

# SECTION 1.0

## INTRODUCTION

The Emission Factors and Inventory Group (EFIG) of the U.S. Environmental Protection Agency (EPA) is responsible for compiling and maintaining national emission data for the criteria pollutants. To that end, EFIG produces estimates of the annual national air pollutant emissions for six major pollutants: carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), lead (Pb), particulate matter less than 10 microns (PM-10), sulfur dioxide (SO<sub>2</sub>), and volatile organic compounds (VOC). In addition, total particulate matter (TSP) has been estimated in the past. For the years 1990-1996, particulate matter less than 2.5 microns (PM-2.5) and ammonia (NH<sub>3</sub>) have also been estimated. These estimates are published annually in two EPA reports and are entitled for 1997, “National Air Pollutant Emission Trends, 1900-1996,”<sup>1</sup> and “National Air Quality and Emission Trends Report, 1996.”<sup>2</sup> Collectively, these are known as the *Trends Reports*.

The 1997 *Trends Procedures Document* is an accompanying document designed to describe the methodology and procedures used to create the emission estimates presented in the 1997 *Trends Reports*. The emission estimating methodologies fall into five major categories: 1900-1939 Methodology, 1940-1984 Methodology, 1985-1989 Methodology, 1990-1996 Methodology, and 1997-2010 Methodology. The methodology used to make specific estimates depends on the pollutant and the time period. Table 1-1 presents a detailed characterization of the emission estimates created using each of these five methodologies and the section of this report that describes the methodology.

In general, the SO<sub>2</sub>, NO<sub>x</sub>, and VOC emissions for the time period before 1940 were using the 1900-1939 methodology. The emissions of no other pollutants were estimated for these years.

The 1940-1984 methodology was originally developed specifically to make the emission estimates for all years and pollutants presented in the *Trends Reports*. For the 1997 *Trends* report, this methodology was generally used to estimate the emissions for the years from 1940 to 1984. In addition to SO<sub>2</sub>, NO<sub>x</sub>, and VOC emissions, the emissions of CO, Pb, PM-10, and TSP are estimated by this methodology.

The emissions for the years from 1985 to 1989 were estimated by the methodology underlying a new emission inventory, the Interim Inventory.<sup>3</sup> This methodology was applied to the emission estimates for all pollutants, except Pb and TSP. The emissions of these pollutants are estimated using the 1940-1984 methodology. (TSP estimates were last developed for the 1992 emissions. Currently there is no plan to estimate TSP emissions in the future since the current National Air Quality Standards for particulate matter are for the size 10 microns or less.)

The emissions for the year 1990 are based on State-submitted data. The 1991-1996 emissions for non-utility point and area sources are based on economic growth [Bureau of Economic Analysis (BEA) or State Energy Data System (SEDS)] data and the Clean Air Act Amendments of 1990 (CAAA) controls. The remaining sources were estimated using modifications/updates to the Interim Inventory Methodology.

For each methodology, the procedures used to estimate the emissions are described by the source category divisions most appropriate for that methodology. For a given source category, the estimating procedure is described for all pollutants collectively, unless differences exist in the methods used for different pollutants. In this case, the methods used for each pollutant are described separately. Because of the unique nature of the methodology used to estimate the lead emissions, this methodology is described in section 5. This allows each section of the manual to be used independently.

Section 6 presents the methodology used to develop the emission projections for the years 1999, 2000, 2002, 2005, 2007, 2008, and 2010.

Emission estimates presented in the 1997 *Trends* Reports are categorized using the Tier structure. Emissions derived by the 1900-1939 methodology are presented by the Tier I categories. All other emissions appear by the Tier III categories. Because the methodologies are not necessarily described by these Tier categories, a description of the correspondence between the source categories used to describe the estimating methodology and the Tier structure is included in each section of this document.

This document is best used as a reference for those personnel who already have some familiarity with the trends report production process or for a technical person inquiring about the origins of the estimates. Some details of procedures are vaguely or inadequately defined, since getting such details down on paper and keeping the document current, is a real challenge. A new person who takes over responsibility for this work will in general need help from an experienced person.

In the past, the emission estimates presented in the *Trends* reports would change from one year to the next based on the development of new information, data, or methodologies used to estimate the emissions. These changes were applied not only to the most recent year, but to all or some of the preceding years. As of 1997, no such changes are planned to be made to the emissions for the years prior to 1985. Therefore, the methodologies and reference presented in this document for the determination of the emission for these years will not change. Updates may be made, however, to the emissions for the years 1985 to the current year of the report. Any changes in the data or methodologies used to estimate the emissions for this time period will be documented in yearly addenda to this procedures document.

## 1.1 REFERENCES

1. *National Air Pollutant Emission Trends, 1900-1996*. EPA-454/R-97-011. U.S. Environmental Protection Agency, Research Triangle Park, NC. December 1997.
2. *National Air Quality Emissions Trends Report, 1996*. U.S. Environmental Protection Agency, Research Triangle Park, NC. October 1997.
3. *Regional Interim Emission Inventories (1987-1991), Volume I: Development Methodologies*. EPA-454/R-93-021a. Source Receptor Analysis Branch, U.S. Environmental Protection Agency, Research Triangle Park, NC. May 1993.

**Table 1-1. Estimating Methods Used in the 1997 Trends Report**

<b>Tier Category</b>	<b>Time Period</b>	<b>Pollutant(s)</b>	<b>Methodology</b>	<b>Section</b>	
Fuel Combustion - Electric Utilities Fuel Combustion - Industrial Fuel Combustion - Other Chemical & Allied Product Mfg. Metals Processing Petroleum & Related Industries Other Industrial Processes Solvent Utilization Storage & Transport Waste Disposal & Recycling Natural Sources Miscellaneous	1900-1969, excluding 1940, 1950, and 1960	VOC, SO <sub>2</sub> , and NO <sub>x</sub>	1900-1939 Methodology	2	
	1940, 1950, and 1960 and 1970 through 1984	VOC, SO <sub>2</sub> , NO <sub>x</sub> , CO, and PM-10	1940-1984 Methodology	3	
		Pb	Lead Methodology	5	
	1985 through 1989 and 1990 through 1996	VOC, SO <sub>2</sub> , NO <sub>x</sub> , CO, and PM-10	1985-1989 Methodology	4	
		VOC, SO <sub>2</sub> , NO <sub>x</sub> , CO, PM-10, PM-2.5, and NH <sub>3</sub>	1990-1996 Methodology	4	
		Pb	Lead Methodology	5	
	1999, 2000, 2002, 2005, 2007, 2008, 2010	VOC, SO <sub>2</sub> , NO <sub>x</sub> , CO, and PM-10	Projection Methodology	6	
	On-road Vehicles Non-road Sources	1900-1939	VOC, SO <sub>2</sub> , NO <sub>x</sub>	1900-1939 Methodology	2
		1940 through 1969	VOC, SO <sub>2</sub> , NO <sub>x</sub> , CO, and PM-10	1940-1984 Methodology	3
			Pb	Lead Methodology	5
1970 through 1993		VOC, SO <sub>2</sub> , NO <sub>x</sub> , CO, and PM-10	1985-1993 Methodology	4	
		PM-2.5 and NH <sub>3</sub>	1990-1996 Methodology	4	
		Pb	Lead Methodology	5	
1999, 2000, 2002, 2005, 2007, 2008, 2010		VOC, SO <sub>2</sub> , NO <sub>x</sub> , CO, and PM-10	Projection Methodology	6	

NOTE(S): SO<sub>2</sub>, VOC, and NO<sub>x</sub> estimated 1900-1996.  
CO, PM-10 estimated 1940-1996.  
Lead estimated 1970-1996.  
PM-10 fugitive Dust estimated 1985-1996.  
PM-2.5 and NH<sub>3</sub> estimated 1990-1996.