Documentation for the Nonroad Model Criteria Air Pollutant Component for the National Emissions Inventory (NEI) for Base Years 1970-2001

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A. INTRODUCTION

1. What Is the National Emissions Inventory?

The National Emissions Inventory (NEI) is a comprehensive inventory covering all criteria pollutants and hazardous air pollutants (HAPs) for the 50 United States, Washington DC, Puerto Rico, and US Virgin Islands. The NEI was created by the U.S. Environmental Protection Agency's (EPA's) Emission Factor and Inventory Group (EFIG) in Research Triangle Park, North Carolina.

The NEI will be used to support air quality modeling and other activities. To this end, we, the EPA, established a goal to compile comprehensive emissions data in the NEI for criteria and HAPs for nonroad mobile, onroad mobile, point, and nonpoint sources.

2. What Is the Purpose of This Document?

This report summarizes the procedures we used to estimate emissions for the NONROAD model category component of EPA's NEI. Criteria pollutant emission estimates are described in this report, while NONROAD model HAP emission estimates, and aircraft, commercial marine vessel (CMV) and locomotive emission estimates (both criteria and HAP) are addressed in the draft report "Documentation for Aircraft, Commercial Marine Vessel, Locomotive, and Other Nonroad Components of the National Emissions Inventory," (EPA, 2003). Table 1 summarizes the methods applied and the pollutants for which emissions were estimated for all nonroad sources. Those source categories and years that are included in this report are noted in bold.

B. WHAT METHODOLOGIES DID WE USE TO DEVELOP NONROAD EMISSION ESTIMATES?

For several years the EPA's Office of Transportation and Air Quality (OTAQ) has been developing an emissions model (NONROAD) to estimate emissions from nonroad sources. We used the "Lockdown C" draft version of the NONROAD model (EPA, 2002) to generate emission inventories for volatile organic compounds (VOCs), oxides of nitrogen (NO_x), carbon monoxide (CO), sulfur dioxide (SO_2), primary particulate matter with an aerodynamic diameter less than or equal to 10 micrometers (PM-10), and primary particulate matter with an aerodynamic diameter less than or equal to 2.5 micrometers (PM-2.5) for all gasoline, diesel, compressed natural gas (CNG), and liquefied petroleum gas (LPG) nonroad equipment types at the 10-digit Source Classification Code (SCC) level.

The NONROAD model does not contain emission factors to calculate ammonia (NH_3) emissions; therefore, we used fuel consumption estimates generated by the NONROAD model and applied NH_3 emission factors for diesel and noncatalyst gasoline vehicles as appropriate. For the latest publicly-available version of the NONROAD model (NONROAD2002a), the reader is referred to http://www.epa.gov/otaq/nonrdmdl.htm. The emission inventories produced by the Lockdown C NONROAD model and the NONROAD2002a model should be comparable, although there have been some enhancements to the model, including the addition of a NEI Input Format (NIF) Version 2.0 reporting option.

1. What Emissions Does the NONROAD Model Estimate?

The NONROAD model calculates emission estimates for hydrocarbon (HC), NO_x, CO, SO_2, PM-10, and PM-2.5. The model reports various HC species, including VOC, and breaks out the HC emissions according to exhaust and evaporative components. PM-10 is assumed to be equivalent to total PM, and PM-2.5 is assumed to be 92 percent of PM-10 for gasoline and diesel-fueled engines, and 100 percent of PM-10 for LPG and CNG-fueled engines.

2. What Equipment Categories Are Included in the NONROAD Model?

The NONROAD model includes the following general equipment categories:

- agricultural;
- airport support;
- light commercial;
- construction and mining;
- industrial;
- lawn and garden;
- logging;
- pleasure craft;
- railroad; and
- recreational equipment.

The model generates emissions at subcategory levels lower than the general categories listed above. The subcategories are equivalent to 10-digit SCCs, and correspond to specific nonroad applications within a category.

3. How Did We Develop NONROAD Model Emission Inventories?

We estimated nonroad emissions from two emission inventories including: 1) a 1996 county-level inventory, developed using EPA's October 2001 draft NONROAD model (EPA, 2001); and 2) an updated year-specific national inventory, based on EPA's draft Lockdown C NONROAD model (EPA, 2002). Using the county-level emission estimates referenced in (1), seasonal and daily county-to-national ratios were then developed for application to updated national estimates per season referenced in (2). As such, a description of the methods for developing 1996 county emissions is provided below, followed by a discussion of the procedures for developing alternate base year emissions (i.e., for 1997-2001, 1990, 1987, 1985, and 1978).

a. How Did We Develop 1996 Base Year Emissions?

We developed an updated 1996 county-level inventory using the EPA's October 2001 draft NONROAD model. To develop the 1996 county-level inventory, we prepared NONROAD model input files for each State to account for the average statewide temperatures and Reid vapor pressure (RVP) for four seasons, including summer, fall, winter, and spring. Typical summer weekday runs were also performed to estimate ozone season daily emissions, using the same inputs as the summer season runs. We used these default state input files to calculate emissions for all counties in the United States. Estimates for particular counties were replaced with county-specific estimates, if those counties had significant differences in their RVP, fuel characteristics due to reformulated gasoline (RFG) and oxygenated fuel requirements, and Stage II controls.

Table 2 presents the statewide seasonal default RVP values used as input to the NONROAD model. For areas subject to Phase 1 of the Federal RFG program, separate RVP values were modeled in the 1996 NONROAD inputs for May through September (values not shown). Table 3 presents the areas and counties modeled with RFG. Oxygenated fuel was modeled in the areas participating in this program in 1996, as presented in Table 4. Emissions calculated for counties with fuel characteristic data that varied from statewide average values replaced emissions for these same counties generated by running the default input files.

Pechan calculated seasonal, county-to-national emissions ratios for each 10-digit SCC and pollutant based on county emissions divided by the sum total of county-level emissions for the nation. This was done for each of the four seasons and a typical summer weekday. This ensured that the fractions calculated for county-to-national emissions all added up to 1 at the national level.

b. How Did We Estimate Alternate Base Year Emissions?

Using the 1996 inventory described above as the basis for the county distribution, we prepared updated emissions inventories for 1997-2001, 1990, 1987, and 1985 to reflect revisions made to the NONROAD model since the October 2001 version. From the May 2002 draft Lockdown C NONROAD model, we obtained national, seasonal emissions at the SCC level for the following pollutants: VOC, NO_x, SO_2, CO, PM-10, and PM-2.5. We also performed national NONROAD model runs to estimate typical summer weekday emissions. Table 5 presents a summary of the input values used for each of the national NONROAD model runs.

National, SCC-level emissions for each of the four seasons were then multiplied by the season-specific county-to-national emissions ratios. The following formula represents how an updated 1999 county-level annual emissions inventory was developed for a given SCC and pollutant.

$$E_{Ann,\,Cty,\,y} = \sum_{S} \left[\left(E_{S,\,Cty,1996} \div E_{S,\,N,1996}\right) * E_{S,\,N,\,y}\right]$$

Where:

Where:	E	=	Emissions, tons
	Ann	=	Annual
	S	=	Season (winter, spring, summer, fall)
	Cty	=	County
	N	=	National
	y	=	year of inventory (e.g., 1999)

In this manner, the county-level distribution assumed for the 1996 inventory is normalized to the updated national, SCC-level totals for alternate years. This approach ensures that the sum of all county-level emissions for any year are equivalent to the national-level estimates and are distributed to the counties according to the 1996 distribution.

Because the NONROAD model estimates growth in local equipment populations using one national average growth rate, the effects of growth should be reflected in the national-level runs for each alternate year aside from the base year 1996. The effects of federal nonroad emission standards in future years (e.g., years beyond 1996) would also be accounted for. Because the model uses one average growth rate for the whole nation, the approach of using the 1996 county-level inventory as a basis for geographically allocating national inventories for other years was assumed to be reasonable. However, temperature and fuel inputs to reflect local conditions cannot be accounted for when doing a national-level run for a specified year. We used this approach due to time and resource constraints.

c. How Did We Estimate Interim Year Emissions?

In developing inventories for 1991 through 1995, we used the 1990 and 1996 county-level inventories already completed as the basis for these interim year inventories. We estimated interim year emissions using linear interpolation of national level emissions between 1990 and 1996, and from these emissions calculated the average annual growth rate for each pollutant/SCC combination. The following shows an example of how national, SCC, pollutant-specific emissions were calculated for the year 1992:

$$E_{1992} = E_{1990} + [(E_{1996} - E_{1990}) \times 2/6]$$

To estimate 1993 emissions, we multiplied the above equation by 3/6 instead of 2/6, and to estimate 1994, we multiplied by 4/6, etc. Based on the national rate of change for each pollutant/SCC, growth factors were developed for each year, and were applied to 1990 county-level emissions to estimate 1991, 1992, 1993, 1994, and 1995 emissions.

County-level inventories for 1986, 1988, and 1989 were developed using linear interpolation between 1985 and 1990, using similar steps described for 1991 through 1995.

For many categories, the rate of change in emissions during this time period will largely be dependent on the equipment population, as control programs are not in effect yet. The NONROAD model predicts year-specific nonroad equipment populations by extrapolating from a linear regression of national-level historical equipment populations. The growth rate does not vary by county or State.

Because we do not maintain a comprehensive county-level database for the NEI for years prior to 1985, we developed national-level estimates only for the years 1970, 1975, 1978, and 1980. From the May 2002 draft Lockdown C NONROAD model, we obtained national, seasonal emissions at the SCC level for the following pollutants: VOC, NO_x, SO_2, CO, PM-10, and PM-2.5. We also performed national NONROAD model runs to estimate typical summer weekday emissions. Once the seasonal runs were completed, they were added to estimate annual emissions. Table 5 presents a summary of the input values used for these historic national NONROAD model runs.

d. How Did We Estimate NH_3 Emissions for NONROAD Model Categories?

We estimated NH_3 emissions based on national, SCC-level fuel consumption estimates for all engines, as reported by the May 2002 "Lockdown C" draft version of NONROAD. In this version of NONROAD, fuel consumption estimates were available for LPG- and CNG-fueled equipment as well. As with the criteria pollutant emission estimates, we estimated county-level fuel consumption using season-specific county-to-national ratios developed for 1996 (based on EPA's October 2001 draft NONROAD model), applied to updated national fuel consumption values for 1999. The NH_3 emissions for California were also recalculated using updated diesel fuel consumption values generated for California-specific runs, and assuming the 1996 county-level distribution.

Once a county-level data base of fuel consumption was developed, we multiplied these activity data by emission factors provided by OTAQ to estimate NH_3 emissions. OTAQ derived the emission factors primarily from light-duty onroad vehicle emission measurements (Harvey, 1983). Results from the measurements were extrapolated to nonroad engines on a fuel consumption basis. An emission factor value of 0.00352 grams (g)/mile, corresponding to gasoline non-catalyst engines, was converted to the appropriate activity basis using a fuel economy of 43.6 miles/gallon. This conversion results in an emission factor of 153.47 milligrams (mg)/gallon, which was applied to fuel consumption estimates for 2-stroke and 4-stroke gasoline engines, as well as LPG engines. Similarly, an onroad diesel engine emission factor of 0.00188 g/mile was converted to the appropriate activity basis using a fuel economy of 88.2 miles/gallon. This calculation results in an emission factor of 165.86 mg/gallon, which was applied to fuel consumption estimates for diesel engines. These emission factor values are, in general, consistent with more recent studies on motor vehicle NH_3 emissions.

It should be noted that earlier versions of the inventory erroneously applied these gasoline emission factors to CNG fuel consumption. Although reported as uncompressed gallons in the NONROAD model, the fuel consumption estimates represent a gaseous, not liquid, volume. In addition, during 2003 OTAQ performed a review of NH_3 emission factors as applied to nonroad engines, and developed new recommended emission factor values that will be used for subsequent updated versions of the NEI (Harvey, 2003).

4. Were NONROAD Model Runs Performed for Any Specific States?

Yes, we performed separate runs for California using the May 2002 "Lockdown C" draft version of the NONROAD model. We generated new results for diesel-fueled equipment SCCs to account for a lower diesel fuel sulfur level in California compared to the rest of the nation (i.e., 120 parts per million by volume (ppmv) versus 2,700 ppmv for remaining States). County-to-State ratios were developed and applied in a manner similar to the county-to-national ratios to produce an updated diesel equipment inventory for California. These California results replace the diesel equipment emissions generated from prior application of county-to-national ratios. As described below, however, annual data submitted by California for 1999 replaced the NONROAD model based estimates. Daily emissions estimates for California are still based on the EPA method.

C. WHAT METHODOLOGIES DID WE USE TO DEVELOP THE 1999 NONROAD NEI?

Concurrent with the development of the default 1999 national emission estimates described above, state and local agencies developed and provided emissions inventory data for their areas based on local knowledge and activity information. These State and local agency data generally replaced the national emission estimates when the pollutant, source category, and emission type matched with the national estimates. However, for NONROAD model categories, because we anticipate our default estimates to be of higher quality than estimates made by States using earlier versions of NONROAD or with older EPA guidance, we only used State-submitted data in cases where State or local agencies incorporated local equipment population or activity data into earlier publically-available versions of NONROAD. Alternatively, a State may have used another emission estimation method deemed by EPA to be representative for their State (e.g., California has developed the Off-Road Model).

We accepted and incorporated NONROAD model category data for three States including California, Pennsylvania, and Texas. California provided an annual criteria pollutant inventory for all pollutants, with the exception of NH_3. The inventory provided was a complete replacement for EPA's NONROAD model based inventory, for all counties in California. We did not estimate updated ozone season daily emissions from annual emissions submitted by California.

For Pennsylvania, we used typical summer day emission estimates provided for the recreational marine category, since State-specific equipment populations were used as input for this category for their NONROAD model runs. In addition, we incorporated Pennsylvania's emission estimates for aircraft ground support equipment, since these estimates were developed using the Federal Aviation Administration's (FAA) Emission Dispersion and Modeling System (EDMS), which is the preferred method for this nonroad category. Pennsylvania provided daily emission estimates for all criteria pollutants, except for PM-2.5 and NH_3. We did not estimate updated annual emissions from the daily emissions submitted by Pennsylvania.

Texas provided updated annual and typical summer weekday emission estimates for specific nonroad equipment types. We incorporated revised VOC, NO_x, and CO emission estimates for equipment categories for which input values were replaced with area-specific data for the NONROAD model runs. These categories included construction equipment, oil field equipment, aircraft ground support equipment, and lawn and garden equipment. In addition, we zeroed out emission estimates for specific areas and categories for which Texas indicated no nonroad activity occurred. These included recreational marine vessels, off-road motorcycles, and diesel snowblowers.

For all States, we did not augment the data records submitted with additional pollutant estimates. Appendix A provides summary reports of the NONROAD model data incorporated into the NEI. It should be noted that in converting the EPA-developed and the State-supplied data into NIF Version 3.0, emission estimates that report less than 0.005 tons will have been rounded out to zero, and have been removed from the database. As such, the lack of a daily record for a corresponding annual emissions record does not imply that the daily emissions are necessarily zero, but that the number of significant digits was not enough to be retained in the NIF Version 3.0.

For the 1999 NEI, Version 3, we also made the following revisions to the prior version of the 1999 NEI (Version 2):

- Added NONROAD model criteria pollutant emission estimates for the Territories of Puerto Rico and the Virgin Islands;
- Removed NH_3 emissions for all CNG engines; and
- Added additional data submitted by Texas for specific NONROAD model categories.

We prepared NONROAD model 1999 criteria pollutant emission estimates for the territories of Puerto Rico and the Virgin Islands. Emission estimates were developed using per capita emission factors developed from emission estimates and population for Collier County in Florida [Federal Information Processing Standards (FIPS) 12 021]. The population based emission factors were then applied to 1999 population estimates for Puerto Rico and the Virgin Islands to estimate emissions.

Table 6 provides a summary of how the 1999 NEI was developed for each subsequent version.

D. REFERENCES

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Table 1. Methods Used to Develop Annual Emission Estimates for Nonroad Mobile Sources

(categories included in this report are noted in bold print)

Category	Base Year	Pollutant(s)	Estimation Method*
NONROAD Categories			
Nonroad Gasoline, Diesel, LPG, CNG	**1999**	**VOC, NO_x, CO, SO_2, PM-10, PM-2.5**	**Using emission estimates from two emission inventories including: 1) a 1996 county-level inventory, developed using EPA's October 2001 draft NONROAD model; and 2) an updated 1999 national inventory, based on EPA's draft Lockdown C NONROAD model (dated May 2002). Using the 1996 county-level emission estimates, seasonal and daily county-to-national ratios were then developed for application to updated national estimates per season estimated from the Lockdown C model. Replaced State-submitted data for California for all NONROAD model categories; Pennsylvania for recreational marine and aircraft ground support equipment, and Texas for select equipment categories.**
	1996, 1997, 1998, 2000 & 2001	**VOC, NO_x, CO, SO_2, PM-10, PM-2.5**	**Using emission estimates from two emission inventories including: 1) a 1996 county-level inventory, developed using EPA's October 2001 draft NONROAD model; and 2) updated year-specific national and California inventories, based on EPA's draft Lockdown C NONROAD model (dated May 2002). Using the 1996 county-level emission estimates, seasonal and daily county-to-national ratios and California county-to-state ratios were then developed for application to updated national estimates per season estimated from the Lockdown C model. California results replace the diesel equipment emissions generated from prior application of county-to-national ratios.**
	1991-1995	**VOC, NO_x, CO, SO_2, PM-10, PM-2.5, NH_3**	**Using 1990 and 1996 county-level emissions inventories, estimated emissions using linear interpolation of national emissions between 1990 and 1996. From these emissions, calculated the average annual growth rate for each pollutant/SCC combination for each year, and then applied the growth factors to 1990 county-level emissions to estimate 1991-1995 emissions.**
	1990	**VOC, NO_x, CO, SO_2, PM-10, PM-2.5**	**Using emission estimates from two emission inventories including: 1) a 1996 county-level inventory, developed using EPA's October 2001 draft NONROAD model; and 2) updated 1990 national inventory, based on EPA's draft Lockdown C NONROAD model (dated May 2002). Using the 1996 county-level emission estimates, seasonal and daily county-to-national ratios were then developed for application to updated national estimates per season estimated from the Lockdown C model.**
	1986, 1988, & 1989	**VOC, NO_x, CO, SO_2, PM-10, PM-2.5, NH_3**	**Using 1985 and 1990 county-level emissions inventories, estimated emissions using linear interpolation of national emissions between 1985 and 1990. From these emissions, calculated the average annual growth rate for each pollutant/SCC combination for each year, and then applied the growth factors to 1985 county-level emissions to estimate 1986-1989 emissions.**

Table 1 (continued)

Category	Base Year	Pollutant(s)	Estimation Method*
Nonroad Gasoline, Diesel, LPG, and CNG (Continued)	**1987**	**VOC, NO_x, CO, SO_2, PM-10, PM-2.5**	**Using EPA's draft Lockdown C NONROAD model (dated May 2002), developed updated national emissions for 1987 by running 4 seasonal NONROAD model runs to estimate annual criteria pollutant emissions. Also performed national NONROAD model runs to estimate typical summer weekday emissions.**
	1985	**VOC, NO_x, CO, SO_2, PM-10, PM-2.5**	**Using emission estimates from two emission inventories including: 1) a 1996 county-level inventory, developed using EPA's October 2001 draft NONROAD model; and 2) updated 1985 national inventory, based on EPA's draft Lockdown C NONROAD model (dated May 2002). Using the 1996 county-level emission estimates, seasonal and daily county-to-national ratios were then developed for application to updated national estimates per season estimated from the Lockdown C model.**
	1970, 1975, 1978, & 1980	**VOC, NO_x, CO, SO_2, PM-10, PM-2.5**	**Using EPA's draft Lockdown C NONROAD model (dated May 2002), developed updated national emissions for all years by running 4 seasonal NONROAD model runs to estimate annual criteria pollutant emissions. Also performed national NONROAD model runs to estimate typical summer weekday emissions.**
	1996, 1997, 1998, 1999, 2000, & 2001	**NH_3**	**Obtaining national fuel consumption estimates from the Lockdown C NONROAD model, multiplying by NH_3 emission factors, and distributing to counties using 1996 inventory, based on October 2001 draft NONROAD. NH_3 emissions for California were also recalculated using updated diesel fuel consumption values generated for California-specific runs, and assuming the 1996 county-level distribution.**
	1985 & 1990	**NH_3**	**Obtaining national fuel consumption estimates from the Lockdown C NONROAD model, multiplying by NH_3 emission factors, and distributing to counties using 1996 inventory, based on October 2001 draft NONROAD.**
	1987	**NH_3**	**Obtaining 1987 national fuel consumption estimates from Lockdown C NONROAD model and multiplying by NH_3 emission factors.**
	1970, 1975, 1978, & 1980	**NH_3**	**Obtaining national fuel consumption estimates from the Lockdown C NONROAD model and multiplying by NH_3 emission factors.**
	1990, 1996, & 1999	HAPs	Speciation profiles applied to county VOC and PM estimates. Metal HAPs were calculated using fuel and activity-based emission factors. Some state data were provided and replaced national estimates. (2002)

Table 1 (continued)

Category	Base Year	Pollutant(s)	Estimation Method*
Aircraft			
All Aircraft Categories	2002	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	2001 Estimates carried over (2003)
		HAPs	1999 Estimates carried over (2003)
Commercial Aircraft	1990, 1996, 1999, 2000, & 2001	VOC, NO_x, CO, SO_X	Input landing and take-off (LTO) data into Federal Aviation Administration (FAA) Emissions and Dispersion and Modeling System (EDMS). National emissions were assigned to airports based on airport specific LTO data and BTS GIS data. State data replaced national estimates. (2002)
	1970-1998	VOC, NO_x, CO, SO_X	Estimated emissions for interim years using linear interpolation between available base years. (2003)
	1990, 1996, & 1999	HAPs	Speciation profiles were applied to VOC estimates to get national HAP estimates. State data replaced national estimates. (2002)
General Aviation, Air Taxis	1978, 1987, 1990, 1996, 1999, 2000, & 2001	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Used FAA LTO data and EPA approved emission factors for criteria estimates. Speciation profiles were applied to VOC estimates to get national HAP estimates. State data replaced national estimates. (2002)
	1970-1998	VOC, NO_x, CO, SO_x, PM_{10}, $PM_{2.5}$	Estimated emissions for interim years using linear interpolation between available base years. (2003)
	1990, 1996, & 1999	HAPs	Used FAA LTO data and EPA approved emission factors for criteria estimates. Speciation profiles were applied to VOC estimates to develop national HAP estimates. (2002)
	1990, 1996, & 1999	Pb	Used Department of Energy (DOE) aviation gasoline usage data with lead concentration of aviation gasoline. (2002)
	1996	NH_3	Applied NH_3 emissions factors to 1996 national jet fuel and aviation gasoline consumption estimates.
Military Aircraft	1978, 1987, 1990, 1996, 1999, 2000, & 2001	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Used FAA LTO data and EPA approved emission factors for criteria estimates. Representative HAP profiles were not readily available, therefore HAP estimates were not developed. State data replaced national estimates. (2002)
	1970-1998	VOC, NO_x, CO, SO_x, PM_{10}, $PM_{2.5}$	Estimated emissions for interim years using linear interpolation between available base years. (2003)
Auxiliary Power Units	1985-2001	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Grew 1996 emissions to each year using LTO operations data from the FAA. Estimation methods prior to 1996 reported in EPA, 1998.
Unpaved Airstrips	1985-2001	PM_{10}, $PM_{2.5}$	Grew 1996 emissions to each year using SIC 45-Air Transportation growth factors, consistent with the current draft version of EGAS. Estimation methods prior to 1996 reported in EPA, 1998.
Aircraft Refueling	1985-2001	VOC	Grew 1996 emissions to each year using SIC 45-Air Transportation growth factors, consistent with the current draft version of EGAS. Estimation methods prior to 1996 reported in EPA, 1998.
Commercial Marine Vessel (CMV)			
All CMV Categories	2002	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	2001 Estimates carried over
		HAPs	1999 Estimates carried over
CMV Diesel	1978, 1987, 1990, 1996, 1999, 2000, & 2001	VOC, NO_x, CO, SO_x, PM_{10}, & $PM_{2.5}$,	Used criteria emission estimates in the background document for marine diesel regulations for 2000. Adjusted 2000 criteria emission estimates for other used based on fuel usage. Emissions were disaggregated into port traffic and underway activities. Port emissions were assigned to specific ports based on amount of cargo handled. Underway emissions were allocated based on Army Corp of Engineering waterway data. State data replaced national estimates. (2002)

Table 1 (continued)

Category	Base Year	Pollutant(s)	Estimation Method*
CMV Diesel (continued)	1970-1998	VOC, NO_x, CO, SO_X, PM_{10}, $PM_{2.5}$	Estimated emissions for interim years using linear interpolation between available base years. (2003)
	1990, 1996, 1999	HAPs	VOC and PM emission estimates were speciated into HAP components. State data replaced national estimates. (2002)
	1996	NH_3	Applied NH_3 emissions factors to 1996 distillate and residual fuel oil estimates (i.e., as reported in EIA, 1996).
	1990-1995	NH_3	Estimation methods reported in EPA, 1998.
CMV Steam Powered	1978, 1987, 1990, 1996, 1999, 2000, & 2001	VOC, NO_x, CO, SO_x, PM_{10}, & $PM_{2.5}$	Calculated criteria emissions based on EPA SIP guidance. Emissions were disaggregated into port traffic and under way activities. Port emissions were assigned to specific ports based on amount of cargo handled. Underway emissions were allocated based on Army Corp of Engineering waterway data. State data replaced national estimates. (2002)
	1970-1998	VOC, NO_x, CO, SO_X, PM_{10}, $PM_{2.5}$	Estimated emissions for interim years using linear interpolation between available base years. (2003)
	1990, 1996, & 1999	HAPs	VOC and PM emission estimates were speciated into HAP components. State data replaced national estimates. (2002)
Military Marine	1997-2001	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Applied EGAS growth factors to 1996 emissions estimates for this category.
CMV Coal,[1] CMV, Steam powered, CMV Gasoline[1]	1997-1998	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Applied EGAS growth factors to 1996 emissions estimates for this category.
CM Coal, CMV, Steam powered, CMV Gasoline, Military Marine	1991-1995	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Estimation methods reported in EPA, 1998.
Locomotives			
Class I, Class II, Commuter, Passenger, and Yard Locomotives	1978, 1987, 1990, 1996, 1999, 2000, 2000, & 2002	VOC, NO_x, CO, PM_{10}, $PM_{2.5}$	Criteria pollutants were estimated by using locomotive fuel use data from DOE EIA and available emission factors. County-level estimates were obtained by scaling the national estimates with the rail GIS data from DOT. State data replaced national estimates. (2002)
	1978, 1987, 1990, 1996, 1999, 2000, 2001, & 2002	SO_2	SO_x emissions were calculated by using locomotive fuel use and fuel sulfur concentration data from EIA. County-level estimates were obtained by scaling the national estimates with the county level rail activity data from DOT. State data replaced national estimates. (2002)
	1970-1998	VOC, NO_x, CO, SO_X, PM_{10}, $PM_{2.5}$	Estimated emissions for interim years using linear interpolation between available base years. (2003)
	1990, 1996, 1999, & 2002	HAPs	HAP emissions were calculated by applying speciation profiles to VOC and PM estimates. County-level estimates were obtained by scaling the national estimates with the county level rail activity from DOT. State data replaced national estimates. (2002)
	1997-1998	NH_3	Grew 1996 base year emissions using EGAS growth indicators.
	1996	NH_3	Applied NH_3 emissions factors to diesel consumption estimates for 1996.
	1990-1995	NH_3	Estimation methods reported in EPA, 1998.

Notes:
* Dates included at the end of Estimation Method represent the year that the section was revised.
[1] National Emission estimates for CMV Coal and CMV Gasoline were not developed though states and local agencies may have submitted estimates for these source categories.
EPA, 1998. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Emission Factors and Inventory Group, *National Air Pollutant Emission Trends, Procedures Document*, 1900–1996, EPA-454/R-98-008. May 1998.

Table 2. Seasonal RVP Values Modeled for 1996 NONROAD Model Runs

State	FIPS State Code	Seasonal RVP (psi)			
		Winter	Spring	Summer	Autumn
AL	01	12.4	9.3	7.5	8.8
AK	02	14.1	13.7	13.0	13.7
AZ	04	8.2	7.1	6.8	6.9
AR	05	13.7	9.5	6.8	10.1
CA (Los Angeles Region)	06	11.9	9.3	6.9	7.6
CA (San Francisco Region)	06	11.7	10.8	6.9	7.6
CO	08	12.5	10.1	7.8	9.4
CT	09	13.0	9.8	7.9	9.8
DE	10	13.5	10.0	7.9	9.0
DC	11	12.0	8.1	7.0	8.1
FL	12	11.8	7.4	7.4	7.4
GA	13	12.4	9.3	7.4	8.7
HI	15	10.0	10.0	9.8	10.0
ID	16	12.8	10.4	8.6	9.1
IL	17	14.1	10.2	7.8	9.0
IN	18	14.5	10.9	8.8	9.8
IA	19	14.9	11.2	9.0	11.2
KS	20	12.7	8.9	7.6	8.2
KY	21	13.4	9.5	8.4	9.5
LA	22	12.4	9.4	7.6	8.9
ME	23	13.2	10.3	9.0	10.3
MD	24	13.2	9.7	7.5	8.6
MA	25	12.9	9.7	7.8	9.7
MI	26	14.1	9.9	7.4	9.9
MN	27	14.9	11.4	9.0	10.4
MS	28	13.7	9.5	7.1	8.8
MO	29	12.6	10.0	7.2	9.4
MT	30	13.8	10.4	8.7	10.4
NE	31	13.9	10.6	8.6	9.2
NV	32	9.6	8.0	7.6	7.8
NH	33	12.9	9.7	7.8	9.7
NJ	34	13.7	10.5	8.8	10.5
NM	35	11.7	9.2	7.8	9.0

Table 2 (continued)

State	FIPS State Code	Seasonal RVP (psi) Winter	Spring	Summer	Autumn
NY	36	14.3	10.9	8.8	10.9
NC	37	12.4	10.3	7.4	9.7
ND	38	14.9	11.9	9.0	11.2
OH	39	14.6	11.0	8.7	9.8
OK	40	13.9	9.1	7.2	8.2
OR	41	12.3	9.8	7.7	8.7
PA	42	14.4	10.9	8.8	10.9
RI	44	12.9	9.7	7.8	9.7
SC	45	12.4	10.3	7.4	9.7
SD	46	14.4	11.2	9.0	9.9
TN	47	12.7	10.4	7.3	9.8
TX	48	12.2	9.7	7.8	8.7
UT	49	12.5	10.6	7.8	9.4
VT	50	14.9	11.4	9.0	11.4
VA	51	11.8	8.2	7.2	8.2
WA	53	14.0	10.6	8.5	9.5
WV	54	14.6	11.0	8.8	9.9
WI	55	14.6	11.1	9.0	10.1
WY	56	13.0	10.4	8.8	9.3
CA	57	11.7	10.8	6.9	7.6

Note: For areas receiving reformulated gasoline May through September, RVP values were modeled in place of the values shown here.

Table 3. Counties Modeled with Federal Reformulated Gasoline

State (American Society for Testing and Materials (ASTM) Class)/ Nonattainment Area	County
Arizona (B)	
Phoenix	
	Maricopa Co
Connecticut (C)	
Greater Connecticut	
	Hartford Co
	Litchfield Co
	Middlesex Co
	New Haven Co
	New London Co
	Tolland Co
	Windham Co
New York-Northern New Jersey-Long Island	
	Fairfield Co
District of Columbia (B)	
Washington DC	
	Washington
Delaware (C)	
Philadelphia-Wilmington-Trenton	
	Kent Co
	New Castle Co
Sussex County	
	Sussex Co
Illinois (C)	
Chicago-Gary-Lake County	
	Cook Co
	Du Page Co
	Grundy Co
	Kane Co
	Kendall Co
	Lake Co
	McHenry Co
	Will Co
Indiana (C)	
Chicago-Gary-Lake County	
	Lake Co
	Porter Co
Kentucky (C)	
Cincinnati-Hamilton	
	Boone Co
	Campbell Co
	Kenton Co
Louisville	
	Bullitt Co
	Jefferson Co
	Oldham Co

State (ASTM Class)/ Nonattainment Area	County
Maine (C)	
Knox & Lincoln Counties	
	Knox Co
	Lincoln Co
Lewiston-Auburn	
	Androscoggin Co
	Kennebec Co
Portland	
	Cumberland Co
	Sagadahoc Co
	York Co
Maryland (B)	
Baltimore	
	Anne Arundel Co
	Baltimore
	Baltimore Co
	Carroll Co
	Harford Co
	Howard Co
Kent & Queen Annes Counties	
	Kent Co
	Queen Annes Co
Philadelphia-Wilmington-Trenton	
	Cecil Co
Washington DC	
	Calvert Co
	Charles Co
	Frederick Co
	Montgomery Co
	Prince Georges Co
Massachusetts (C)	
Boston-Lawrence-Worcester-Eastern MA	
	Barnstable Co
	Bristol Co
	Dukes Co
	Essex Co
	Middlesex Co
	Nantucket Co
	Norfolk Co
	Plymouth Co
	Suffolk Co
	Worcester Co
Springfield/Pittsfield-Western MA	
	Berkshire Co
	Franklin Co
	Hampden Co
	Hampshire Co

Table 3 (continued)

State (American Society for Testing and Materials (ASTM) Class)/ Nonattainment Area	County
New Hampshire (C)	
Manchester	
	Hillsborough Co
	Merrimack Co
Portsmouth-Dover-Rochester	
	Rockingham Co
	Strafford Co
New Jersey (C)	
Allentown-Bethlehem-Easton	
	Warren Co
Atlantic City	
	Atlantic Co
	Cape May Co
New York-Northern New Jersey-Long Island	
	Bergen Co
	Essex Co
	Hudson Co
	Hunterdon Co
	Middlesex Co
	Monmouth Co
	Morris Co
	Ocean Co
	Passaic Co
	Somerset Co
	Sussex Co
	Union Co
Philadelphia-Wilmington-Trenton	
	Burlington Co
	Camden Co
	Cumberland Co
	Gloucester Co
	Mercer Co
	Salem Co
New York (C)	
New York-Northern New Jersey-Long Island	
	Bronx Co
	Kings Co
	Nassau Co
	New York Co
	Orange Co
	Queens Co
	Richmond Co
	Rockland Co
	Suffolk Co
	Westchester Co

State (ASTM Class)/ Nonattainment Area	County
New York (C)	
Poughkeepsie	
	Dutchess Co
	Putnam Co
Pennsylvania (C)	
Philadelphia-Wilmington-Trenton	
	Bucks Co
	Chester Co
	Delaware Co
	Montgomery Co
	Philadelphia Co
Rhode Island (C)	
Providence	
	Bristol Co
	Kent Co
	Newport Co
	Providence Co
	Washington Co
Texas (B)	
Dallas-Fort Worth	
	Collin Co
	Dallas Co
	Denton Co
	Tarrant Co
Houston-Galveston-Brazoria	
	Brazoria Co
	Chambers Co
	Fort Bend Co
	Galveston Co
	Harris Co
	Liberty Co
	Montgomery Co
	Waller Co
Virginia (B)	
Norfolk-Virginia Beach-Newport News	
	Chesapeake
	Hampton
	James City Co
	Newport News
	Norfolk
	Poquoson
	Portsmouth
	Suffolk
	Virginia Beach
	Williamsburg
	York Co

Table 3 (continued)

State (American Society for Testing and Materials (ASTM) Class)/ Nonattainment Area	County	State (ASTM Class)/ Nonattainment Area	County
Virginia (B)		Wisconsin (C)	
Richmond-Petersburg		Milwaukee-Racine	
	Charles City Co		Kenosha Co
	Chesterfield Co		Milwaukee Co
	Colonial Heights		Ozaukee Co
	Hanover Co		Racine Co
	Henrico Co		Washington Co
	Hopewell		Waukesha Co
	Richmond		
Washington DC			
	Alexandria		
	Arlington Co		
	Fairfax		
	Fairfax Co		
	Falls Church		
	Loudoun Co		
	Manassas		
	Manassas Park		
	Prince William Co		
	Stafford Co		

NOTE: California reformulated gasoline was modeled statewide in California.

Table 4. Oxygenated Fuel Modeling Parameters

		Market Shares (%)		Oxygen Content (%)		Oxygenated
State	**County**	**MTBE**	**Alcohol Blends**	**MTBE**	**Alcohol Blends**	**Fuel Season**
Alaska	Anchorage Ed	0	100	2.7	2.0	NOV-FEB (2007 & 2030)
Alaska	Anchorage Ed	0	100	2.7	2.0	NOV-DEC (1996 only)
Arizona	Maricopa Co	80	20	2.7	2.0	OCT-FEB
Colorado	Adams Co	75	25	2.7	2.0	NOV-FEB
Colorado	Arapahoe Co	75	25	2.7	2.0	NOV-FEB
Colorado	Boulder Co	75	25	2.7	2.0	NOV-FEB
Colorado	Douglas Co	75	25	2.7	2.0	NOV-FEB
Colorado	Jefferson Co	75	25	2.7	2.0	NOV-FEB
Colorado	Denver Co	75	25	2.7	2.0	NOV-FEB
Colorado	El Paso Co	75	25	2.7	2.0	NOV-FEB
Colorado	Larimer Co	75	25	2.7	2.0	NOV-FEB
Connecticut	Fairfield Co	90	10	2.7	2.0	NOV-FEB
Minnesota	Anoka Co	10	90	2.7	2.0	OCT-JAN
Minnesota	Carver Co	10	90	2.7	2.0	OCT-JAN
Minnesota	Dakota Co	10	90	2.7	2.0	OCT-JAN
Minnesota	Hennepin Co	10	90	2.7	2.0	OCT-JAN
Minnesota	Ramsey Co	10	90	2.7	2.0	OCT-JAN
Minnesota	Scott Co	10	90	2.7	2.0	OCT-JAN
Minnesota	Washington Co	10	90	2.7	2.0	OCT-JAN
Minnesota	Wright Co	10	90	2.7	2.0	OCT-JAN
Minnesota	Chisago Co	10	90	2.7	2.0	OCT-JAN
Minnesota	Isanti Co	10	90	2.7	2.0	OCT-JAN
Montana	Missoula Co	0	100	2.7	2.0	NOV-FEB
Nevada	Clark Co	0	100	2.7	2.0	OCT-MAR
Nevada	Washoe Co	95	5	2.7	2.0	OCT-JAN
New Jersey	Bergen Co	95	5	2.7	2.0	NOV-FEB
New Jersey	Essex Co	95	5	2.7	2.0	NOV-FEB
New Jersey	Hudson Co	95	5	2.7	2.0	NOV-FEB
New Jersey	Hunterdon Co	95	5	2.7	2.0	NOV-FEB
New Jersey	Mercer Co	95	5	2.7	2.0	JAN-FEB (1996 only)
New Jersey	Middlesex Co	95	5	2.7	2.0	NOV-FEB
New Jersey	Monmouth Co	95	5	2.7	2.0	NOV-FEB
New Jersey	Morris Co	95	5	2.7	2.0	NOV-FEB
New Jersey	Ocean Co	95	5	2.7	2.0	NOV-FEB
New Jersey	Passaic Co	95	5	2.7	2.0	NOV-FEB
New Jersey	Somerset Co	95	5	2.7	2.0	NOV-FEB
New Jersey	Sussex Co	95	5	2.7	2.0	NOV-FEB
New Jersey	Union Co	95	5	2.7	2.0	NOV-FEB
New Mexico	Bernalillo Co	15	85	2.7	2.0	JAN-FEB (1996 only)
New York	Bronx Co	95	5	2.7	2.0	NOV-FEB
New York	Kings Co	95	5	2.7	2.0	NOV-FEB
New York	Nassau Co	95	5	2.7	2.0	NOV-FEB

Table 4 (continued)

State	County	Market Shares (%) MTBE	Market Shares (%) Alcohol Blends	Oxygen Content (%) MTBE	Oxygen Content (%) Alcohol Blends	Oxygenated Fuel Season
New York	New York Co	95	5	2.7	2.0	NOV-FEB
New York	Queens Co	95	5	2.7	2.0	NOV-FEB
New York	Richmond Co	95	5	2.7	2.0	NOV-FEB
New York	Rockland Co	95	5	2.7	2.0	NOV-FEB
New York	Suffolk Co	95	5	2.7	2.0	NOV-FEB
New York	Westchester Co	95	5	2.7	2.0	NOV-FEB
New York	Orange Co	95	5	2.7	2.0	NOV-FEB
New York	Putnam Co	95	5	2.7	2.0	NOV-FEB
Oregon	Clackamas Co	1	99	2.7	2.0	NOV-FEB
Oregon	Jackson Co	1	99	2.7	2.0	NOV-FEB
Oregon	Multnomah Co	1	99	2.7	2.0	NOV-FEB
Oregon	Washington Co	1	99	2.7	2.0	NOV-FEB
Oregon	Josephine Co	1	99	2.7	2.0	NOV-FEB
Oregon	Klamath Co	1	99	2.7	2.0	NOV-FEB
Oregon	Yamhill Co	1	99	2.7	2.0	NOV-FEB
Texas	El Paso Co	15	85	2.7	2.0	NOV-FEB
Utah	Utah Co	20	80	2.7	2.0	NOV-FEB
Washington	Clark Co	1	99	2.7	2.0	NOV-FEB
Washington	King Co	1	99	2.7	2.0	JAN-FEB (1996 only)
Washington	Snohomish Co	1	99	2.7	2.0	JAN-FEB (1996 only)
Washington	Spokane Co	1	99	2.7	2.0	SEP-FEB
Wisconsin	St. Croix Co	10	90	2.7	2.0	OCT-JAN

Table 5. Summary of Input Values for National NONROAD Model Runs

Season	Input	Value: 1970, 1975, 1980, and 1985	Value: 1987	Value: 1990	Value: 1996-2001
Summer	RVP (psi)	11.0	10.5	8.8	8.1
Fall & Spring	RVP (psi)	11.9	11.5	10.1	9.7
Winter	RVP (psi)	13.7	13.5	12.8	13.1
All Seasons	Diesel Fuel Sulfur (ppmv)	2,500	2,500	2,500	2,700'

'Sulfur value corresponds to national input value. For California-specific runs, a value of 120 ppm was used

Table 6. Methods for Developing Versions 1 through 3 of the 1999 National Emissions Inventory

For version	For the category	For the pollutant(s)	EPA estimated emissions by
Version 1			
	Nonroad Gasoline, Diesel, LPG and CNG	VOC, NO_x, CO, SO_2, PM-10, PM-2.5	Calculating SCC-specific ratios (at the 10-digit SCC level) using updated, national 1999 annual and typical summer day emission estimates (based on June 2000 draft NONROAD model) divided by the previous 1996 national values (based on April 1999 draft NONROAD model). County-level emissions were calculated by multiplying each record in the existing 1996 inventory by the appropriate ratio for each SCC. Performed separate State-level run for California diesel equipment, to reflect lower diesel fuel sulfur content. Calculated SCC-specific ratios by dividing the updated 1999 California results by the previous 1996 results developed for diesel at the State level. These ratios were applied to existing 1996 county-level records for California.
	Nonroad Gasoline & Diesel	NH_3	Normalizing 1996 county, SCC-level fuel consumption values based on the April 1999 draft NONROAD model to equal new 1999 national fuel consumption from the June 2000 draft NONROAD model. Multiplied fuel consumption by emission factor of 165.86 mg/gallon for diesel engines, and 153.47 mg/gallon for gasoline engines. No NH_3 emissions were developed for LPG-fueled equipment, since fuel consumption estimates were not available.
Version 1.5			
	Nonroad Gasoline, Diesel, LPG and CNG	VOC, NO_x, CO, SO_2, PM-10, PM-2.5	Calculating SCC-specific ratios (at the 10-digit SCC level) using updated, national 1999 annual and typical summer day emission estimates (based on December 2000 "Final Finding" NONROAD model) divided by the previous 1996 national values (based on June 2000 NONROAD model). County-level emissions were calculated by multiplying each record in the existing 1996 inventory by the appropriate ratio for each SCC. Performed separate State-level run for California diesel equipment, to reflect lower diesel fuel sulfur content. Calculated SCC-specific ratios by dividing the updated 1999 California results by the previous 1996 results developed for diesel at the State level. These ratios were applied to existing 1996 county-level records for California.
Nonroad Gasoline & Diesel		NH_3	Normalizing 1996 county, SCC-level fuel consumption values based on the June 2000 NONROAD model to equal new 1999 national fuel consumption from the December 2000 "Final Finding" NONROAD model. Multiplied fuel consumption by emission factor of 165.86 mg/gallon for diesel engines, and 153.47 mg/gallon for gasoline engines. No NH_3 emissions were developed for LPG-fueled equipment, since fuel consumption estimates were not available.

Table 6 (continued)

For version	For the category	For the pollutant(s)	EPA estimated emissions by
Version 2			
	Nonroad Gasoline, Diesel, LPG and CNG	VOC, NO_x, CO, SO_2, PM-10, PM-2.5	Using emission estimates from two emission inventories including: 1) a 1996 county-level inventory, developed using EPA's October 2001 draft NONROAD model; and 2) an updated 1999 national inventory, based on EPA's draft Lockdown C NONROAD model (dated May 2002). Using the 1996 county-level emission estimates, seasonal and daily county-to-national ratios were then developed for application to updated national estimates per season estimated from the Lockdown C model. Replaced State-submitted data for California for all NONROAD model categories; Pennsylvania for recreational marine and aircraft ground support equipment, and Texas for select equipment categories.
	Nonroad Gasoline, Diesel, LPG and CNG	NH_3	Obtaining national fuel consumption estimates from the Lockdown C NONROAD model, multiplying by NH_3 emission factors, and distributing to counties using 1996 inventory, based on October 2001 draft NONROAD.
Version 3			
	Nonroad Gasoline, Diesel, LPG and CNG	VOC, NO_x, CO, SO_2, PM-10, PM-2.5	Using same procedures as for the 1999 NEI Version 2, but added emission estimates for the territories of Puerto Rico and Virgin Islands, and added additional statewide data for Texas for select equipment categories.
	Nonroad Gasoline, Diesel & LPG	NH_3	Using same procedures as for the 1999 NEI Version 2, but removed NH_3 emission estimates from CNG-fueled engines.

APPENDIX A

NONROAD MODEL S/L/T DATABASE SUMMARY REPORTS

State: California

State/Local Agency Name: California Air Resources Board

Contact Name, Address, Phone Number, Email:

Andy Alexis
California Air Resources Board
(916) 323-1085
aalexis@arb.ca.gov

Counties Included/Number in State: 58 out of 58

Inventory Year: 1999

Inventory Type - Criteria, toxics, both: Criteria - Annual (Emission Type = 30)
VOC, NOx, CO, SOX, and PM10-PRI and PM-25-PRI

General Comments on File, if any:
Daily emissions were not provided, therefore used Lockdown C NONROAD model daily emissions (Emission Type 29) for California. Changes to EM Table included:

1. Changed SOX to SO2.

2. Rounded all emission values to 2 places to right of decimal, which created records with zero emissions.

3. Rule Effectiveness and Rule Penetration values changed to percentages to comply with NIF 2.0. Where rule effectiveness was null, changed to default of 100%.

State: Pennsylvania

State/Local Agency Name: Pennsylvania DEP

Contact Name, Address, Phone Number, Email:

Robert Altenburg
Pennsylvania DEP
717-787-9495
raltenburg@state.pa.us

Counties Included/Number in State: 67 out of 67

Inventory Year: 1999

Inventory Type - Criteria, toxics, both: Criteria - Daily (Emission Type = 28)
VOC, NOx, CO, SOX, and PM

General Comments on File, if any:

No annual emissions provided, therefore used Lockdown C NONROAD model annual emissions (Emission Type 30) for these SCCs. Changes to EM Table included:

1. Changed PM to PM10-PRI for above SCCs.

2. Changed SOX to SO2, changed NOx to NOX.

3. Rounded all emission values to 2 places to right of decimal, which created records with zero emissions.

4. Rule Effectiveness and Rule Penetration values changed to percentages to comply with NIF 2.0. Where rule effectiveness was null, changed to default of 100%.

State: Texas

State/Local Agency Name: Texas Commission on Environmental Quality (TCEQ)

Contact Name, Address, Phone Number, Email:

Melinda Torres
TCEQ
(512) 239-0058

Counties Included/Number in State: 254 out of 254

Inventory Year: 1999

Inventory Type - Criteria, toxics, both: Criteria - Annual and Daily (Emission Types = 30, 27) VOC, NOx, and CO

General Comments on File, if any:
EPA did not augment the data to add the remaining criteria pollutants. Changes to EM Table included:

1. Rounded all emission values to 2 places to right of decimal, which created records with zero emissions.

2. Rule Effectiveness and Rule Penetration values changed to percentages to comply with NIF 2.0. Where rule effectiveness was null, changed to default of 100%.

United States Environmental Protection Agency	Office of Air Quality Planning and Standards Air Quality Assessment Division Research Triangle Park, NC	Publication No. EPA-454/B-20-019 September 2003