005  0.1366          0.0308  0.0004  0.0021  0.0339  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.623   1.031   0.794   0.971   0.779    0.222   0.346   0.297    2.82   0.815
Composite NOX:    0.457   0.738   0.723   0.734   2.041    0.389   0.503   4.183    1.01   0.784
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural Interstate - Gaston County
* File 1, Run 1, Scenario 12.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural interstate mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M581 Warning:
            The user supplied freeway average speed of 42.0
            will be used for all hours of the day. 100% of VMT
            has been assigned to the freeway roadway type for
            all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
```

```
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.2845  0.2922  0.0995          0.0926  0.0003  0.0015  0.2252  0.0042  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.568   0.961   0.739   0.904   0.671    0.188   0.289   0.275    2.56   0.651
Composite NOX:    0.448   0.738   0.722   0.734   2.255    0.405   0.525   5.825    1.09   1.941
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural principle arterial- Gaston County
* File 1, Run 1, Scenario 13.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural other principle arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M 96 Warning:
                 66.0     speed reduced to 65 mph maximum
  M581 Warning:
            The user supplied freeway average speed of 65.0
            will be used for all hours of the day. 100% of VMT
            has been assigned to the freeway roadway type for
            all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3551  0.3648  0.1243          0.0412  0.0003  0.0019  0.1071  0.0053  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.515   0.883   0.681   0.832   0.604    0.171   0.260   0.231    3.18   0.657
Composite NOX:    0.479   0.797   0.777   0.792   2.636    0.748   0.973  10.637    1.52   1.815
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor arterial- Gaston County
* File 1, Run 1, Scenario 14.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor arterial mix and speeds
  M615 Comment:
```

```
             User supplied VMT mix.
  M583 Warning:
          The user supplied arterial average speed of 36.0
          will be used for all hours of the day.  100% of VMT
          has been assigned to the arterial/collector roadway
          type for all hours of the day and all vehicle types.
  M 48 Warning:
            there are no sales for vehicle class HDGV8b

                  Calendar Year:  2009
                          Month:  July
                       Altitude:  Low
            Minimum Temperature:  71.0 (F)
            Maximum Temperature:  89.6 (F)
              Minimum Rel. Hum.:  47.0 (%)
              Maximum Rel. Hum.:  91.0 (%)
            Barometric Pressure: 30.00 (inches Hg)
               Nominal Fuel RVP:   7.8 psi
                  Weathered RVP:   7.5 psi
            Fuel Sulfur Content:   30. ppm

            Exhaust I/M Program:  No
               Evap I/M Program:  No
                    ATP Program:  Yes
               Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3738  0.3837  0.1307          0.0386  0.0004  0.0020  0.0653  0.0055  1.0000
-----------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.589   0.986   0.758   0.928   0.713    0.202   0.313   0.291    2.66   0.760
Composite NOX:    0.443   0.726   0.711   0.723   2.148    0.388   0.502   4.788    1.06   0.940
-----------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural major collector- Gaston County
* File 1, Run 1, Scenario 15.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural major collector mix and speeds
  M615 Comment:
             User supplied VMT mix.
  M583 Warning:
          The user supplied arterial average speed of 43.0
          will be used for all hours of the day.  100% of VMT
          has been assigned to the arterial/collector roadway
          type for all hours of the day and all vehicle types.
  M 48 Warning:
            there are no sales for vehicle class HDGV8b

                  Calendar Year:  2009
                          Month:  July
                       Altitude:  Low
            Minimum Temperature:  71.0 (F)
            Maximum Temperature:  89.6 (F)
              Minimum Rel. Hum.:  47.0 (%)
              Maximum Rel. Hum.:  91.0 (%)
            Barometric Pressure: 30.00 (inches Hg)
               Nominal Fuel RVP:   7.8 psi
                  Weathered RVP:   7.5 psi
            Fuel Sulfur Content:   30. ppm

            Exhaust I/M Program:  No
               Evap I/M Program:  No
                    ATP Program:  Yes
               Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
```

```
VMT Distribution:0.3780  0.3884  0.1324          0.0381  0.0004  0.0020  0.0551  0.0056  1.0000
-----------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.565   0.957   0.736   0.901   0.658    0.186   0.286   0.242    2.55   0.736
Composite NOX:    0.450   0.740   0.724   0.736   2.262    0.410   0.531   4.855    1.09   0.914
-----------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor collector- Gaston County
* File 1, Run 1, Scenario 16.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 41.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3756  0.3852  0.1312          0.0402  0.0004  0.0020  0.0599  0.0055  1.0000
-----------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.572   0.965   0.742   0.908   0.671    0.190   0.293   0.254    2.57   0.741
Composite NOX:    0.447   0.735   0.719   0.731   2.229    0.400   0.518   4.790    1.08   0.929
-----------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural local- Gaston County
* File 1, Run 1, Scenario 17.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural local mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 30.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
```

```
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3749  0.3851  0.1313          0.0404  0.0004  0.0020  0.0604  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.623   1.031   0.794   0.971   0.783    0.222   0.346   0.329    2.82   0.802
Composite NOX:    0.457   0.738   0.723   0.734   2.046    0.389   0.503   4.644    1.01   0.920
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban interstate- Gaston County
* File 1, Run 1, Scenario 18.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban interstate mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M581 Warning:
            The user supplied freeway average speed of 44.0
            will be used for all hours of the day. 100% of VMT
            has been assigned to the freeway roadway type for
            all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3415  0.3506  0.1195          0.0528  0.0003  0.0018  0.1285  0.0050  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.562   0.953   0.733   0.897   0.659    0.185   0.283   0.266    2.54   0.696
Composite NOX:    0.451   0.743   0.726   0.738   2.287    0.415   0.537   5.953    1.09   1.393
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban freeway- Gaston County
* File 1, Run 1, Scenario 19.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban freeway mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M 96 Warning:
                 66.0     speed reduced to 65 mph maximum
```

```
  M581 Warning:
            The user supplied freeway average speed of 65.0
            will be used for all hours of the day. 100% of VMT
            has been assigned to the freeway roadway type for
            all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3714  0.3815  0.1301           0.0318  0.0004  0.0020  0.0774  0.0055  1.0000
----------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.515   0.883   0.681   0.832   0.603    0.171   0.260   0.229    3.18   0.672
Composite NOX:    0.479   0.797   0.777   0.792   2.635    0.748   0.973  10.525    1.52   1.492
----------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban principle arterial- Gaston County
* File 1, Run 1, Scenario 20.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban principle arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 26.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3915  0.4021  0.1371           0.0261  0.0004  0.0021  0.0351  0.0057  1.0000
```

```
-----------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.651   1.068   0.823   1.006   0.849    0.239   0.376   0.359    2.96   0.850
Composite NOX:    0.478   0.761   0.745   0.757   1.981    0.402   0.520   4.662    0.97   0.817
-----------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban minor arterial- Gaston County
* File 1, Run 1, Scenario 21.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban minor arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 29.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3894  0.4000  0.1364          0.0298  0.0004  0.0021  0.0362  0.0058  1.0000
-----------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.629   1.039   0.801   0.978   0.796    0.225   0.353   0.318    2.85   0.822
Composite NOX:    0.462   0.743   0.728   0.739   2.029    0.392   0.507   4.398    1.00   0.803
-----------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban collector- Gaston County
* File 1, Run 1, Scenario 22.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 26.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
```

```
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3902  0.4005  0.1365          0.0309  0.0004  0.0021  0.0338  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.651   1.068   0.823   1.006   0.845    0.239   0.376   0.334    2.96   0.849
Composite NOX:    0.478   0.761   0.745   0.757   1.977    0.402   0.520   4.320    0.97   0.807
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban local- Gaston County
* File 1, Run 1, Scenario 23.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban local mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 30.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   7.8 psi
                    Weathered RVP:   7.5 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3901  0.4005  0.1366          0.0308  0.0004  0.0021  0.0339  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.623   1.031   0.794   0.971   0.779    0.222   0.346   0.297    2.82   0.815
Composite NOX:    0.457   0.738   0.723   0.734   2.041    0.389   0.503   4.183    1.01   0.784
-------------------------------------------------------------------------------------------
```

```
***************************************************************************
* MOBILE6.2.03 (24-Sep-2003)                                              *
* Input file: RIL09.IN (file 1, run 1).                                   *
***************************************************************************

* Reading Registration Distributions from the following external
* data file: NCAGE04.PRN
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.999     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
* OBDII

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural principle arterial- Rowan County
* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural other principle arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M581 Warning:
            The user supplied freeway average speed of 45.0
            will be used for all hours of the day. 100% of VMT
            has been assigned to the freeway roadway type for
            all hours of the day and all vehicle types.
*** I/M credits for Tech1&2 vehicles were read from the following external
    data file: TECH12.D
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No
```

```
Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3550  0.3648  0.1244          0.0418  0.0004  0.0019  0.1065  0.0053  1.0000
-----------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.798   1.286   1.300   1.290   1.272    0.261   0.427   0.312    2.98   1.017
Composite NOX:    0.511   0.773   0.913   0.809   2.965    0.574   0.771   7.589    1.11   1.516
-----------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor arterial- Rowan County
* File 1, Run 1, Scenario 2.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor arterial mix and speeds
  M615 Comment:
             User supplied VMT mix.
  M583 Warning:
          The user supplied arterial average speed of 49.0
          will be used for all hours of the day.  100% of VMT
          has been assigned to the arterial/collector roadway
          type for all hours of the day and all vehicle types.
  M 48 Warning:
            there are no sales for vehicle class HDGV8b

                  Calendar Year:  2009
                          Month:  July
                       Altitude:  Low
            Minimum Temperature:  71.0 (F)
            Maximum Temperature:  89.6 (F)
              Minimum Rel. Hum.:  47.0 (%)
              Maximum Rel. Hum.:  91.0 (%)
            Barometric Pressure: 30.00 (inches Hg)
               Nominal Fuel RVP:   9.0 psi
                  Weathered RVP:   8.6 psi
            Fuel Sulfur Content:   30. ppm

            Exhaust I/M Program:  Yes
               Evap I/M Program:  Yes
                    ATP Program:  Yes
               Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3738  0.3837  0.1308          0.0391  0.0004  0.0019  0.0648  0.0055  1.0000
-----------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.779   1.264   1.276   1.267   1.223    0.254   0.415   0.273    2.96   1.026
Composite NOX:    0.516   0.784   0.924   0.819   3.038    0.619   0.833   6.767    1.16   1.180
-----------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural major collector- Rowan County
* File 1, Run 1, Scenario 3.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural major collector mix and speeds
  M615 Comment:
             User supplied VMT mix.
  M583 Warning:
          The user supplied arterial average speed of 50.0
          will be used for all hours of the day.  100% of VMT
          has been assigned to the arterial/collector roadway
          type for all hours of the day and all vehicle types.
  M 48 Warning:
            there are no sales for vehicle class HDGV8b

                  Calendar Year:  2009
                          Month:  July
                       Altitude:  Low
            Minimum Temperature:  71.0 (F)
```

```
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3780  0.3884  0.1325          0.0386  0.0004  0.0020  0.0546  0.0056  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.775   1.259   1.270   1.262   1.213    0.252   0.412   0.259    2.96   1.029
Composite NOX:    0.518   0.786   0.926   0.822   3.054    0.629   0.846   6.558    1.17   1.108
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor collector- Rowan County
* File 1, Run 1, Scenario 4.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 50.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3756  0.3852  0.1313          0.0407  0.0004  0.0020  0.0594  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.775   1.259   1.270   1.262   1.213    0.252   0.412   0.262    2.96   1.025
Composite NOX:    0.518   0.786   0.926   0.822   3.054    0.629   0.846   6.639    1.17   1.146
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural local- Rowan County
* File 1, Run 1, Scenario 5.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural local mix and speeds
  M615 Comment:
```

```
                User supplied VMT mix.
  M583 Warning:
             The user supplied arterial average speed of 30.0
             will be used for all hours of the day.  100% of VMT
             has been assigned to the arterial/collector roadway
             type for all hours of the day and all vehicle types.
  M 48 Warning:
               there are no sales for vehicle class HDGV8b

                     Calendar Year:  2009
                             Month:  July
                          Altitude:  Low
               Minimum Temperature:  71.0 (F)
               Maximum Temperature:  89.6 (F)
                 Minimum Rel. Hum.:  47.0 (%)
                 Maximum Rel. Hum.:  91.0 (%)
               Barometric Pressure: 30.00 (inches Hg)
                  Nominal Fuel RVP:   9.0 psi
                     Weathered RVP:   8.6 psi
               Fuel Sulfur Content:   30. ppm

               Exhaust I/M Program:  Yes
                  Evap I/M Program:  Yes
                       ATP Program:  Yes
                  Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3749  0.3851  0.1314          0.0410  0.0004  0.0020  0.0598  0.0055  1.0000
---------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.897   1.397   1.421   1.403   1.503    0.313   0.520   0.389    3.28   1.165
Composite NOX:    0.517   0.764   0.907   0.801   2.631    0.532   0.716   5.601    1.03   1.057
---------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban interstate- Rowan County
* File 1, Run 1, Scenario 6.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban interstate mix and speeds
  M615 Comment:
                User supplied VMT mix.
  M581 Warning:
             The user supplied freeway average speed of 57.0
             will be used for all hours of the day. 100% of VMT
             has been assigned to the freeway roadway type for
             all hours of the day and all vehicle types.
  M 48 Warning:
               there are no sales for vehicle class HDGV8b

                     Calendar Year:  2009
                             Month:  July
                          Altitude:  Low
               Minimum Temperature:  71.0 (F)
               Maximum Temperature:  89.6 (F)
                 Minimum Rel. Hum.:  47.0 (%)
                 Maximum Rel. Hum.:  91.0 (%)
               Barometric Pressure: 30.00 (inches Hg)
                  Nominal Fuel RVP:   9.0 psi
                     Weathered RVP:   8.6 psi
               Fuel Sulfur Content:   30. ppm

               Exhaust I/M Program:  Yes
                  Evap I/M Program:  Yes
                       ATP Program:  Yes
                  Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
```

```
VMT Distribution:0.3415  0.3506  0.1196           0.0535  0.0003  0.0018  0.1278  0.0050  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.749   1.222   1.230   1.224   1.180    0.246   0.401   0.274    3.10   0.946
Composite NOX:    0.529   0.806   0.947   0.842   3.222    0.766   1.033   9.786    1.34   2.008
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban principle arterial- Rowan County
* File 1, Run 1, Scenario 7.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban principle arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 38.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3915  0.4021  0.1371           0.0265  0.0004  0.0020  0.0347  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.834   1.325   1.342   1.329   1.344    0.279   0.460   0.308    3.07   1.108
Composite NOX:    0.502   0.757   0.897   0.792   2.802    0.536   0.721   5.451    1.08   0.895
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban minor arterial- Rowan County
* File 1, Run 1, Scenario 8.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban minor arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 39.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
```

```
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3894  0.4000  0.1364          0.0302  0.0004  0.0020  0.0358  0.0058  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.829   1.318   1.335   1.323   1.327    0.276   0.455   0.293    3.05   1.101
Composite NOX:    0.503   0.758   0.899   0.794   2.820    0.539   0.724   5.288    1.09   0.904
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban collector- Rowan County
* File 1, Run 1, Scenario 9.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 36.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3902  0.4005  0.1365          0.0313  0.0004  0.0020  0.0334  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.846   1.338   1.356   1.342   1.369    0.286   0.473   0.299    3.11   1.123
Composite NOX:    0.500   0.753   0.894   0.789   2.750    0.531   0.713   4.962    1.07   0.878
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban local- Rowan County
* File 1, Run 1, Scenario 10.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban local mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 30.0
```

```
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3901  0.4005  0.1366          0.0312  0.0004  0.0020  0.0335  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.897   1.397   1.421   1.403   1.495    0.313   0.520   0.351    3.28   1.182
Composite NOX:    0.517   0.764   0.907   0.801   2.623    0.532   0.716   4.988    1.03   0.888
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural Interstate - Iredell County(Pt)
* File 1, Run 1, Scenario 11.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural interstate mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M581 Warning:
            The user supplied freeway average speed of 38.0
            will be used for all hours of the day. 100% of VMT
            has been assigned to the freeway roadway type for
            all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.2845  0.2922  0.0995          0.0938  0.0003  0.0015  0.2240  0.0042  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
```

```
Composite VOC:    0.834   1.325   1.342   1.329   1.356    0.279   0.460   0.352    3.07   0.978
Composite NOX:    0.502   0.757   0.897   0.792   2.817    0.536   0.721   7.052    1.08   2.303
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural principle arterial- Iredell County(Pt)
* File 1, Run 1, Scenario 12.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural other principle arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M581 Warning:
            The user supplied freeway average speed of 54.0
            will be used for all hours of the day. 100% of VMT
            has been assigned to the freeway roadway type for
            all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3550  0.3648  0.1244          0.0418  0.0004  0.0019  0.1065  0.0053  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.759   1.236   1.246   1.239   1.197    0.248   0.404   0.282    2.96   0.972
Composite NOX:    0.524   0.797   0.938   0.833   3.159    0.698   0.940   9.082    1.27   1.702
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor arterial- Iredell County(Pt)
* File 1, Run 1, Scenario 13.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 11.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
```

```
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3738  0.3837  0.1308          0.0391  0.0004  0.0019  0.0648  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    1.465   2.101   2.173   2.120   2.802    0.499   0.850   0.802    4.73   1.828
Composite NOX:    0.753   1.018   1.208   1.066   2.235    0.745   1.003   8.161    0.87   1.453
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural major collector- Iredell County(Pt)
* File 1, Run 1, Scenario 14.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural major collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 24.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3780  0.3884  0.1325          0.0386  0.0004  0.0020  0.0546  0.0056  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.967   1.482   1.512   1.490   1.695    0.351   0.588   0.463    3.50   1.253
Composite NOX:    0.553   0.802   0.952   0.840   2.505    0.563   0.757   5.856    0.97   1.070
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor collector- Iredell County(Pt)
* File 1, Run 1, Scenario 15.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 24.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
```

```
  M 48 Warning:
            there are no sales for vehicle class HDGV8b

                  Calendar Year:  2009
                          Month:  July
                       Altitude:  Low
            Minimum Temperature:  71.0 (F)
            Maximum Temperature:  89.6 (F)
              Minimum Rel. Hum.:  47.0 (%)
              Maximum Rel. Hum.:  91.0 (%)
            Barometric Pressure: 30.00 (inches Hg)
               Nominal Fuel RVP:   9.0 psi
                  Weathered RVP:   8.6 psi
            Fuel Sulfur Content:   30. ppm

            Exhaust I/M Program:  Yes
               Evap I/M Program:  Yes
                    ATP Program:  Yes
               Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3756  0.3852  0.1313          0.0407  0.0004  0.0020  0.0594  0.0055  1.0000
------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.967   1.482   1.512   1.490   1.695    0.351   0.588   0.468    3.50   1.250
Composite NOX:    0.553   0.802   0.952   0.840   2.505    0.563   0.757   5.929    0.97   1.103
------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural local- Iredell County(Pt)
* File 1, Run 1, Scenario 16.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural local mix and speeds
  M615 Comment:
             User supplied VMT mix.
  M583 Warning:
           The user supplied arterial average speed of 20.0
           will be used for all hours of the day.  100% of VMT
           has been assigned to the arterial/collector roadway
           type for all hours of the day and all vehicle types.
  M 48 Warning:
            there are no sales for vehicle class HDGV8b

                  Calendar Year:  2009
                          Month:  July
                       Altitude:  Low
            Minimum Temperature:  71.0 (F)
            Maximum Temperature:  89.6 (F)
              Minimum Rel. Hum.:  47.0 (%)
              Maximum Rel. Hum.:  91.0 (%)
            Barometric Pressure: 30.00 (inches Hg)
               Nominal Fuel RVP:   9.0 psi
                  Weathered RVP:   8.6 psi
            Fuel Sulfur Content:   30. ppm

            Exhaust I/M Program:  Yes
               Evap I/M Program:  Yes
                    ATP Program:  Yes
               Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3749  0.3851  0.1314          0.0410  0.0004  0.0020  0.0598  0.0055  1.0000
------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    1.040   1.572   1.610   1.582   1.889    0.386   0.649   0.541    3.71   1.338
Composite NOX:    0.589   0.840   0.996   0.879   2.418    0.599   0.806   6.316    0.92   1.159
------------------------------------------------------------------------------------------
```

```
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban interstate- Iredell County(Pt)
* File 1, Run 1, Scenario 17.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban interstate mix and speeds
  M615 Comment:
             User supplied VMT mix.
  M581 Warning:
          The user supplied freeway average speed of 55.0
          will be used for all hours of the day. 100% of VMT
          has been assigned to the freeway roadway type for
          all hours of the day and all vehicle types.
  M 48 Warning:
            there are no sales for vehicle class HDGV8b

                  Calendar Year:  2009
                          Month:  July
                       Altitude:  Low
            Minimum Temperature:  71.0 (F)
            Maximum Temperature:  89.6 (F)
              Minimum Rel. Hum.:  47.0 (%)
              Maximum Rel. Hum.:  91.0 (%)
            Barometric Pressure: 30.00 (inches Hg)
               Nominal Fuel RVP:   9.0 psi
                  Weathered RVP:   8.6 psi
            Fuel Sulfur Content:   30. ppm

            Exhaust I/M Program:  Yes
               Evap I/M Program:  Yes
                    ATP Program:  Yes
               Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3415  0.3506  0.1196          0.0535  0.0003  0.0018  0.1278  0.0050  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.756   1.231   1.240   1.234   1.189    0.247   0.403   0.277    2.96   0.953
Composite NOX:    0.526   0.800   0.941   0.836   3.177    0.714   0.961   9.161    1.29   1.921
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban principle arterial- Iredell County(Pt)
* File 1, Run 1, Scenario 18.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban principle arterial mix and speeds
  M615 Comment:
             User supplied VMT mix.
  M583 Warning:
          The user supplied arterial average speed of 18.0
          will be used for all hours of the day.  100% of VMT
          has been assigned to the arterial/collector roadway
          type for all hours of the day and all vehicle types.
  M 48 Warning:
            there are no sales for vehicle class HDGV8b

                  Calendar Year:  2009
                          Month:  July
                       Altitude:  Low
            Minimum Temperature:  71.0 (F)
            Maximum Temperature:  89.6 (F)
              Minimum Rel. Hum.:  47.0 (%)
              Maximum Rel. Hum.:  91.0 (%)
            Barometric Pressure: 30.00 (inches Hg)
               Nominal Fuel RVP:   9.0 psi
                  Weathered RVP:   8.6 psi
            Fuel Sulfur Content:   30. ppm

            Exhaust I/M Program:  Yes
```

```
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3915  0.4021  0.1371          0.0265  0.0004  0.0020  0.0347  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    1.103   1.649   1.691   1.660   2.025    0.405   0.683   0.562    3.84   1.423
Composite NOX:    0.611   0.864   1.025   0.905   2.381    0.622   0.837   6.349    0.90   1.018
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban minor arterial- Iredell County(Pt)
* File 1, Run 1, Scenario 19.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban minor arterial mix and speeds
  M615 Comment:
             User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 22.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3894  0.4000  0.1364          0.0302  0.0004  0.0020  0.0358  0.0058  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    1.000   1.523   1.557   1.532   1.779    0.367   0.616   0.470    3.59   1.304
Composite NOX:    0.569   0.819   0.972   0.858   2.462    0.579   0.779   5.698    0.94   0.968
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban collector- Iredell County(Pt)
* File 1, Run 1, Scenario 20.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban collector mix and speeds
  M615 Comment:
             User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 23.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
```

```
                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3902  0.4005  0.1365          0.0313  0.0004  0.0020  0.0334  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.983   1.502   1.533   1.510   1.727    0.359   0.601   0.435    3.55   1.285
Composite NOX:    0.561   0.810   0.961   0.849   2.478    0.571   0.767   5.346    0.96   0.938
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban local- Iredell County(Pt)
* File 1, Run 1, Scenario 21.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban local mix and speeds
  M615 Comment:
             User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 18.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3901  0.4005  0.1366          0.0312  0.0004  0.0020  0.0335  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    1.103   1.649   1.691   1.660   2.017    0.405   0.683   0.523    3.84   1.426
Composite NOX:    0.611   0.864   1.025   0.905   2.375    0.622   0.837   5.858    0.90   1.002
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural principle arterial- Lincoln County
```

```
* File 1, Run 1, Scenario 22.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural other principle arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M581 Warning:
            The user supplied freeway average speed of 59.0
            will be used for all hours of the day. 100% of VMT
            has been assigned to the freeway roadway type for
            all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3550  0.3648  0.1244          0.0418  0.0004  0.0019  0.1065  0.0053  1.0000
------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.743   1.214   1.220   1.215   1.173    0.245   0.399   0.274    3.24   0.955
Composite NOX:    0.532   0.811   0.953   0.847   3.266    0.815   1.099  10.490    1.39   1.867
------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor arterial- Lincoln County
* File 1, Run 1, Scenario 23.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 37.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No
```

```
Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3738  0.3837  0.1308          0.0391  0.0004  0.0019  0.0648  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.840   1.331   1.349   1.335   1.362    0.283   0.466   0.336    3.09   1.094
Composite NOX:    0.501   0.755   0.895   0.791   2.784    0.534   0.717   5.824    1.08   1.088
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural major collector- Lincoln County
* File 1, Run 1, Scenario 24.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural major collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 51.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3780  0.3884  0.1325          0.0386  0.0004  0.0020  0.0546  0.0056  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.771   1.253   1.264   1.256   1.206    0.251   0.410   0.257    2.96   1.023
Composite NOX:    0.519   0.789   0.930   0.825   3.077    0.647   0.871   6.752    1.20   1.122
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor collector- Lincoln County
* File 1, Run 1, Scenario 25.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 45.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
```

```
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3756  0.3852  0.1313           0.0407  0.0004  0.0020  0.0594  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.798   1.286   1.300   1.290   1.259    0.261   0.427   0.279    2.98   1.051
Composite NOX:    0.511   0.773   0.913   0.809   2.948    0.574   0.771   6.045    1.11   1.096
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural local- Lincoln County
* File 1, Run 1, Scenario 26.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural local mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 30.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3749  0.3851  0.1314           0.0410  0.0004  0.0020  0.0598  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.897   1.397   1.421   1.403   1.503    0.313   0.520   0.389    3.28   1.165
Composite NOX:    0.517   0.764   0.907   0.801   2.631    0.532   0.716   5.601    1.03   1.057
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban principle arterial- Lincoln County
* File 1, Run 1, Scenario 27.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban principle arterial mix and speeds
```

```
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 41.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3915  0.4021  0.1371           0.0265  0.0004  0.0020  0.0347  0.0057  1.0000
------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.818   1.307   1.323   1.311   1.303    0.270   0.444   0.290    3.02   1.090
Composite NOX:    0.505   0.763   0.903   0.798   2.865    0.548   0.737   5.576    1.09   0.906
------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban minor arterial- Lincoln County
* File 1, Run 1, Scenario 28.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban minor arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 23.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
```

```
                  ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3894  0.4000  0.1364          0.0302  0.0004  0.0020  0.0358  0.0058  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.983   1.502   1.533   1.510   1.733    0.359   0.601   0.454    3.55   1.283
Composite NOX:    0.561   0.810   0.961   0.849   2.483    0.571   0.767   5.611    0.96   0.957
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban collector- Lincoln County
* File 1, Run 1, Scenario 29.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 22.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                  ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3902  0.4005  0.1365          0.0313  0.0004  0.0020  0.0334  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    1.000   1.523   1.557   1.532   1.773    0.367   0.616   0.451    3.59   1.305
Composite NOX:    0.569   0.819   0.972   0.858   2.457    0.579   0.779   5.430    0.94   0.948
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban local- Lincoln County
* File 1, Run 1, Scenario 30.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban local mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 30.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
```

```
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3901  0.4005  0.1366           0.0312  0.0004  0.0020  0.0335  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.897   1.397   1.421   1.403   1.495    0.313   0.520   0.351    3.28   1.182
Composite NOX:    0.517   0.764   0.907   0.801   2.623    0.532   0.716   4.988    1.03   0.888
-------------------------------------------------------------------------------------------
```

```
****************************************************************************
* MOBILE6.2.03 (24-Sep-2003)                                               *
* Input file: RIL09N.IN (file 1, run 1).                                   *
****************************************************************************

* Reading Registration Distributions from the following external
* data file: NCAGE04.PRN
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.999     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural principle arterial- Rowan County
* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural other principle arterial mix and speeds
  M615 Comment:
              User supplied VMT mix.
  M581 Warning:
           The user supplied freeway average speed of 45.0
           will be used for all hours of the day. 100% of VMT
           has been assigned to the freeway roadway type for
           all hours of the day and all vehicle types.
  M 48 Warning:
             there are no sales for vehicle class HDGV8b

                   Calendar Year:  2009
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  71.0 (F)
             Maximum Temperature:  89.6 (F)
               Minimum Rel. Hum.:  47.0 (%)
               Maximum Rel. Hum.:  91.0 (%)
             Barometric Pressure: 30.00 (inches Hg)
                Nominal Fuel RVP:   9.0 psi
                   Weathered RVP:   8.6 psi
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  No
                Evap I/M Program:  No
                     ATP Program:  Yes
                Reformulated Gas:  No

Vehicle Type:     LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:      <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
```

```
VMT Distribution:0.3550  0.3648  0.1244           0.0418  0.0004  0.0019  0.1065  0.0053  1.0000
-----------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.875   1.390   1.400   1.393   1.272    0.261   0.427   0.312    2.98   1.095
Composite NOX:    0.590   0.887   1.022   0.921   2.965    0.574   0.771   7.589    1.11   1.600
-----------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor arterial- Rowan County
* File 1, Run 1, Scenario 2.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor arterial mix and speeds
  M615 Comment:
              User supplied VMT mix.
  M583 Warning:
           The user supplied arterial average speed of 49.0
           will be used for all hours of the day.  100% of VMT
           has been assigned to the arterial/collector roadway
           type for all hours of the day and all vehicle types.
  M 48 Warning:
             there are no sales for vehicle class HDGV8b

                   Calendar Year:  2009
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  71.0 (F)
             Maximum Temperature:  89.6 (F)
               Minimum Rel. Hum.:  47.0 (%)
               Maximum Rel. Hum.:  91.0 (%)
             Barometric Pressure: 30.00 (inches Hg)
                Nominal Fuel RVP:   9.0 psi
                   Weathered RVP:   8.6 psi
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  No
                Evap I/M Program:  No
                     ATP Program:  Yes
                Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3738  0.3837  0.1308           0.0391  0.0004  0.0019  0.0648  0.0055  1.0000
-----------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.853   1.364   1.372   1.366   1.223    0.254   0.415   0.273    2.96   1.105
Composite NOX:    0.595   0.898   1.033   0.932   3.038    0.619   0.833   6.767    1.16   1.268
-----------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural major collector- Rowan County
* File 1, Run 1, Scenario 3.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural major collector mix and speeds
  M615 Comment:
              User supplied VMT mix.
  M583 Warning:
           The user supplied arterial average speed of 50.0
           will be used for all hours of the day.  100% of VMT
           has been assigned to the arterial/collector roadway
           type for all hours of the day and all vehicle types.
  M 48 Warning:
             there are no sales for vehicle class HDGV8b

                   Calendar Year:  2009
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  71.0 (F)
             Maximum Temperature:  89.6 (F)
               Minimum Rel. Hum.:  47.0 (%)
               Maximum Rel. Hum.:  91.0 (%)
```

```
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3780  0.3884  0.1325          0.0386  0.0004  0.0020  0.0546  0.0056  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.848   1.359   1.366   1.360   1.213    0.252   0.412   0.259    2.96   1.108
Composite NOX:    0.597   0.900   1.035   0.935   3.054    0.629   0.846   6.558    1.17   1.197
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor collector- Rowan County
* File 1, Run 1, Scenario 4.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor collector mix and speeds
  M615 Comment:
              User supplied VMT mix.
  M583 Warning:
           The user supplied arterial average speed of 50.0
           will be used for all hours of the day.  100% of VMT
           has been assigned to the arterial/collector roadway
           type for all hours of the day and all vehicle types.
  M 48 Warning:
             there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3756  0.3852  0.1313          0.0407  0.0004  0.0020  0.0594  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.848   1.359   1.366   1.360   1.213    0.252   0.412   0.262    2.96   1.103
Composite NOX:    0.597   0.901   1.035   0.935   3.054    0.629   0.846   6.639    1.17   1.234
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural local- Rowan County
* File 1, Run 1, Scenario 5.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural local mix and speeds
  M615 Comment:
              User supplied VMT mix.
  M583 Warning:
           The user supplied arterial average speed of 30.0
```

```
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3749  0.3851  0.1314          0.0410  0.0004  0.0020  0.0598  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.985   1.518   1.539   1.524   1.503    0.313   0.520   0.389    3.28   1.260
Composite NOX:    0.598   0.880   1.018   0.915   2.631    0.532   0.716   5.601    1.03   1.147
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban interstate- Rowan County
* File 1, Run 1, Scenario 6.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban interstate mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M581 Warning:
            The user supplied freeway average speed of 57.0
            will be used for all hours of the day. 100% of VMT
            has been assigned to the freeway roadway type for
            all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3415  0.3506  0.1196          0.0535  0.0003  0.0018  0.1278  0.0050  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
```

```
Composite VOC:    0.818   1.316   1.320   1.317   1.180    0.246   0.401   0.274    3.10   1.013
Composite NOX:    0.608   0.921   1.056   0.955   3.222    0.766   1.033   9.786    1.34   2.089
------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban principle arterial- Rowan County
* File 1, Run 1, Scenario 7.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban principle arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 38.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:     LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:      <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3915  0.4021  0.1371          0.0265  0.0004  0.0020  0.0347  0.0057  1.0000
------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.915   1.435   1.448   1.438   1.344    0.279   0.460   0.308    3.07   1.198
Composite NOX:    0.582   0.871   1.006   0.905   2.802    0.536   0.721   5.451    1.08   0.987
------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban minor arterial- Rowan County
* File 1, Run 1, Scenario 8.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban minor arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 39.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
```

```
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3894  0.4000  0.1364          0.0302  0.0004  0.0020  0.0358  0.0058  1.0000
------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.909   1.428   1.441   1.431   1.327    0.276   0.455   0.293    3.05   1.191
Composite NOX:    0.582   0.872   1.007   0.907   2.820    0.539   0.724   5.288    1.09   0.996
------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban collector- Rowan County
* File 1, Run 1, Scenario 9.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 36.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3902  0.4005  0.1365          0.0313  0.0004  0.0020  0.0334  0.0057  1.0000
------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.928   1.450   1.464   1.453   1.369    0.286   0.473   0.299    3.11   1.214
Composite NOX:    0.581   0.867   1.003   0.901   2.750    0.531   0.713   4.962    1.07   0.970
------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban local- Rowan County
* File 1, Run 1, Scenario 10.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban local mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 30.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
```

```
  M 48 Warning:
             there are no sales for vehicle class HDGV8b

                   Calendar Year:  2009
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  71.0 (F)
             Maximum Temperature:  89.6 (F)
               Minimum Rel. Hum.:  47.0 (%)
               Maximum Rel. Hum.:  91.0 (%)
             Barometric Pressure: 30.00 (inches Hg)
                Nominal Fuel RVP:   9.0 psi
                   Weathered RVP:   8.6 psi
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  No
                Evap I/M Program:  No
                     ATP Program:  Yes
                Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3901  0.4005  0.1366          0.0312  0.0004  0.0020  0.0335  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.985   1.518   1.539   1.524   1.495    0.313   0.520   0.351    3.28   1.281
Composite NOX:    0.598   0.880   1.018   0.915   2.623    0.532   0.716   4.988    1.03   0.981
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural Interstate - Iredell County(Pt)
* File 1, Run 1, Scenario 11.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural interstate mix and speeds
  M615 Comment:
              User supplied VMT mix.
  M581 Warning:
            The user supplied freeway average speed of 38.0
            will be used for all hours of the day. 100% of VMT
            has been assigned to the freeway roadway type for
            all hours of the day and all vehicle types.
  M 48 Warning:
             there are no sales for vehicle class HDGV8b

                   Calendar Year:  2009
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  71.0 (F)
             Maximum Temperature:  89.6 (F)
               Minimum Rel. Hum.:  47.0 (%)
               Maximum Rel. Hum.:  91.0 (%)
             Barometric Pressure: 30.00 (inches Hg)
                Nominal Fuel RVP:   9.0 psi
                   Weathered RVP:   8.6 psi
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  No
                Evap I/M Program:  No
                     ATP Program:  Yes
                Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.2845  0.2922  0.0995          0.0938  0.0003  0.0015  0.2240  0.0042  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.915   1.435   1.448   1.438   1.356    0.279   0.460   0.352    3.07   1.043
Composite NOX:    0.582   0.871   1.006   0.905   2.817    0.536   0.721   7.052    1.08   2.369
-------------------------------------------------------------------------------------------
```

```
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural principle arterial- Iredell County(Pt)
* File 1, Run 1, Scenario 12.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural other principle arterial mix and speeds
  M615 Comment:
             User supplied VMT mix.
  M581 Warning:
          The user supplied freeway average speed of 54.0
          will be used for all hours of the day. 100% of VMT
          has been assigned to the freeway roadway type for
          all hours of the day and all vehicle types.
  M 48 Warning:
            there are no sales for vehicle class HDGV8b

                  Calendar Year:  2009
                          Month:  July
                       Altitude:  Low
            Minimum Temperature:  71.0 (F)
            Maximum Temperature:  89.6 (F)
              Minimum Rel. Hum.:  47.0 (%)
              Maximum Rel. Hum.:  91.0 (%)
            Barometric Pressure: 30.00 (inches Hg)
               Nominal Fuel RVP:   9.0 psi
                  Weathered RVP:   8.6 psi
            Fuel Sulfur Content:   30. ppm

            Exhaust I/M Program:  No
               Evap I/M Program:  No
                    ATP Program:  Yes
               Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34   LDGT   HDGV    LDDV    LDDT    HDDV     MC   All Veh
      GVWR:     <6000   >6000   (All)
                ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3550  0.3648  0.1244          0.0418  0.0004  0.0019  0.1065  0.0053  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.830   1.333   1.338   1.334   1.197    0.248   0.404   0.282    2.96   1.044
Composite NOX:    0.603   0.912   1.047   0.946   3.159    0.698   0.940   9.082    1.27   1.785
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor arterial- Iredell County(Pt)
* File 1, Run 1, Scenario 13.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor arterial mix and speeds
  M615 Comment:
             User supplied VMT mix.
  M583 Warning:
          The user supplied arterial average speed of 11.0
          will be used for all hours of the day.  100% of VMT
          has been assigned to the arterial/collector roadway
          type for all hours of the day and all vehicle types.
  M 48 Warning:
            there are no sales for vehicle class HDGV8b

                  Calendar Year:  2009
                          Month:  July
                       Altitude:  Low
            Minimum Temperature:  71.0 (F)
            Maximum Temperature:  89.6 (F)
              Minimum Rel. Hum.:  47.0 (%)
              Maximum Rel. Hum.:  91.0 (%)
            Barometric Pressure: 30.00 (inches Hg)
               Nominal Fuel RVP:   9.0 psi
                  Weathered RVP:   8.6 psi
            Fuel Sulfur Content:   30. ppm

            Exhaust I/M Program:  No
```

```
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3738  0.3837  0.1308          0.0391  0.0004  0.0019  0.0648  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    1.614   2.304   2.372   2.321   2.802    0.499   0.850   0.802    4.73   1.987
Composite NOX:    0.863   1.165   1.347   1.211   2.235    0.745   1.003   8.161    0.87   1.569
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural major collector- Iredell County(Pt)
* File 1, Run 1, Scenario 14.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural major collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 24.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3780  0.3884  0.1325          0.0386  0.0004  0.0020  0.0546  0.0056  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    1.064   1.614   1.640   1.620   1.695    0.351   0.588   0.463    3.50   1.358
Composite NOX:    0.639   0.922   1.067   0.959   2.505    0.563   0.757   5.856    0.97   1.165
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor collector- Iredell County(Pt)
* File 1, Run 1, Scenario 15.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 24.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
```

```
                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3756  0.3852  0.1313          0.0407  0.0004  0.0020  0.0594  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    1.064   1.614   1.640   1.620   1.695    0.351   0.588   0.468    3.50   1.354
Composite NOX:    0.639   0.922   1.067   0.959   2.505    0.563   0.757   5.929    0.97   1.197
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural local- Iredell County(Pt)
* File 1, Run 1, Scenario 16.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural local mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 20.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3749  0.3851  0.1314          0.0410  0.0004  0.0020  0.0598  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    1.145   1.716   1.750   1.725   1.889    0.386   0.649   0.541    3.71   1.451
Composite NOX:    0.679   0.965   1.115   1.003   2.418    0.599   0.806   6.316    0.92   1.256
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban interstate- Iredell County(Pt)
```

```
* File 1, Run 1, Scenario 17.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban interstate mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M581 Warning:
            The user supplied freeway average speed of 55.0
            will be used for all hours of the day. 100% of VMT
            has been assigned to the freeway roadway type for
            all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3415  0.3506  0.1196          0.0535  0.0003  0.0018  0.1278  0.0050  1.0000
------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.825   1.327   1.332   1.328   1.189    0.247   0.403   0.277    2.96   1.021
Composite NOX:    0.605   0.915   1.050   0.949   3.177    0.714   0.961   9.161    1.29   2.002
------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban principle arterial- Iredell County(Pt)
* File 1, Run 1, Scenario 18.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban principle arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 18.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No
```

```
Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3915  0.4021  0.1371          0.0265  0.0004  0.0020  0.0347  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    1.214   1.801   1.839   1.810   2.025    0.405   0.683   0.562    3.84   1.548
Composite NOX:    0.705   0.992   1.147   1.031   2.381    0.622   0.837   6.349    0.90   1.123
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban minor arterial- Iredell County(Pt)
* File 1, Run 1, Scenario 19.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban minor arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 22.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3894  0.4000  0.1364          0.0302  0.0004  0.0020  0.0358  0.0058  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    1.101   1.660   1.690   1.668   1.779    0.367   0.616   0.470    3.59   1.416
Composite NOX:    0.657   0.942   1.089   0.979   2.462    0.579   0.779   5.698    0.94   1.067
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban collector- Iredell County(Pt)
* File 1, Run 1, Scenario 20.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 23.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
```

```
             Minimum Temperature:  71.0 (F)
             Maximum Temperature:  89.6 (F)
               Minimum Rel. Hum.:  47.0 (%)
               Maximum Rel. Hum.:  91.0 (%)
             Barometric Pressure: 30.00 (inches Hg)
                Nominal Fuel RVP:   9.0 psi
                   Weathered RVP:   8.6 psi
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  No
                Evap I/M Program:  No
                     ATP Program:  Yes
                Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3902  0.4005  0.1365          0.0313  0.0004  0.0020  0.0334  0.0057  1.0000
-----------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    1.081   1.636   1.664   1.643   1.727    0.359   0.601   0.435    3.55   1.394
Composite NOX:    0.648   0.932   1.077   0.969   2.478    0.571   0.767   5.346    0.96   1.036
-----------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban local- Iredell County(Pt)
* File 1, Run 1, Scenario 21.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban local mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 18.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                   Calendar Year:  2009
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  71.0 (F)
             Maximum Temperature:  89.6 (F)
               Minimum Rel. Hum.:  47.0 (%)
               Maximum Rel. Hum.:  91.0 (%)
             Barometric Pressure: 30.00 (inches Hg)
                Nominal Fuel RVP:   9.0 psi
                   Weathered RVP:   8.6 psi
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  No
                Evap I/M Program:  No
                     ATP Program:  Yes
                Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3901  0.4005  0.1366          0.0312  0.0004  0.0020  0.0335  0.0057  1.0000
-----------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    1.214   1.801   1.839   1.810   2.017    0.405   0.683   0.523    3.84   1.550
Composite NOX:    0.705   0.992   1.147   1.032   2.375    0.622   0.837   5.858    0.90   1.106
-----------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural principle arterial- Lincoln County
* File 1, Run 1, Scenario 22.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural other principle arterial mix and speeds
```

```
  M615 Comment:
              User supplied VMT mix.
  M581 Warning:
           The user supplied freeway average speed of 59.0
           will be used for all hours of the day. 100% of VMT
           has been assigned to the freeway roadway type for
           all hours of the day and all vehicle types.
  M 48 Warning:
             there are no sales for vehicle class HDGV8b

                   Calendar Year:  2009
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  71.0 (F)
             Maximum Temperature:  89.6 (F)
               Minimum Rel. Hum.:  47.0 (%)
               Maximum Rel. Hum.:  91.0 (%)
             Barometric Pressure: 30.00 (inches Hg)
                Nominal Fuel RVP:   9.0 psi
                   Weathered RVP:   8.6 psi
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  No
                Evap I/M Program:  No
                     ATP Program:  Yes
                Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3550  0.3648  0.1244          0.0418  0.0004  0.0019  0.1065  0.0053  1.0000
-----------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.810   1.306   1.308   1.306   1.173    0.245   0.399   0.274    3.24   1.023
Composite NOX:    0.611   0.927   1.062   0.961   3.266    0.815   1.099  10.490    1.39   1.951
-----------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor arterial- Lincoln County
* File 1, Run 1, Scenario 23.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor arterial mix and speeds
  M615 Comment:
              User supplied VMT mix.
  M583 Warning:
           The user supplied arterial average speed of 37.0
           will be used for all hours of the day.  100% of VMT
           has been assigned to the arterial/collector roadway
           type for all hours of the day and all vehicle types.
  M 48 Warning:
             there are no sales for vehicle class HDGV8b

                   Calendar Year:  2009
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  71.0 (F)
             Maximum Temperature:  89.6 (F)
               Minimum Rel. Hum.:  47.0 (%)
               Maximum Rel. Hum.:  91.0 (%)
             Barometric Pressure: 30.00 (inches Hg)
                Nominal Fuel RVP:   9.0 psi
                   Weathered RVP:   8.6 psi
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  No
                Evap I/M Program:  No
                     ATP Program:  Yes
                Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
```

```
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3738  0.3837  0.1308          0.0391  0.0004  0.0019  0.0648  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.922   1.442   1.456   1.446   1.362    0.283   0.466   0.336    3.09   1.181
Composite NOX:    0.581   0.869   1.004   0.903   2.784    0.534   0.717   5.824    1.08   1.176
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural major collector- Lincoln County
* File 1, Run 1, Scenario 24.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural major collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 51.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3780  0.3884  0.1325          0.0386  0.0004  0.0020  0.0546  0.0056  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.843   1.352   1.359   1.353   1.206    0.251   0.410   0.257    2.96   1.102
Composite NOX:    0.598   0.904   1.038   0.938   3.077    0.647   0.871   6.752    1.20   1.211
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor collector- Lincoln County
* File 1, Run 1, Scenario 25.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 45.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
```

```
              Maximum Rel. Hum.:  91.0 (%)
            Barometric Pressure: 30.00 (inches Hg)
               Nominal Fuel RVP:   9.0 psi
                  Weathered RVP:   8.6 psi
            Fuel Sulfur Content:   30. ppm

            Exhaust I/M Program:  No
               Evap I/M Program:  No
                    ATP Program:  Yes
               Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3756  0.3852  0.1313          0.0407  0.0004  0.0020  0.0594  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.875   1.390   1.400   1.393   1.259    0.261   0.427   0.279    2.98   1.133
Composite NOX:    0.590   0.887   1.022   0.921   2.948    0.574   0.771   6.045    1.11   1.184
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural local- Lincoln County
* File 1, Run 1, Scenario 26.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural local mix and speeds
  M615 Comment:
             User supplied VMT mix.
  M583 Warning:
          The user supplied arterial average speed of 30.0
          will be used for all hours of the day.  100% of VMT
          has been assigned to the arterial/collector roadway
          type for all hours of the day and all vehicle types.
  M 48 Warning:
            there are no sales for vehicle class HDGV8b

                  Calendar Year:  2009
                          Month:  July
                       Altitude:  Low
            Minimum Temperature:  71.0 (F)
            Maximum Temperature:  89.6 (F)
              Minimum Rel. Hum.:  47.0 (%)
              Maximum Rel. Hum.:  91.0 (%)
            Barometric Pressure: 30.00 (inches Hg)
               Nominal Fuel RVP:   9.0 psi
                  Weathered RVP:   8.6 psi
            Fuel Sulfur Content:   30. ppm

            Exhaust I/M Program:  No
               Evap I/M Program:  No
                    ATP Program:  Yes
               Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3749  0.3851  0.1314          0.0410  0.0004  0.0020  0.0598  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.985   1.518   1.539   1.524   1.503    0.313   0.520   0.389    3.28   1.260
Composite NOX:    0.598   0.880   1.018   0.915   2.631    0.532   0.716   5.601    1.03   1.147
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban principle arterial- Lincoln County
* File 1, Run 1, Scenario 27.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban principle arterial mix and speeds
  M615 Comment:
             User supplied VMT mix.
  M583 Warning:
```

```
            The user supplied arterial average speed of 41.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3915  0.4021  0.1371          0.0265  0.0004  0.0020  0.0347  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.897   1.414   1.426   1.417   1.303    0.270   0.444   0.290    3.02   1.178
Composite NOX:    0.584   0.877   1.012   0.911   2.865    0.548   0.737   5.576    1.09   0.997
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban minor arterial- Lincoln County
* File 1, Run 1, Scenario 28.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban minor arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 23.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3894  0.4000  0.1364          0.0302  0.0004  0.0020  0.0358  0.0058  1.0000
-------------------------------------------------------------------------------------------
```

```
 Composite Emission Factors (g/mi):
Composite VOC:    1.081   1.636   1.664   1.643   1.733    0.359   0.601   0.454    3.55   1.393
Composite NOX:    0.648   0.932   1.077   0.969   2.483    0.571   0.767   5.611    0.96   1.055
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban collector- Lincoln County
* File 1, Run 1, Scenario 29.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban collector mix and speeds
  M615 Comment:
             User supplied VMT mix.
  M583 Warning:
          The user supplied arterial average speed of 22.0
          will be used for all hours of the day.  100% of VMT
          has been assigned to the arterial/collector roadway
          type for all hours of the day and all vehicle types.
  M 48 Warning:
            there are no sales for vehicle class HDGV8b

                  Calendar Year:  2009
                          Month:  July
                       Altitude:  Low
            Minimum Temperature:  71.0 (F)
            Maximum Temperature:  89.6 (F)
              Minimum Rel. Hum.:  47.0 (%)
              Maximum Rel. Hum.:  91.0 (%)
            Barometric Pressure: 30.00 (inches Hg)
               Nominal Fuel RVP:   9.0 psi
                  Weathered RVP:   8.6 psi
            Fuel Sulfur Content:   30. ppm

            Exhaust I/M Program:  No
               Evap I/M Program:  No
                    ATP Program:  Yes
               Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3902  0.4005  0.1365          0.0313  0.0004  0.0020  0.0334  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    1.101   1.660   1.690   1.668   1.773    0.367   0.616   0.451    3.59   1.417
Composite NOX:    0.657   0.942   1.089   0.979   2.457    0.579   0.779   5.430    0.94   1.048
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban local- Lincoln County
* File 1, Run 1, Scenario 30.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban local mix and speeds
  M615 Comment:
             User supplied VMT mix.
  M583 Warning:
          The user supplied arterial average speed of 30.0
          will be used for all hours of the day.  100% of VMT
          has been assigned to the arterial/collector roadway
          type for all hours of the day and all vehicle types.
  M 48 Warning:
            there are no sales for vehicle class HDGV8b

                  Calendar Year:  2009
                          Month:  July
                       Altitude:  Low
            Minimum Temperature:  71.0 (F)
            Maximum Temperature:  89.6 (F)
              Minimum Rel. Hum.:  47.0 (%)
              Maximum Rel. Hum.:  91.0 (%)
            Barometric Pressure: 30.00 (inches Hg)
               Nominal Fuel RVP:   9.0 psi
```

```
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3901  0.4005  0.1366           0.0312  0.0004  0.0020  0.0335  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.985   1.518   1.539   1.524   1.495    0.313   0.520   0.351    3.28   1.281
Composite NOX:    0.598   0.880   1.018   0.915   2.623    0.532   0.716   4.988    1.03   0.981
-------------------------------------------------------------------------------------------
```

```
************************************************************************
* MOBILE6.2.03 (24-Sep-2003)                                           *
* Input file: UC09.IN (file 1, run 1).                                 *
************************************************************************

* Reading Registration Distributions from the following external
* data file: NCAGE04.PRN
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.999     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
* OBDII

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural principle arterial- Cabarrus County
* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural other principle arterial mix and speeds
  M615 Comment:
              User supplied VMT mix.
  M581 Warning:
           The user supplied freeway average speed of 46.0
           will be used for all hours of the day. 100% of VMT
           has been assigned to the freeway roadway type for
           all hours of the day and all vehicle types.
*** I/M credits for Tech1&2 vehicles were read from the following external
    data file: TECH12.D
  M 48 Warning:
             there are no sales for vehicle class HDGV8b

                   Calendar Year:  2009
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  71.0 (F)
             Maximum Temperature:  89.6 (F)
               Minimum Rel. Hum.:  47.0 (%)
               Maximum Rel. Hum.:  91.0 (%)
             Barometric Pressure: 30.00 (inches Hg)
                Nominal Fuel RVP:   9.0 psi
                   Weathered RVP:   8.6 psi
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  Yes
                Evap I/M Program:  Yes
                     ATP Program:  Yes
                Reformulated Gas:  No
```

```
Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3550  0.3648  0.1244          0.0418  0.0004  0.0019  0.1065  0.0053  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.793   1.280   1.293   1.283   1.262    0.259   0.424   0.308    2.97   1.012
Composite NOX:    0.512   0.776   0.916   0.811   2.989    0.586   0.788   7.733    1.12   1.535
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor arterial- Cabarrus County
* File 1, Run 1, Scenario 2.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 41.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3738  0.3837  0.1308          0.0391  0.0004  0.0019  0.0648  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.818   1.307   1.323   1.311   1.306    0.270   0.445   0.309    3.02   1.069
Composite NOX:    0.505   0.763   0.903   0.798   2.868    0.548   0.737   5.986    1.09   1.107
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural major collector- Cabarrus County
* File 1, Run 1, Scenario 3.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural major collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 38.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
```

```
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3780  0.3884  0.1325          0.0386  0.0004  0.0020  0.0546  0.0056  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.834   1.325   1.342   1.329   1.345    0.279   0.460   0.315    3.07   1.095
Composite NOX:    0.502   0.757   0.897   0.792   2.802    0.536   0.721   5.575    1.08   1.023
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor collector- Cabarrus County
* File 1, Run 1, Scenario 4.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 34.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3756  0.3852  0.1313          0.0407  0.0004  0.0020  0.0594  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.861   1.354   1.374   1.359   1.413    0.294   0.487   0.349    3.16   1.122
Composite NOX:    0.503   0.753   0.894   0.789   2.717    0.529   0.711   5.564    1.06   1.045
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural local- Cabarrus County
* File 1, Run 1, Scenario 5.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural local mix and speeds
  M615 Comment:
```

```
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 30.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3749  0.3851  0.1314          0.0410  0.0004  0.0020  0.0598  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.897   1.397   1.421   1.403   1.503    0.313   0.520   0.389    3.28   1.165
Composite NOX:    0.517   0.764   0.907   0.801   2.631    0.532   0.716   5.601    1.03   1.057
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban interstate- Cabarrus County
* File 1, Run 1, Scenario 6.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban interstate mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M581 Warning:
            The user supplied freeway average speed of 35.0
            will be used for all hours of the day. 100% of VMT
            has been assigned to the freeway roadway type for
            all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
```

```
VMT Distribution:0.3415  0.3506  0.1196           0.0535  0.0003  0.0018  0.1278  0.0050  1.0000
-----------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.853   1.345   1.364   1.350   1.406    0.290   0.479   0.377    3.13   1.066
Composite NOX:    0.500   0.751   0.892   0.787   2.750    0.528   0.709   6.954    1.06   1.583
-----------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban principle arterial- Cabarrus County
* File 1, Run 1, Scenario 7.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban principle arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 28.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3915  0.4021  0.1371           0.0265  0.0004  0.0020  0.0347  0.0057  1.0000
-----------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.917   1.421   1.447   1.428   1.557    0.324   0.540   0.399    3.34   1.204
Composite NOX:    0.527   0.775   0.920   0.812   2.591    0.541   0.727   5.498    1.01   0.911
-----------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban minor arterial- Cabarrus County
* File 1, Run 1, Scenario 8.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban minor arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 29.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
```

```
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3894  0.4000  0.1364          0.0302  0.0004  0.0020  0.0358  0.0058  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.907   1.409   1.434   1.415   1.526    0.318   0.530   0.375    3.31   1.192
Composite NOX:    0.522   0.770   0.913   0.806   2.608    0.536   0.721   5.265    1.02   0.910
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban collector- Cabarrus County
* File 1, Run 1, Scenario 9.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban collector mix and speeds
  M615 Comment:
             User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 30.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3902  0.4005  0.1365          0.0313  0.0004  0.0020  0.0334  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.897   1.397   1.421   1.403   1.494    0.313   0.520   0.350    3.28   1.182
Composite NOX:    0.517   0.764   0.907   0.801   2.621    0.532   0.716   4.978    1.03   0.887
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban local- Cabarrus County
* File 1, Run 1, Scenario 10.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban local mix and speeds
  M615 Comment:
             User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 30.0
```

```
           will be used for all hours of the day.  100% of VMT
           has been assigned to the arterial/collector roadway
           type for all hours of the day and all vehicle types.
  M 48 Warning:
             there are no sales for vehicle class HDGV8b

                   Calendar Year:  2009
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  71.0 (F)
             Maximum Temperature:  89.6 (F)
               Minimum Rel. Hum.:  47.0 (%)
               Maximum Rel. Hum.:  91.0 (%)
             Barometric Pressure: 30.00 (inches Hg)
                Nominal Fuel RVP:   9.0 psi
                   Weathered RVP:   8.6 psi
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  Yes
                Evap I/M Program:  Yes
                     ATP Program:  Yes
                Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3901  0.4005  0.1366          0.0312  0.0004  0.0020  0.0335  0.0057  1.0000
------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.897   1.397   1.421   1.403   1.495    0.313   0.520   0.351    3.28   1.182
Composite NOX:    0.517   0.764   0.907   0.801   2.623    0.532   0.716   4.988    1.03   0.888
------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural principle arterial- Union County
* File 1, Run 1, Scenario 11.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural other principle arterial mix and speeds
  M615 Comment:
              User supplied VMT mix.
  M581 Warning:
           The user supplied freeway average speed of 46.0
           will be used for all hours of the day. 100% of VMT
           has been assigned to the freeway roadway type for
           all hours of the day and all vehicle types.
  M 48 Warning:
             there are no sales for vehicle class HDGV8b

                   Calendar Year:  2009
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  71.0 (F)
             Maximum Temperature:  89.6 (F)
               Minimum Rel. Hum.:  47.0 (%)
               Maximum Rel. Hum.:  91.0 (%)
             Barometric Pressure: 30.00 (inches Hg)
                Nominal Fuel RVP:   9.0 psi
                   Weathered RVP:   8.6 psi
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  Yes
                Evap I/M Program:  Yes
                     ATP Program:  Yes
                Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3550  0.3648  0.1244          0.0418  0.0004  0.0019  0.1065  0.0053  1.0000
------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
```

```
Composite VOC:    0.793   1.280   1.293   1.283   1.262    0.259   0.424   0.308    2.97   1.012
Composite NOX:    0.512   0.776   0.916   0.811   2.989    0.586   0.788   7.733    1.12   1.535
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor arterial- Union County
* File 1, Run 1, Scenario 12.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 43.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:     LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:      <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3738  0.3837  0.1308          0.0391  0.0004  0.0019  0.0648  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.808   1.296   1.311   1.300   1.282    0.265   0.436   0.298    3.00   1.057
Composite NOX:    0.508   0.768   0.908   0.804   2.911    0.561   0.755   6.133    1.10   1.122
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural major collector- Union County
* File 1, Run 1, Scenario 13.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural major collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 45.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
```

```
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3780  0.3884  0.1325          0.0386  0.0004  0.0020  0.0546  0.0056  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.798   1.286   1.300   1.290   1.259    0.261   0.427   0.277    2.98   1.055
Composite NOX:    0.511   0.773   0.913   0.809   2.948    0.574   0.771   5.971    1.11   1.062
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor collector- Union County
* File 1, Run 1, Scenario 14.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 44.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3756  0.3852  0.1313          0.0407  0.0004  0.0020  0.0594  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.803   1.291   1.305   1.295   1.269    0.263   0.431   0.284    2.99   1.056
Composite NOX:    0.509   0.771   0.911   0.806   2.929    0.568   0.763   5.982    1.11   1.090
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural local- Union County
* File 1, Run 1, Scenario 15.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural local mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 30.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
```

```
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3749  0.3851  0.1314          0.0410  0.0004  0.0020  0.0598  0.0055  1.0000
---------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.897   1.397   1.421   1.403   1.503    0.313   0.520   0.389    3.28   1.165
Composite NOX:    0.517   0.764   0.907   0.801   2.631    0.532   0.716   5.601    1.03   1.057
---------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban freeway- Union County
* File 1, Run 1, Scenario 16.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban freeway mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M581 Warning:
            The user supplied freeway average speed of 36.0
            will be used for all hours of the day. 100% of VMT
            has been assigned to the freeway roadway type for
            all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3714  0.3815  0.1301          0.0322  0.0004  0.0019  0.0770  0.0055  1.0000
---------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.846   1.338   1.356   1.342   1.389    0.286   0.473   0.368    3.11   1.092
Composite NOX:    0.500   0.753   0.894   0.789   2.774    0.531   0.713   6.988    1.07   1.224
---------------------------------------------------------------------------------------------
```

```
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban principle arterial- Union County
* File 1, Run 1, Scenario 17.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban principle arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 33.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3915  0.4021  0.1371           0.0265  0.0004  0.0020  0.0347  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.869   1.364   1.385   1.369   1.433    0.298   0.494   0.347    3.19   1.148
Composite NOX:    0.506   0.756   0.897   0.792   2.697    0.530   0.712   5.382    1.05   0.891
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban minor arterial- Union County
* File 1, Run 1, Scenario 18.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban minor arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 32.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
```

```
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3894  0.4000  0.1364          0.0302  0.0004  0.0020  0.0358  0.0058  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.878   1.374   1.396   1.380   1.452    0.303   0.502   0.345    3.21   1.158
Composite NOX:    0.509   0.758   0.900   0.795   2.673    0.530   0.713   5.205    1.04   0.899
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban collector- Union County
* File 1, Run 1, Scenario 19.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 36.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3902  0.4005  0.1365          0.0313  0.0004  0.0020  0.0334  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.846   1.338   1.356   1.342   1.369    0.286   0.473   0.299    3.11   1.123
Composite NOX:    0.500   0.753   0.894   0.789   2.750    0.531   0.713   4.962    1.07   0.878
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban local- Union County
* File 1, Run 1, Scenario 20.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban local mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 30.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
```

```
                 Calendar Year:  2009
                         Month:  July
                      Altitude:  Low
           Minimum Temperature:  71.0 (F)
           Maximum Temperature:  89.6 (F)
             Minimum Rel. Hum.:  47.0 (%)
             Maximum Rel. Hum.:  91.0 (%)
           Barometric Pressure: 30.00 (inches Hg)
              Nominal Fuel RVP:   9.0 psi
                 Weathered RVP:   8.6 psi
           Fuel Sulfur Content:   30. ppm

           Exhaust I/M Program:  Yes
              Evap I/M Program:  Yes
                   ATP Program:  Yes
              Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3901  0.4005  0.1366           0.0312  0.0004  0.0020  0.0335  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.897   1.397   1.421   1.403   1.495    0.313   0.520   0.351    3.28   1.182
Composite NOX:    0.517   0.764   0.907   0.801   2.623    0.532   0.716   4.988    1.03   0.888
-------------------------------------------------------------------------------------------
```

```
***************************************************************************
* MOBILE6.2.03 (24-Sep-2003)                                              *
* Input file: UC09N.IN (file 1, run 1).                                   *
***************************************************************************

* Reading Registration Distributions from the following external
* data file: NCAGE04.PRN
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.999     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural principle arterial- Cabarrus County
* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural other principle arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M581 Warning:
            The user supplied freeway average speed of 46.0
            will be used for all hours of the day. 100% of VMT
            has been assigned to the freeway roadway type for
            all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
```

```
VMT Distribution:0.3550  0.3648  0.1244           0.0418  0.0004  0.0019  0.1065  0.0053  1.0000
------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.869   1.383   1.393   1.386   1.262    0.259   0.424   0.308    2.97   1.089
Composite NOX:    0.591   0.890   1.025   0.924   2.989    0.586   0.788   7.733    1.12   1.618
------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor arterial- Cabarrus County
* File 1, Run 1, Scenario 2.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 41.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3738  0.3837  0.1308           0.0391  0.0004  0.0019  0.0648  0.0055  1.0000
------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.897   1.414   1.426   1.418   1.306    0.270   0.445   0.309    3.02   1.153
Composite NOX:    0.584   0.877   1.012   0.911   2.868    0.548   0.737   5.986    1.09   1.195
------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural major collector- Cabarrus County
* File 1, Run 1, Scenario 3.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural major collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 38.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
```

```
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3780  0.3884  0.1325          0.0386  0.0004  0.0020  0.0546  0.0056  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.915   1.435   1.448   1.438   1.345    0.279   0.460   0.315    3.07   1.182
Composite NOX:    0.582   0.871   1.006   0.905   2.802    0.536   0.721   5.575    1.08   1.111
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor collector- Cabarrus County
* File 1, Run 1, Scenario 4.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 34.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3756  0.3852  0.1313          0.0407  0.0004  0.0020  0.0594  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.944   1.469   1.484   1.473   1.413    0.294   0.487   0.349    3.16   1.212
Composite NOX:    0.583   0.868   1.004   0.902   2.717    0.529   0.711   5.564    1.06   1.133
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural local- Cabarrus County
* File 1, Run 1, Scenario 5.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural local mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 30.0
```

```
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3749  0.3851  0.1314          0.0410  0.0004  0.0020  0.0598  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.985   1.518   1.539   1.524   1.503    0.313   0.520   0.389    3.28   1.260
Composite NOX:    0.598   0.880   1.018   0.915   2.631    0.532   0.716   5.601    1.03   1.147
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban interstate- Cabarrus County
* File 1, Run 1, Scenario 6.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban interstate mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M581 Warning:
            The user supplied freeway average speed of 35.0
            will be used for all hours of the day. 100% of VMT
            has been assigned to the freeway roadway type for
            all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3415  0.3506  0.1196          0.0535  0.0003  0.0018  0.1278  0.0050  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
```

```
Composite VOC:    0.936   1.458   1.473   1.462   1.406    0.290   0.479   0.377    3.13   1.147
Composite NOX:    0.580   0.865   1.001   0.900   2.750    0.528   0.709   6.954    1.06   1.663
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban principle arterial- Cabarrus County
* File 1, Run 1, Scenario 7.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban principle arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 28.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:     LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:      <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3915  0.4021  0.1371          0.0265  0.0004  0.0020  0.0347  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    1.008   1.545   1.567   1.551   1.557    0.324   0.540   0.399    3.34   1.306
Composite NOX:    0.610   0.892   1.032   0.927   2.591    0.541   0.727   5.498    1.01   1.006
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban minor arterial- Cabarrus County
* File 1, Run 1, Scenario 8.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban minor arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 29.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
```

```
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  No
                Evap I/M Program:  No
                     ATP Program:  Yes
                Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3894  0.4000  0.1364          0.0302  0.0004  0.0020  0.0358  0.0058  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.996   1.531   1.552   1.537   1.526    0.318   0.530   0.375    3.31   1.292
Composite NOX:    0.604   0.886   1.024   0.921   2.608    0.536   0.721   5.265    1.02   1.004
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban collector- Cabarrus County
* File 1, Run 1, Scenario 9.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban collector mix and speeds
  M615 Comment:
              User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 30.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
             there are no sales for vehicle class HDGV8b

                   Calendar Year:  2009
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  71.0 (F)
             Maximum Temperature:  89.6 (F)
               Minimum Rel. Hum.:  47.0 (%)
               Maximum Rel. Hum.:  91.0 (%)
             Barometric Pressure: 30.00 (inches Hg)
                Nominal Fuel RVP:   9.0 psi
                   Weathered RVP:   8.6 psi
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  No
                Evap I/M Program:  No
                     ATP Program:  Yes
                Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3902  0.4005  0.1365          0.0313  0.0004  0.0020  0.0334  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.985   1.518   1.539   1.524   1.494    0.313   0.520   0.350    3.28   1.281
Composite NOX:    0.598   0.880   1.017   0.915   2.621    0.532   0.716   4.978    1.03   0.980
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban local- Cabarrus County
* File 1, Run 1, Scenario 10.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban local mix and speeds
  M615 Comment:
              User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 30.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
```

```
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3901  0.4005  0.1366          0.0312  0.0004  0.0020  0.0335  0.0057  1.0000
---------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.985   1.518   1.539   1.524   1.495    0.313   0.520   0.351    3.28   1.281
Composite NOX:    0.598   0.880   1.018   0.915   2.623    0.532   0.716   4.988    1.03   0.981
---------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural principle arterial- Union County
* File 1, Run 1, Scenario 11.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural other principle arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M581 Warning:
            The user supplied freeway average speed of 46.0
            will be used for all hours of the day. 100% of VMT
            has been assigned to the freeway roadway type for
            all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3550  0.3648  0.1244          0.0418  0.0004  0.0019  0.1065  0.0053  1.0000
---------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.869   1.383   1.393   1.386   1.262    0.259   0.424   0.308    2.97   1.089
Composite NOX:    0.591   0.890   1.025   0.924   2.989    0.586   0.788   7.733    1.12   1.618
---------------------------------------------------------------------------------------------
```

```
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor arterial- Union County
* File 1, Run 1, Scenario 12.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor arterial mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 43.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:     LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:      <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3738  0.3837  0.1308          0.0391  0.0004  0.0019  0.0648  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.885   1.402   1.413   1.405   1.282    0.265   0.436   0.298    3.00   1.140
Composite NOX:    0.587   0.882   1.017   0.916   2.911    0.561   0.755   6.133    1.10   1.210
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural major collector- Union County
* File 1, Run 1, Scenario 13.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural major collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 45.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
```

```
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3780  0.3884  0.1325          0.0386  0.0004  0.0020  0.0546  0.0056  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.875   1.390   1.400   1.393   1.259    0.261   0.427   0.277    2.98   1.137
Composite NOX:    0.590   0.887   1.022   0.921   2.948    0.574   0.771   5.971    1.11   1.150
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor collector- Union County
* File 1, Run 1, Scenario 14.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural minor collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 44.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3756  0.3852  0.1313          0.0407  0.0004  0.0020  0.0594  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.880   1.396   1.406   1.399   1.269    0.263   0.431   0.284    2.99   1.139
Composite NOX:    0.588   0.885   1.019   0.919   2.929    0.568   0.763   5.982    1.11   1.178
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural local- Union County
* File 1, Run 1, Scenario 15.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural local mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 30.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
```

```
                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3749  0.3851  0.1314          0.0410  0.0004  0.0020  0.0598  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.985   1.518   1.539   1.524   1.503    0.313   0.520   0.389    3.28   1.260
Composite NOX:    0.598   0.880   1.018   0.915   2.631    0.532   0.716   5.601    1.03   1.147
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban freeway- Union County
* File 1, Run 1, Scenario 16.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban freeway mix and speeds
  M615 Comment:
             User supplied VMT mix.
  M581 Warning:
            The user supplied freeway average speed of 36.0
            will be used for all hours of the day. 100% of VMT
            has been assigned to the freeway roadway type for
            all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3714  0.3815  0.1301          0.0322  0.0004  0.0019  0.0770  0.0055  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.928   1.450   1.464   1.453   1.389    0.286   0.473   0.368    3.11   1.180
Composite NOX:    0.581   0.867   1.003   0.902   2.774    0.531   0.713   6.988    1.07   1.312
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban principle arterial- Union County
```

```
* File 1, Run 1, Scenario 17.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban principle arterial mix and speeds
  M615 Comment:
              User supplied VMT mix.
  M583 Warning:
           The user supplied arterial average speed of 33.0
           will be used for all hours of the day.  100% of VMT
           has been assigned to the arterial/collector roadway
           type for all hours of the day and all vehicle types.
  M 48 Warning:
             there are no sales for vehicle class HDGV8b

                   Calendar Year:  2009
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  71.0 (F)
             Maximum Temperature:  89.6 (F)
               Minimum Rel. Hum.:  47.0 (%)
               Maximum Rel. Hum.:  91.0 (%)
             Barometric Pressure: 30.00 (inches Hg)
                Nominal Fuel RVP:   9.0 psi
                   Weathered RVP:   8.6 psi
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  No
                Evap I/M Program:  No
                     ATP Program:  Yes
                Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3915  0.4021  0.1371          0.0265  0.0004  0.0020  0.0347  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.954   1.480   1.497   1.484   1.433    0.298   0.494   0.347    3.19   1.243
Composite NOX:    0.587   0.870   1.007   0.905   2.697    0.530   0.712   5.382    1.05   0.984
-------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban minor arterial- Union County
* File 1, Run 1, Scenario 18.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban minor arterial mix and speeds
  M615 Comment:
              User supplied VMT mix.
  M583 Warning:
           The user supplied arterial average speed of 32.0
           will be used for all hours of the day.  100% of VMT
           has been assigned to the arterial/collector roadway
           type for all hours of the day and all vehicle types.
  M 48 Warning:
             there are no sales for vehicle class HDGV8b

                   Calendar Year:  2009
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  71.0 (F)
             Maximum Temperature:  89.6 (F)
               Minimum Rel. Hum.:  47.0 (%)
               Maximum Rel. Hum.:  91.0 (%)
             Barometric Pressure: 30.00 (inches Hg)
                Nominal Fuel RVP:   9.0 psi
                   Weathered RVP:   8.6 psi
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  No
                Evap I/M Program:  No
                     ATP Program:  Yes
                Reformulated Gas:  No
```

```
Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3894  0.4000  0.1364          0.0302  0.0004  0.0020  0.0358  0.0058  1.0000
------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.964   1.492   1.510   1.496   1.452    0.303   0.502   0.345    3.21   1.254
Composite NOX:    0.590   0.873   1.010   0.908   2.673    0.530   0.713   5.205    1.04   0.992
------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban collector- Union County
* File 1, Run 1, Scenario 19.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban collector mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 36.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3902  0.4005  0.1365          0.0313  0.0004  0.0020  0.0334  0.0057  1.0000
------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.928   1.450   1.464   1.453   1.369    0.286   0.473   0.299    3.11   1.214
Composite NOX:    0.581   0.867   1.003   0.901   2.750    0.531   0.713   4.962    1.07   0.970
------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban local- Union County
* File 1, Run 1, Scenario 20.
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban local mix and speeds
  M615 Comment:
               User supplied VMT mix.
  M583 Warning:
            The user supplied arterial average speed of 30.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
```

```
              Minimum Temperature:  71.0 (F)
              Maximum Temperature:  89.6 (F)
                Minimum Rel. Hum.:  47.0 (%)
                Maximum Rel. Hum.:  91.0 (%)
              Barometric Pressure: 30.00 (inches Hg)
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.6 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  Yes
                 Reformulated Gas:  No

Vehicle Type:    LDGV   LDGT12  LDGT34    LDGT   HDGV     LDDV    LDDT    HDDV      MC   All Veh
      GVWR:     <6000   >6000   (All)
                 ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
VMT Distribution:0.3901  0.4005  0.1366          0.0312  0.0004  0.0020  0.0335  0.0057  1.0000
-------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
Composite VOC:    0.985   1.518   1.539   1.524   1.495    0.313   0.520   0.351    3.28   1.281
Composite NOX:    0.598   0.880   1.018   0.915   2.623    0.532   0.716   4.988    1.03   0.981
-------------------------------------------------------------------------------------------
```

5.3 2009 Metrolina Vehicle Mix

LDV	LDT1	LDT2	LDT3	LDT4	HDV2B	HDV3	HDV4
HDV5	**HDV6**	**HDV7**	**HDV8a**	**HDV8b**	**HDBS**	**HDBT**	**MC**
Urban Interstate							
0.3418	0.081	0.2696	0.0831	0.0382	0.0581	0.0057	0.0048
0.0036	0.013	0.0154	0.0167	0.0595	0.003	0.0015	0.005
Urban Freeway							
0.3718	0.0881	0.2934	0.0904	0.0416	0.035	0.0034	0.0029
0.0022	0.0078	0.0093	0.0101	0.0358	0.0018	0.0009	0.0055
Urban Principal Arterial							
0.3919	0.0929	0.3092	0.0953	0.0438	0.0292	0.0029	0.0024
0.0018	0.0066	0.0027	0.0029	0.0103	0.0016	0.0008	0.0057
Urban Minor Arterial							
0.3898	0.0924	0.3076	0.0948	0.0436	0.0334	0.0032	0.0027
0.0021	0.0075	0.0024	0.0026	0.0094	0.0018	0.0009	0.0058
Urban Collector							
0.3906	0.0925	0.308	0.0949	0.0436	0.0348	0.0034	0.0028
0.0021	0.0077	0.0019	0.0021	0.0073	0.0017	0.0009	0.0057
Urban Local							
0.3905	0.0925	0.308	0.0949	0.0437	0.0347	0.0034	0.0028
0.0021	0.0077	0.0019	0.0021	0.0073	0.0018	0.0009	0.0057
Rural Interstate							
0.2848	0.0675	0.2247	0.0692	0.0318	0.1019	0.01	0.0084
0.0063	0.0228	0.027	0.0293	0.1043	0.0052	0.0026	0.0042
Rural Principal Arterial							
0.3554	0.0843	0.2805	0.0865	0.0397	0.0453	0.0044	0.0037
0.0028	0.0101	0.0132	0.0144	0.0509	0.0023	0.0012	0.0053
Rural Minor Arterial							
0.3742	0.0886	0.2951	0.0909	0.0418	0.043	0.0042	0.0036
0.0026	0.0096	0.0063	0.0069	0.0244	0.0022	0.0011	0.0055
Rural Major Collector							
0.3784	0.0897	0.2987	0.0921	0.0423	0.0426	0.0042	0.0036
0.0027	0.0095	0.0046	0.005	0.0178	0.0022	0.001	0.0056
Rural Minor Collector							
0.376	0.0889	0.2963	0.0913	0.0419	0.0449	0.0043	0.0037
0.0028	0.0101	0.0052	0.0056	0.0201	0.0023	0.0011	0.0055
Rural Local							
0.3753	0.0889	0.2962	0.0913	0.042	0.0451	0.0044	0.0037
0.0029	0.0102	0.0052	0.0057	0.0201	0.0024	0.0011	0.0055

5.4 Vehicle Age Distribution Used for Mecklenburg and Gaston Counties

```
*Convert MOBILE5 Registration Fractions to MOBILE6-Based Registration Fractions
*
*Calendar Year:         2004.000User-Input
*
*MOBILE5b Reg Fractions
*          0.093   0.081   0.080   0.079   0.084   0.078   0.069   0.065   0.057   0.060
*          0.048   0.040   0.032   0.026   0.022   0.019   0.015   0.011   0.008   0.006
*          0.004   0.002   0.001   0.001   0.018
*          0.064   0.061   0.061   0.066   0.069   0.065   0.063   0.062   0.052   0.056
*          0.056   0.039   0.031   0.026   0.025   0.028   0.027   0.022   0.021   0.014
*          0.012   0.007   0.005   0.005   0.064
*          0.123   0.106   0.075   0.089   0.086   0.087   0.066   0.059   0.038   0.049
*          0.032   0.022   0.013   0.012   0.016   0.018   0.017   0.011   0.010   0.011
*          0.007   0.004   0.002   0.003   0.044
*          0.093   0.103   0.071   0.093   0.099   0.085   0.048   0.063   0.039   0.044
*          0.026   0.018   0.015   0.013   0.014   0.019   0.018   0.015   0.013   0.012
*          0.009   0.006   0.005   0.005   0.075
*          0.062   0.068   0.063   0.052   0.064   0.048   0.030   0.038   0.042   0.048
*          0.025   0.031   0.026   0.023   0.018   0.024   0.017   0.031   0.041   0.056
*          0.048   0.046   0.031   0.025   0.044
*          0.100   0.092   0.067   0.094   0.073   0.098   0.022   0.071   0.054   0.053
*          0.047   0.031   0.023   0.022   0.021   0.014   0.016   0.011   0.015   0.015
*          0.013   0.012   0.018   0.011   0.008
*          0.102   0.075   0.066   0.087   0.106   0.111   0.064   0.071   0.047   0.062
*          0.034   0.025   0.022   0.021   0.024   0.019   0.016   0.014   0.009   0.008
*          0.004   0.003   0.002   0.002   0.006
*          0.115   0.133   0.100   0.086   0.075   0.069   0.052   0.044   0.040   0.034
*          0.028   0.023   0.015   0.011   0.010   0.009   0.011   0.010   0.018   0.015
*          0.011   0.009   0.013   0.010   0.059
*
*
* MOBILE6 Vehicle Classes:
*  1  LDV    Light-Duty Vehicles (Passenger Cars)
*  2  LDT1   Light-Duty Trucks 1 (0-6,000 lbs. GVWR, 0-3750 lbs. LVW)
*  3  LDT2   Light Duty Trucks 2 (0-6,000 lbs. GVWR, 3751-5750 lbs. LVW)
*  4  LDT3   Light Duty Trucks 3 (6,001-8500 lbs. GVWR, 0-3750 lbs. LVW)
*  5  LDT4   Light Duty Trucks 4 (6,001-8500 lbs. GVWR, 3751-5750 lbs. LVW)
*  6  HDV2B  Class 2b Heavy Duty Vehicles (8501-10,000 lbs. GVWR)
*  7  HDV3   Class 3 Heavy Duty Vehicles (10,001-14,000 lbs. GVWR)
*  8  HDV4   Class 4 Heavy Duty Vehicles (14,001-16,000 lbs. GVWR)
*  9  HDV5   Class 5 Heavy Duty Vehicles (16,001-19,500 lbs. GVWR)
* 10  HDV6   Class 6 Heavy Duty Vehicles (19,501-26,000 lbs. GVWR)
* 11  HDV7   Class 7 Heavy Duty Vehicles (26,001-33,000 lbs. GVWR)
* 12  HDV8A  Class 8a Heavy Duty Vehicles (33,001-60,000 lbs. GVWR)
* 13  HDV8B  Class 8b Heavy Duty Vehicles (>60,000 lbs. GVWR)
* 14  HDBS   School Busses
* 15  HDBT   Transit and Urban Busses
* 16  MC     Motorcycles (All)
*
REG DIST
*                       RESULTING MOBILE6-BASED REGISTRATION FRACTIONS
*
*MOBILE6 REGISTRATION FRACTIONS BY VEHICLE CLASS AND AGE
* LDV           M5 LDGV
       1   0.093   0.081   0.080   0.079   0.084   0.078   0.069   0.065   0.057   0.060
           0.048   0.040   0.032   0.026   0.022   0.019   0.015   0.011   0.008   0.006
           0.004   0.002   0.001   0.001   0.018
* LDT1          M5 LDGT1
       2   0.064   0.061   0.061   0.066   0.069   0.065   0.063   0.062   0.052   0.056
           0.056   0.039   0.031   0.026   0.025   0.028   0.027   0.022   0.021   0.014
           0.012   0.007   0.005   0.005   0.064
* LDT2          M5 LDGT1
       3   0.064   0.061   0.061   0.066   0.069   0.065   0.063   0.062   0.052   0.056
           0.056   0.039   0.031   0.026   0.025   0.028   0.027   0.022   0.021   0.014
           0.012   0.007   0.005   0.005   0.064
* LDT3          M5 LDGT2
       4   0.123   0.106   0.075   0.089   0.086   0.087   0.066   0.059   0.038   0.049
           0.032   0.022   0.013   0.012   0.016   0.018   0.017   0.011   0.010   0.011
```

```
          0.007   0.004   0.002   0.003   0.044
* LDT4         M5 LDGT2
       5  0.123   0.106   0.075   0.089   0.086   0.087   0.066   0.059   0.038   0.049
          0.032   0.022   0.013   0.012   0.016   0.018   0.017   0.011   0.010   0.011
          0.007   0.004   0.002   0.003   0.044
* HDV2B        M5 HDVs (Combined HDGV and HDDV)
       6  0.098   0.090   0.068   0.090   0.102   0.098   0.056   0.067   0.043   0.053
          0.030   0.021   0.019   0.017   0.019   0.019   0.017   0.014   0.011   0.010
          0.007   0.004   0.003   0.003   0.041
* HDV3         M5 HDVs (Combined HDGV and HDDV)
       7  0.098   0.090   0.068   0.090   0.102   0.098   0.056   0.067   0.043   0.053
          0.030   0.021   0.019   0.017   0.019   0.019   0.017   0.014   0.011   0.010
          0.007   0.004   0.003   0.003   0.041
* HDV4         M5 HDVs (Combined HDGV and HDDV)
       8  0.098   0.090   0.068   0.090   0.102   0.098   0.056   0.067   0.043   0.053
          0.030   0.021   0.019   0.017   0.019   0.019   0.017   0.014   0.011   0.010
          0.007   0.004   0.003   0.003   0.041
* HDV5         M5 HDVs (Combined HDGV and HDDV)
       9  0.098   0.090   0.068   0.090   0.102   0.098   0.056   0.067   0.043   0.053
          0.030   0.021   0.019   0.017   0.019   0.019   0.017   0.014   0.011   0.010
          0.007   0.004   0.003   0.003   0.041
* HDV6         M5 HDVs (Combined HDGV and HDDV)
      10  0.098   0.090   0.068   0.090   0.102   0.098   0.056   0.067   0.043   0.053
          0.030   0.021   0.019   0.017   0.019   0.019   0.017   0.014   0.011   0.010
          0.007   0.004   0.003   0.003   0.041
* HDV7         M5 HDVs (Combined HDGV and HDDV)
      11  0.098   0.090   0.068   0.090   0.102   0.098   0.056   0.067   0.043   0.053
          0.030   0.021   0.019   0.017   0.019   0.019   0.017   0.014   0.011   0.010
          0.007   0.004   0.003   0.003   0.041
* HDV8a        M5 HDVs (Combined HDGV and HDDV)
      12  0.098   0.090   0.068   0.090   0.102   0.098   0.056   0.067   0.043   0.053
          0.030   0.021   0.019   0.017   0.019   0.019   0.017   0.014   0.011   0.010
          0.007   0.004   0.003   0.003   0.041
* HDV8b        M5 HDVs (Combined HDGV and HDDV)
      13  0.098   0.090   0.068   0.090   0.102   0.098   0.056   0.067   0.043   0.053
          0.030   0.021   0.019   0.017   0.019   0.019   0.017   0.014   0.011   0.010
          0.007   0.004   0.003   0.003   0.041
* HDBS         M5 HDVs (Combined HDGV and HDDV)
      14  0.098   0.090   0.068   0.090   0.102   0.098   0.056   0.067   0.043   0.053
          0.030   0.021   0.019   0.017   0.019   0.019   0.017   0.014   0.011   0.010
          0.007   0.004   0.003   0.003   0.041
* HDBT         M5 HDDVs
      15  0.102   0.075   0.066   0.087   0.106   0.111   0.064   0.071   0.047   0.062
          0.034   0.025   0.022   0.021   0.024   0.019   0.016   0.014   0.009   0.008
          0.004   0.003   0.002   0.002   0.006
* Motorcycles  M5 MC
      16  0.115   0.133   0.100   0.086   0.075   0.069   0.052   0.044   0.040   0.034
          0.028   0.023   0.015   0.011   0.010   0.009   0.011   0.010   0.018   0.015
          0.011   0.009   0.013   0.010   0.059
```

5.5 Vehicle Age Distribution Used for Cabarrus, Gaston, Iredell, Lincoln & Union Counties

```
*Convert MOBILE5 Registration Fractions to MOBILE6-Based Registration Fractions
*
*Calendar Year:         2004.000User-Input
*
*MOBILE5b Reg Fractions
*          0.060   0.063   0.063   0.065   0.074   0.071   0.065   0.064   0.059   0.066
*          0.054   0.049   0.040   0.034   0.030   0.028   0.023   0.018   0.014   0.011
*          0.008   0.005   0.003   0.002   0.032
*          0.048   0.046   0.047   0.051   0.058   0.056   0.056   0.058   0.048   0.053
*          0.056   0.041   0.033   0.030   0.029   0.037   0.036   0.031   0.031   0.023
*          0.021   0.013   0.008   0.008   0.082
*          0.078   0.064   0.050   0.055   0.063   0.062   0.050   0.056   0.043   0.053
*          0.043   0.032   0.026   0.023   0.028   0.035   0.031   0.022   0.024   0.020
*          0.016   0.011   0.007   0.008   0.098
*          0.044   0.044   0.037   0.048   0.052   0.050   0.033   0.042   0.037   0.048
*          0.036   0.026   0.023   0.021   0.026   0.033   0.032   0.025   0.030   0.025
*          0.020   0.014   0.012   0.013   0.227
*          0.075   0.075   0.076   0.068   0.072   0.050   0.036   0.028   0.032   0.031
*          0.021   0.019   0.016   0.024   0.017   0.017   0.013   0.032   0.061   0.056
*          0.044   0.039   0.032   0.019   0.046
*          0.098   0.095   0.081   0.090   0.074   0.095   0.024   0.075   0.043   0.041
*          0.032   0.025   0.020   0.017   0.020   0.020   0.016   0.014   0.022   0.021
*          0.022   0.014   0.024   0.010   0.008
*          0.087   0.070   0.054   0.075   0.091   0.095   0.055   0.069   0.048   0.057
*          0.043   0.031   0.021   0.023   0.031   0.029   0.028   0.024   0.015   0.015
*          0.011   0.004   0.004   0.004   0.015
*          0.109   0.118   0.099   0.086   0.074   0.063   0.047   0.043   0.041   0.031
*          0.027   0.022   0.015   0.011   0.011   0.012   0.011   0.013   0.021   0.019
*          0.015   0.015   0.017   0.013   0.068
*
*
* MOBILE6 Vehicle Classes:
*  1  LDV    Light-Duty Vehicles (Passenger Cars)
*  2  LDT1   Light-Duty Trucks 1 (0-6,000 lbs. GVWR, 0-3750 lbs. LVW)
*  3  LDT2   Light Duty Trucks 2 (0-6,000 lbs. GVWR, 3751-5750 lbs. LVW)
*  4  LDT3   Light Duty Trucks 3 (6,001-8500 lbs. GVWR, 0-3750 lbs. LVW)
*  5  LDT4   Light Duty Trucks 4 (6,001-8500 lbs. GVWR, 3751-5750 lbs. LVW)
*  6  HDV2B  Class 2b Heavy Duty Vehicles (8501-10,000 lbs. GVWR)
*  7  HDV3   Class 3 Heavy Duty Vehicles (10,001-14,000 lbs. GVWR)
*  8  HDV4   Class 4 Heavy Duty Vehicles (14,001-16,000 lbs. GVWR)
*  9  HDV5   Class 5 Heavy Duty Vehicles (16,001-19,500 lbs. GVWR)
* 10  HDV6   Class 6 Heavy Duty Vehicles (19,501-26,000 lbs. GVWR)
* 11  HDV7   Class 7 Heavy Duty Vehicles (26,001-33,000 lbs. GVWR)
* 12  HDV8A  Class 8a Heavy Duty Vehicles (33,001-60,000 lbs. GVWR)
* 13  HDV8B  Class 8b Heavy Duty Vehicles (>60,000 lbs. GVWR)
* 14  HDBS   School Busses
* 15  HDBT   Transit and Urban Busses
* 16  MC     Motorcycles (All)
*
REG DIST
*                       RESULTING MOBILE6-BASED REGISTRATION FRACTIONS
*
*MOBILE6 REGISTRATION FRACTIONS BY VEHICLE CLASS AND AGE
* LDV           M5 LDGV
       1   0.060   0.063   0.063   0.065   0.074   0.071   0.065   0.064   0.059   0.066
           0.054   0.049   0.040   0.034   0.030   0.028   0.023   0.018   0.014   0.011
           0.008   0.005   0.003   0.002   0.032
* LDT1          M5 LDGT1
       2   0.048   0.046   0.047   0.051   0.058   0.056   0.056   0.058   0.048   0.053
           0.056   0.041   0.033   0.030   0.029   0.037   0.036   0.031   0.031   0.023
           0.021   0.013   0.008   0.008   0.082
* LDT2          M5 LDGT1
       3   0.048   0.046   0.047   0.051   0.058   0.056   0.056   0.058   0.048   0.053
           0.056   0.041   0.033   0.030   0.029   0.037   0.036   0.031   0.031   0.023
           0.021   0.013   0.008   0.008   0.082
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* LDT3          M5 LDGT2
       4   0.078   0.064   0.050   0.055   0.063   0.062   0.050   0.056   0.043   0.053
           0.043   0.032   0.026   0.023   0.028   0.035   0.031   0.022   0.024   0.020
           0.016   0.011   0.007   0.008   0.098
* LDT4          M5 LDGT2
       5   0.078   0.064   0.050   0.055   0.063   0.062   0.050   0.056   0.043   0.053
           0.043   0.032   0.026   0.023   0.028   0.035   0.031   0.022   0.024   0.020
           0.016   0.011   0.007   0.008   0.098
* HDV2B         M5 HDVs (Combined HDGV and HDDV)
       6   0.065   0.057   0.046   0.061   0.071   0.072   0.044   0.055   0.042   0.052
           0.040   0.028   0.022   0.022   0.029   0.031   0.030   0.024   0.023   0.020
           0.016   0.009   0.008   0.008   0.123
* HDV3          M5 HDVs (Combined HDGV and HDDV)
       7   0.065   0.057   0.046   0.061   0.071   0.072   0.044   0.055   0.042   0.052
           0.040   0.028   0.022   0.022   0.029   0.031   0.030   0.024   0.023   0.020
           0.016   0.009   0.008   0.008   0.123
* HDV4          M5 HDVs (Combined HDGV and HDDV)
       8   0.065   0.057   0.046   0.061   0.071   0.072   0.044   0.055   0.042   0.052
           0.040   0.028   0.022   0.022   0.029   0.031   0.030   0.024   0.023   0.020
           0.016   0.009   0.008   0.008   0.123
* HDV5          M5 HDVs (Combined HDGV and HDDV)
       9   0.065   0.057   0.046   0.061   0.071   0.072   0.044   0.055   0.042   0.052
           0.040   0.028   0.022   0.022   0.029   0.031   0.030   0.024   0.023   0.020
           0.016   0.009   0.008   0.008   0.123
* HDV6          M5 HDVs (Combined HDGV and HDDV)
      10   0.065   0.057   0.046   0.061   0.071   0.072   0.044   0.055   0.042   0.052
           0.040   0.028   0.022   0.022   0.029   0.031   0.030   0.024   0.023   0.020
           0.016   0.009   0.008   0.008   0.123
* HDV7          M5 HDVs (Combined HDGV and HDDV)
      11   0.065   0.057   0.046   0.061   0.071   0.072   0.044   0.055   0.042   0.052
           0.040   0.028   0.022   0.022   0.029   0.031   0.030   0.024   0.023   0.020
           0.016   0.009   0.008   0.008   0.123
* HDV8a         M5 HDVs (Combined HDGV and HDDV)
      12   0.065   0.057   0.046   0.061   0.071   0.072   0.044   0.055   0.042   0.052
           0.040   0.028   0.022   0.022   0.029   0.031   0.030   0.024   0.023   0.020
           0.016   0.009   0.008   0.008   0.123
* HDV8b         M5 HDVs (Combined HDGV and HDDV)
      13   0.065   0.057   0.046   0.061   0.071   0.072   0.044   0.055   0.042   0.052
           0.040   0.028   0.022   0.022   0.029   0.031   0.030   0.024   0.023   0.020
           0.016   0.009   0.008   0.008   0.123
* HDBS          M5 HDVs (Combined HDGV and HDDV)
      14   0.065   0.057   0.046   0.061   0.071   0.072   0.044   0.055   0.042   0.052
           0.040   0.028   0.022   0.022   0.029   0.031   0.030   0.024   0.023   0.020
           0.016   0.009   0.008   0.008   0.123
* HDBT          M5 HDDVs
      15   0.087   0.070   0.054   0.075   0.091   0.095   0.055   0.069   0.048   0.057
           0.043   0.031   0.021   0.023   0.031   0.029   0.028   0.024   0.015   0.015
           0.011   0.004   0.004   0.004   0.015
* Motorcycles   M5 MC
      16   0.109   0.118   0.099   0.086   0.074   0.063   0.047   0.043   0.041   0.031
           0.027   0.022   0.015   0.011   0.011   0.012   0.011   0.013   0.021   0.019
           0.015   0.015   0.017   0.013   0.068
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