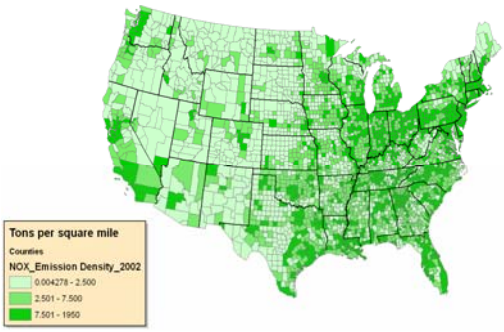
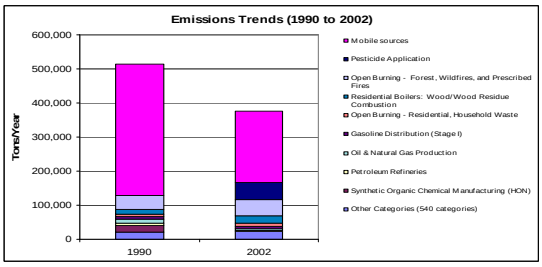
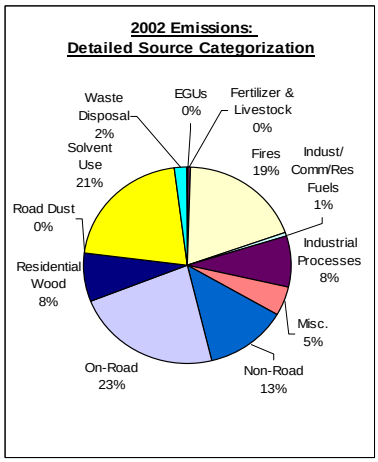


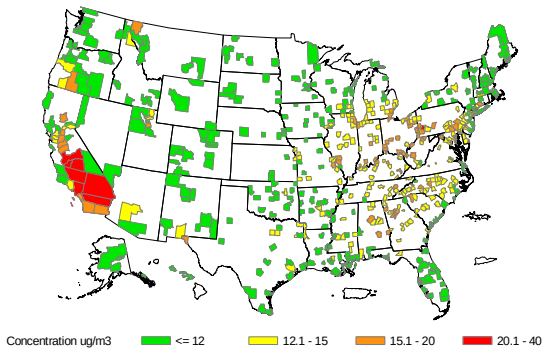
Benzene



2002 National Emissions Inventory Booklet

Volatile Organic Compounds





Ambient 2002 PM2.5 by County

2002 Air Quality Emissions Data Analysis Booklet

Introduction

The United States Environmental Protection Agency (EPA) has completed the National Emission Inventory (NEI) for 2002. This booklet contains analysis of the 2002 NEI and comparisons with 1990 emissions levels. The 2002 NEI is the most comprehensive emissions inventory available and includes data submitted by State, Local, and Tribal Air Pollution Control Agencies (S/L/Ts) as well as information collected from other sources. This analysis focuses upon emissions that are or could be harmful to people including a set of principal criteria air pollutants (CAPs) and air toxics. These CAPs include carbon monoxide (CO), lead (Pb), directly emitted particulate matter ($PM_{2.5}$ and PM_{10}) and precursors to ozone (O_3) and particulate matter, including volatile organic compounds (VOCs), nitrogen oxides (NOx), sulfur dioxide (SO_2), and ammonia (NH_3). Air toxic compounds that have been determined to be hazardous air pollutants (HAPs) are addressed in this booklet including forty of the most toxic and/or pervasive of these pollutants. The analyses contained in this booklet are based upon the 2002 NEI version 1. The NEI Version 1 is the initial version of the NEI made available to the public and this version will be subjected to further updates. These estimates do not reflect emission changes relating to ongoing regulatory projects such as the Lead National Ambient Air Quality Standard (NAAQS) or the Risk and Technology Review (RTR).

Multi-pollutant View of Criteria and Hazardous Air Pollutants

It is useful to assess air pollution from a multi-pollutant standpoint since air emissions are frequently emitted from sources in combinations into the environment. There is also the potential for sector based strategies to provide multi-pollutant emission reductions. Using a multi-pollutant view that evaluates a number of different air pollutants, we conducted an assessment of related CAP and HAP pollutants for the 2002 NEI. We focused on CAPs and HAPs that are emitted as precursors to ozone and $PM_{2.5,}$ or emitted in conjunction with direct $PM_{2.5,}$ or are identified to be high risk HAPs. High risk HAPs are defined as those air pollutants that have been identified as suspected of causing cancer or other serious health problems by the 1999 National Scale Air Toxic Assessment (NATA) or the list of 33 HAPs identified as urban area source HAPs (64FR 38706, July 19,1999 as required by Clean Air act Sections 112(c)(3) and 112K). We found that the sources of emissions related to $PM_{2.5}$ and ozone may be categorized into 12 major sectors that include:

Electric generating units (EGUs),
Fertilizer and livestock (Fertil&Livest),
Prescribed and wild fires (Fires),
Industrial, commercial, and residential fossil fuel sources (I/C/R_Fossil),
Industrial processes (Indust_Proc),
On-road mobile sources (On_Road),
Solvent usage (SolventUse)
Non-road mobile sources (Non_Road),
Residential wood combustion (ResidWood),
Paved and unpaved road dust (Road_Dust),
Waste disposal
Miscellaneous (Misc.), and

Eleven of these broad source categories account for the majority of emissions for the CAPs and HAPs evaluated. All other sources for individual pollutants were combined into a Miscellaneous Category (Misc). This Miscellaneous category accounts for five percent or less of total emissions for most pollutants with notable exceptions such as $PM_{2.5}$ and $PM_{10.}$ Appendix A. shows these 12 categories expanded into a more descriptive grouping of 42 source sector categories. The emissions for each of the 12 categories listed are summarized based on 6,000 Source Classification Codes (SCCs) used in the NEI to describe sources and emission processes and include mobile sources and fires, as well as the more traditionally regulated industries and commercial categories. With the exception of forest wildfires, the emission sources in the 2002 NEI represent man-made or anthropogenic sources. Biogenic sources or natural sources of emissions are significant contributors of VOCs. However, due to the strong influence of physical ambient conditions on emissions rates and the episodic nature of these biogenic emissions, estimates are not generated on an annual basis for the NEI. Rather biogenic emissions are estimated when modeling specific air-quality episodes.

Figures 1, 2, and 3 reflect source sector contributions to 2002 emissions for key pollutants - CAPs and HAPs. Source categories contributing to ambient $PM_{2.5}$ including directly emitted Primary $PM_{2.5}$ (PM25-PRI) and 'Risk Driver' HAP emissions, CAP precursors (NOx, $SO_{2,}$ VOC, and NH_3) and related HAPs precursors are shown on Figure 1. On Figure 2, categories that contribute criteria-pollutant emissions that are ozone precursors and related HAPs are depicted. Figure 3 combines all ozone and PM precursors, directly emitted $PM_{2.5,}$ and the 40 HAPs. A review of these figures indicates the sectors that are contributing to multiple CAPs and HAPs, and also shows that some CAP and HAP emissions are dominated by a single sector while others are associated with many sector sources. For example, NH_3 emissions are dominated by fertilizer and livestock emissions, while primary $PM_{2.5}$ has multiple sources.

These figures demonstrate the potential for sector-based strategies to provide multi-pollutant benefits. For the purpose of this booklet, multi-pollutant programs are those where programs to reduce emissions in one sector may reduce other pollutants and have a positive benefit on other pollutant programs. Multi-pollutant assessment programs may include reviews by source sector or geographic area to reveal where emissions reductions for one pollutant e.g., PM or Ozone precursors can also provide benefits for air toxics and vice-versa. To help illustrate the multi-pollutant relationships, the graphs group the pollutants to show those HAPs that have been associated to date with the PM and Ozone. This is important since emission changes targeted for PM or Ozone may also affect HAPs within the PM- or Ozone-related groupings.

These graphs provide an overview of the sector contributions. While this analysis is national in scope, the emissions footprint for a particular local geographic area may vary from national averages. It is also relevant to note that in many cases the HAP emissions are relatively small in mass in comparison to the magnitude of PM or VOC emissions. Even though HAPs are small in mass, their toxicity makes them of concern. In Figure 1, the associated HAPs are listed in descending order of overall emissions. Table 1 presents the 2002 emissions as reported in total tons per year for each of these pollutants.

In addition to the sector-based multi-pollutant view, more detailed pollutant analyses are also provided for this set of pollutants in the remainder of this report. These pollutant analyses are also national in scope. For each pollutant, 2002 emissions and sources contributions, the spatial distribution of 2002 emissions, and comparisons of the 1990 to 2002 emissions are shown. These figures allow one to see how emissions are changing over time and the geographical distribution of emissions in 2002. For selected pollutants, ambient monitoring information is also presented. A finer level of source sector contribution detail is provided for the HAPs in the section of the booklet. Where relevant, reasons for large changes in emissions between 2002 and 1990 including emission inventory methodology changes and the impacts of emission control programs are noted.

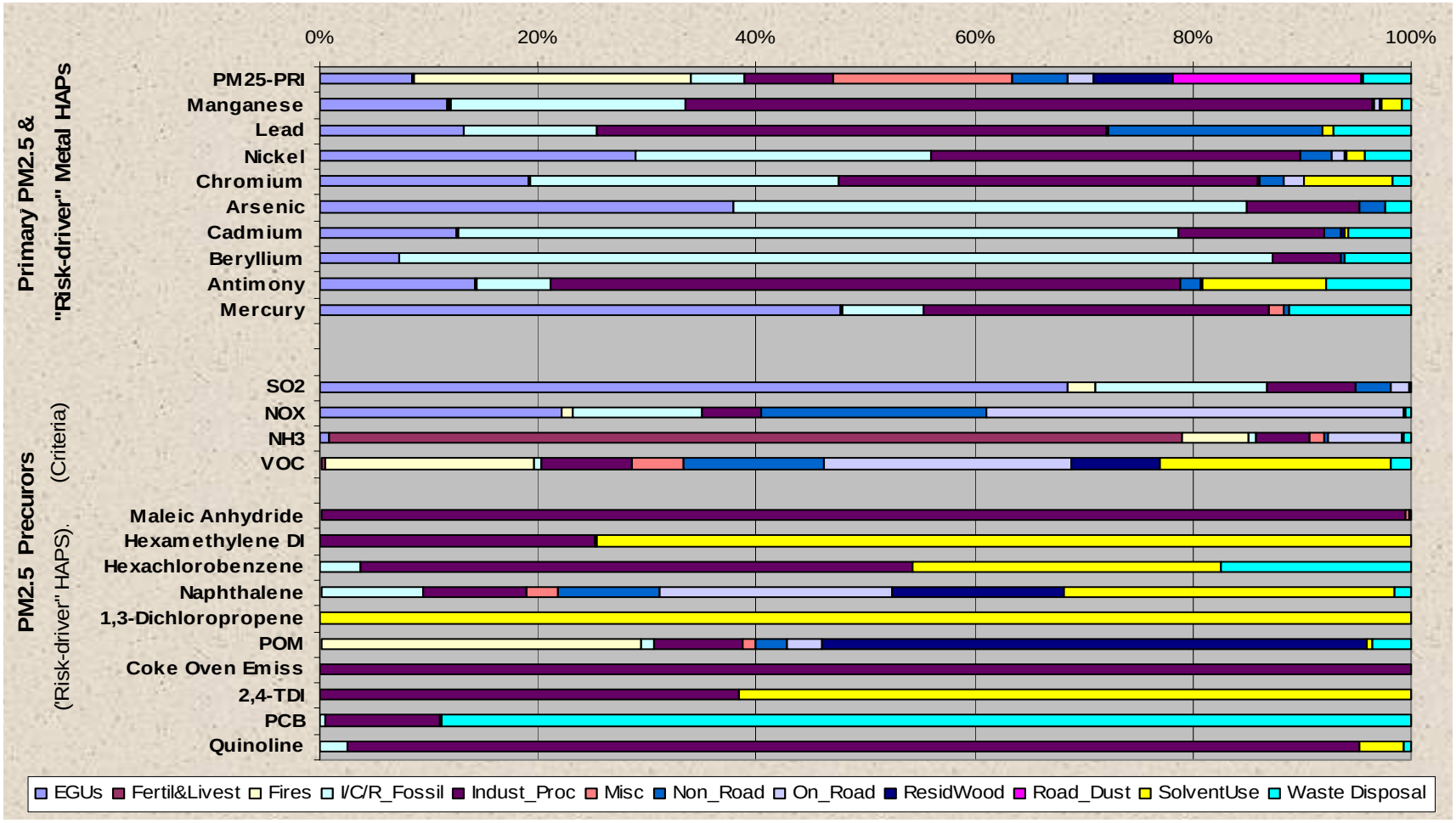


Figure 1. Overview of Source Sector Contributions to Emissions of $PM_{2.5}$, PM Precursors, and Related Hazardous Air Pollutants

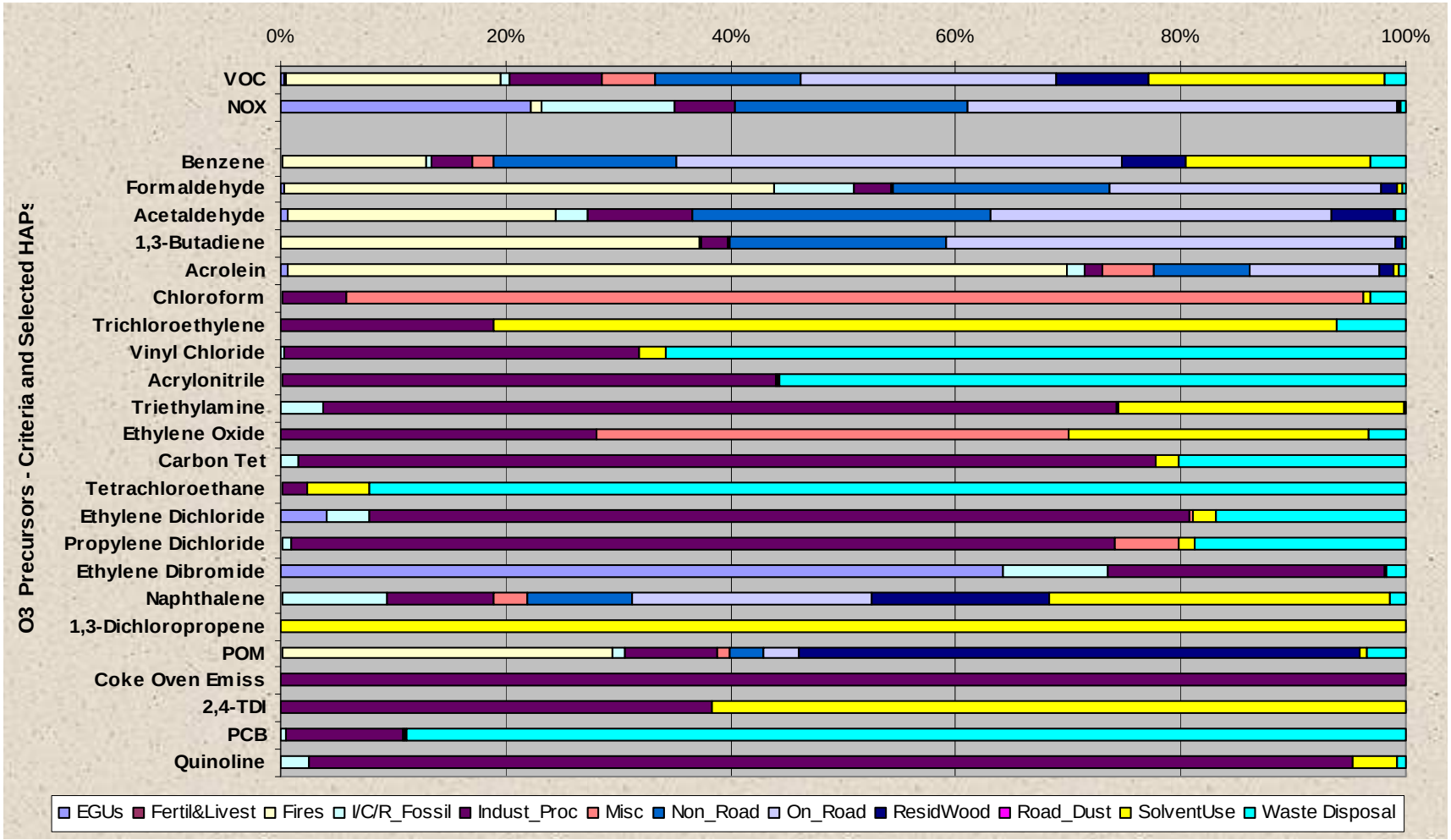


Figure 2. Overview of Source Sector Contributions to Ozone Precursors and Related Hazardous Air Pollutants

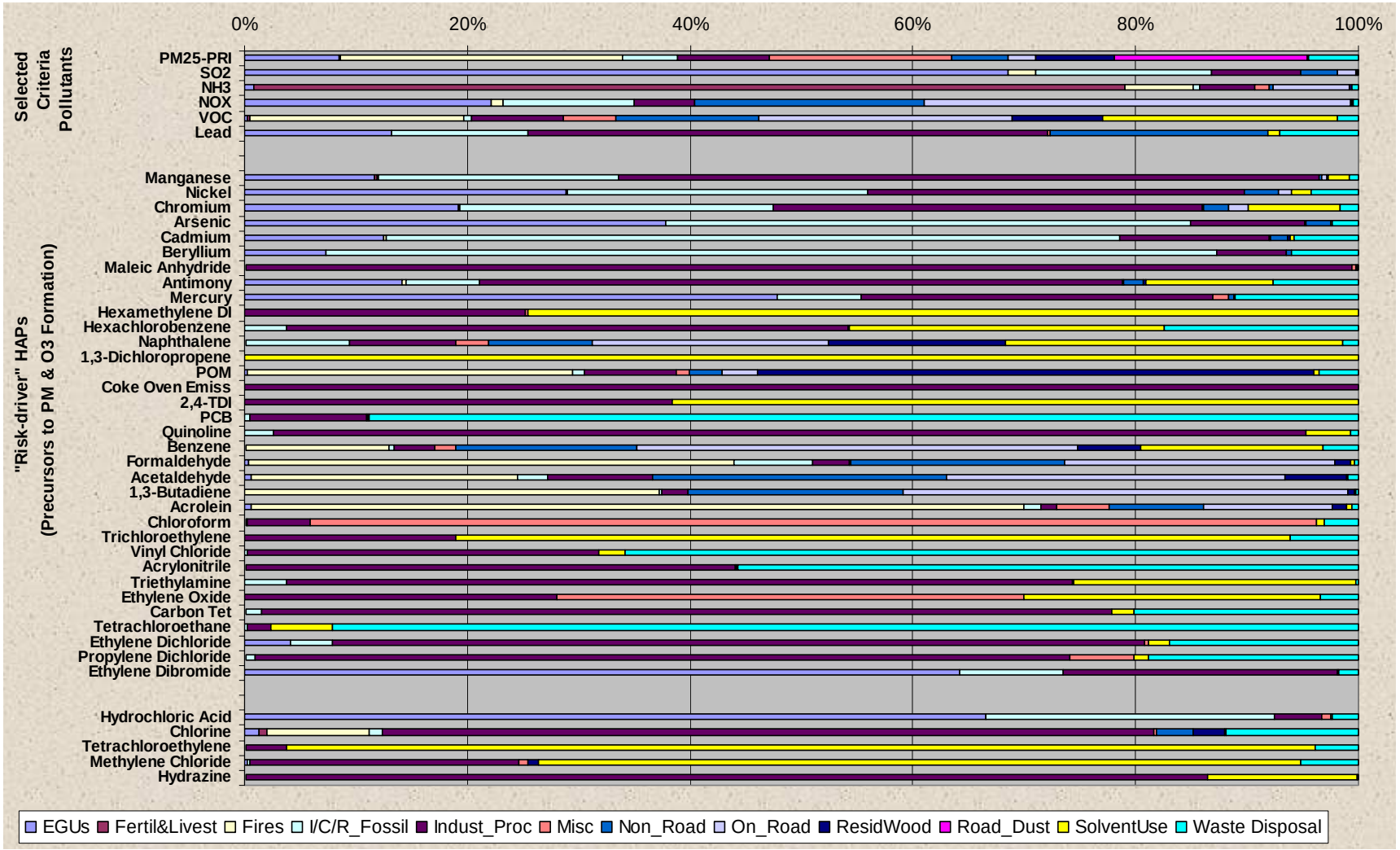


Figure 3. Overview of Source Sector Contributions to Emissions of Criteria and Hazardous Air Pollutants

Table 1. 2002 Emissions of Selected CAPs and 'Risk Driver' HAPs

	2002 Total Emissions From All Sources (tons per year)
Selected CAPs:	
$PM_{2.5}$ – Primary	6,031,351
SO_2	15,293,220
NH_3	4,235,970
NO_x	21,342,858
VOC	20,481,365
Lead Compounds	1,726
'Risk Driver' Metal HAPs & Ozone & $PM_{2.5}$ Precurors	
Manganese	2,664
Nickel	1235
Chromium	787
Arsenic	551
Cadmium	207
Beryllium	158
Maleic Anhydride	144
Antimony	142
Mercury	112
Hexamethylene 1, 6 -diisocyanate	40
Hexachlorobenzene	1
Naphthalene	16,109
1,3-Dichloropropene	11,521
Polychlorinated Biphenyls (POM)	13,772
Coke Oven Emissions	775
2,4 Tolulene Diisocyanate	86
Polychorinated Biphenyls (PCBs)	26
Quinoline	4
Benzene	376,154
Formaldehyde	258,009
Acetaldehyde	77,563
1,3-Butadiene	46,950
Acrolein	27,003
Chloroform	16,513
Trichloroethylene	10,847
Vinyl Chloride	1,308
Acrylonitrile	1,041
Triethylamine	851
Ethylene Oxide	715
Carbon Tetrachloride	433

	2002 Total Emissions From All Sources (tons per year)
1,1,2,2 Tetrachloroethane	297
Ethylene Dichloride	456
Propylene Dichloride	161
Ethylene Dibromide	24
Other 'Risk Driver' HAPs:	
Hydrochloric Acid	562,349
Chlorine	12,530
Tetrachloroethylene	35,587
Methylene Chloride	51,013
Hydrazine	6
Benzidine	0.1

Source: 2002 NEI version 1.

Criteria Pollutants

Background

Under the Clean Air Act, EPA establishes air quality standards to protect public health and the environment. EPA has set NAAQS for six principal air pollutants. These include:

- carbon monoxide,
- lead,
- nitrogen dioxide,
- ozone,
- particulate matter (also known as particle pollution), and
- sulfur dioxide

Four of these pollutants (CO, Pb, NO_2, and SO_2) are emitted directly into the air from a variety of sources. Ozone is not directly emitted, but is formed when oxides of nitrogen, NOx and volatile organic compounds, VOCs react in the presence of sunlight. PM can be directly emitted, or it can be formed when emissions of NOx, sulfur oxides (SOx), ammonia, organic compounds, and other gases react in the atmosphere. Ammonia is an important precursor of PM.

What are Sources of Criteria Pollutants?

CO, VOC and NOx are mainly emitted during the combustion of fuels in motor vehicles, power plants and boilers and the open burning of biomass. VOC is also associated with evaporation from fuels handling and storage and solvent use. SO_2 is emitted from the combustion of sulfur-containing fuels such as coal and fuel oil by power plants and industrial and commercial boilers. These compounds must be removed from the exhaust gases by scrubbers and other control devices. Particulate matter is also emitted during the combustion of both fossil and biomass fuels but it is also emitted during mechanical

grinding, crushing and abrasion of soils, rocks and minerals. Smaller particles ($PM_{2.5}$ – particles smaller than 2.5 micrometer (um) aerodynamic diameter) are mainly associated with combustion while the larger particles (PM Coarse – particles between 2.5 and 10 um aerodynamic diameter) are mainly associated with the mechanical fracture and suspension of soil and mineral matter, mostly from open sources. PM_{10} is the name given to particles smaller than 10 um and includes both $PM_{2.5}$ and PM Coarse. All the criteria pollutants can also be emitted from industrial combustion and manufacturing processes. Lead is a component of PM and is mainly associated with industrial processes and boilers. Some lead is emitted from aircraft, because it is an additive to aircraft gasoline. Ammonia is emitted mainly from animal husbandry and agricultural fertilizers. The emissions of some of the pollutants shown in Table 2 were reduced significantly from 1990 to 2002 due to air pollution control programs. However, in some cases, these

Table 2. Changes in Emissions of Criteria Air Pollutants

Percent Reductions in Emissions of CAPs and NH_3	
	1990-2002, % Reductions
NO_x	16%
VOC	15%
SO_2	34%
PM_{10} [a]	27%
$PM_{2.5}$ [a]	20%
NH3	2%
CO	26%
Pb	52%

a Directly emitted particles only
Source: 2002 NEI version 1.

comparisons also reflect improvements in emission estimation methodologies over time. It has not always been feasible to backcast emissions into previous inventory years using improved estimation procedures. Changes in emissions are also due in part to increasing awareness by our State, Local and Tribe emissions inventory partners of the importance of some categories and pollutants. For example, SO_2 has been reduced through emission controls on electric generating units (EGU), NO_x from EGU and mobile source programs, VOC from mobile source programs and solvent reformulation, $PM_{2.5}$ from new source performance standards for woodstoves and general reductions due to controls on industrial processes and boiler emissions. Lead was dramatically decreased due to the removal of lead from gasoline in the 1980's and continuing reductions in industrial emissions. Emission estimation methodology improvements have resulted in lower emission estimates from fugitive dust sources and for ammonia (a PM precursor). On the other hand, emission estimates for condensible organics were greatly improved in the 1990's and emission estimates for open fires have recently been improved.

Individual Pollutant Analyses – Criteria Pollutants

In addition to providing multi-pollutant emissions inventory data analysis, we provide detailed information CAPs and the 40 HAPs previously discussed. The individual pollutant analyses allow for more in-depth analysis of emissions for the individual pollutants and these analyses are included in Appendix B. Each pollutant sheet includes sector details of the individual pollutants, as well as, emission density maps and ambient concentrations maps where available. Comparisons of emissions are made in sector detail between 1990 and 2002. 2002 emissions are presented by detailed sector categorization for the 12 sectors previously discussed and for four major categories: transportation, fuel combustion, industrial process, and miscellaneous. Emissions densities are shown for each pollutant by county. The distribution of emissions are presented in thirds with the lowest emissions levels shown in light green, medium levels in medium green and highest densities in dark green.

The ambient concentration maps show how monitored concentrations of ambient air varied across the country in 2002. The concentrations are displayed in ranges, with the lower concentrations being green, and the higher concentrations being orange, red and purple (where applicable). In general, the ranges and colors are consistent with the Air Quality Index (AQI) levels, so green and yellow are below the level of the standard and orange, red, and purple are above. The air quality indicator (e.g. annual mean, 2nd maximum) for each pollutant corresponds to the form of the National Ambient Air Quality Standard (NAAQS). For pollutants like $PM_{2.5}$ and PM_{10} that have more than one standard (e.g. annual and 24-hour), the indicator for the "controlling" standard (or the standard that results in the greatest level of control) is represented in the map. The indicators are computed at each monitoring site and the highest in the county is plotted on the map.

With few exceptions, monitored concentrations of CO, Pb, NO_2, and SO_2 were below the level of the NAAQS in 2002. Ozone and PM maps, on the other hand, show that many areas had concentrations above the level of the NAAQS in 2002. While most of the PM_{10} problem areas were in the west, ozone and $PM_{2.5}$ had levels above the NAAQS in the east and west. Ozone was higher in 2002 (than in subsequent years based upon ambient air monitoring) in many areas partly due to meteorology. Since sunlight and hot weather in combination with NO_x and VOC emissions create ground-level ozone, meteorology does impact ozone levels in any given year. In addition, the NO_x Budget Trading Program has successfully reduced ozone season NO_x emissions, and consequently ozone concentrations, in many parts of the eastern U.S. since 2002.

Ammonia – 2002 emissions of ammonia were 4,236 thousand tons, which represents a 2 percent reduction from 1990 to 2002. Seventy-eight percent of 2002 ammonia emissions come from fertilizer and livestock emissions. The density map of ammonia emissions indicates high emissions in agricultural regions of the Midwest, California, the Northeast and Middle Atlantic states

Carbon Monoxide – 2002 emissions of CO were 113,447 thousand tons, a decrease of 26 percent from 1990. Mobile sources contributed 76 percent of these emissions in 2002 with fires as the next highest source accounting for 16 percent of 2002 emissions. The density map of emissions shows higher CO emissions in the eastern US. The ambient monitoring data for 2002 reflect that all counties with the exception of one were below the standard in 2002.

Lead Compounds – 2002 emissions of lead were 1,726 tons. Stationary source and mobile source regulations have reduced lead compound emissions approximately 52% since 1990. Lead compounds are emitted from a variety of industrial sources. Industrial, commercial and institutional boilers, iron and steel foundries, and utility boilers account for approximately 46 percent of total 2002 emissions.

Nitrogen Oxides – Nationwide emissions of nitrogen oxides were 21,373 thousand tons in 2002 a 16 percent decrease from 1990 levels. Mobile emissions account for 59 percent and EGU 22 percent of total NO_x emissions. All areas in the country are below the NO_2 standard in 2002. For the O_3 standard, there are areas in the east and west that experienced ozone concentrations above the 8 hour standard of 0.08 ppm in 2002.

Particulate Matter ($PM_{2.5}$) - 2002 emissions of primary $PM_{2.5}$ were 6,031 thousand tons nationwide. Methodology changes in primary $PM_{2.5}$ make a comparison between 1990 and 2002 emission levels somewhat problematic for many sources of these emissions. Multiple sources account for emissions with 26 percent of these emissions generated by fires and 18% by road dust. Areas exceeding the $PM_{2.5}$ annual standard in 2002 are located in both the eastern and western parts of the US.

Particulate Matter (PM_{10}) – 2002 total emissions of PM_{10} were 21,919 thousand tons nationwide, a 27 percent decrease from 1990 levels. Road dust is the source of 49 percent of these emissions in 2002. Areas in the country exceeding the 24-hour standard in 2002 are located primarily in the west.

Sulfur Dioxide (SO_2) – Emissions of SO_2 were 15,293 thousand tons in 2002, a decrease of 34 percent from 1990 levels. Emissions from EGUs accounted for 70 percent of emissions in 2002. EGUs emissions declined by 34 percent between 1990 and 2002. Based upon monitoring data, no areas in the country exceeded the SO_2 24-hour standard in 2002.

Volatile Organic Compounds (VOC) – 2002 emissions of VOCs were 20,481 thousand tons, a 15 percent decrease from 1990 levels. Mobile sources accounted for 36 percent of total VOC emissions followed by solvent related emissions of 21 percent.

Air Toxics

Background

Toxic air pollutants, also known as hazardous air pollutants, are those pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects. For more information on the health and environmental effects of HAPs, see http://www.epa.gov/air/toxicair/newtoxics.html#health.

Before 1990, EPA had regulated air toxics by writing eight National Emissions Standards for Hazardous Air Pollutants (NESHAP) using a risk reduction approach that proved slow and cumbersome. In the 1990 amendments to the Clean Air Act, Congress mandated EPA to regulate the emissions of 189 HAPs. The list of HAPs is in section 112(b) of the Clean Air Act and at http://www.epa.gov/ttn/atw/orig189.html. Please note that caprolactam, ethylene glycol monobutyl ether, and methyl ethyl ketone are no longer listed as HAPs. Although there are 187 HAPs, some groups of HAPs have been individually listed. For example, xylenes (isomers and mixture) are listed on the list of 188, followed by o-xylenes, m-xylenes, and p-xylenes isomers. In addition, all the metals are listed including compounds, such as antimony compounds, arsenic compounds, beryllium compounds, etc., to indicate all of these metal compounds (instead of only the elemental form of the metal) should be considered a HAP and, thus, subject to air toxics regulations. Other compounds on the HAP list include polychlorinated biphenyls, radionuclides, polycyclic organic matter, cyanide compounds, glycol ethers, and fine mineral fibers. Radionuclides are a special air toxic pollutant because they are not measured and regulated in the same manner as the rest of the HAPs.

In order to comply with Congress's mandate, EPA determined the major source categories of air toxics emissions and subsequently wrote 96 technology-based standards (also called Maximum Achievable Control Technology (MACT) Standards) for 174 source categories to control HAP emissions. For a complete list of the standards and the sources regulated, go to http://www.epa.gov/ttn/atw/mactfnlalph.html.
The HAP emissions reductions from the technology-based standards are estimated to be 1.7 million tons when the rules are fully implemented in 2007. Congress also required EPA to revisit the MACT standards every 8 years to determine whether the standards are still effective and protective of human health. This Congressional mandate requires EPA to conduct a residual risk assessment to determine whether the MACT is adequately protecting human health. For more information on EPA's residual risk program, see http://www.epa.gov/ttn/atw/rrisk/residriskpg.html.

In the Clean Air Act, Congress defined major stationary sources of HAPs emissions to be those that emit or have the potential to emit 10 tons of one pollutant or a combination of 25 or more tons of a combination of pollutants. Sources emitting smaller amounts of HAPs are defined as area sources. Area sources are small emitters of HAPs individually, but are collectively important contributors in urban areas. Area sources represent 65% of the national stationary source emissions. Many area sources emit toxic metals and organics that may pose significant health threats to sensitive populations such as children and the elderly, and can contribute to fine particulate matter and ozone. The Clean Air Act also includes two provisions, section 112(c)(3) and 112(k)(3)(B)(ii) that instruct EPA to identify and list source categories representing at least 90 percent of the

emissions of the 30 ``listed'' HAPs that pose the greatest public health risks to urban areas and that are, or will be, subject to standards under section 112(d) of the CAA (see the **Integrated Urban Air Toxics Strategy**, 64 FR 38706, July 19, 1999 for more information). For more information on area sources, please see http://www.epa.gov/ttn/atw/urban/urbanpg.html.

Automobiles and trucks are also sources of hazardous air pollutants (i.e., diesel exhaust is a HAP). There have been several regulations and initiatives (including a voluntary initiative to retrofit school buses with newer, more efficient burning engines) to reduce emissions from mobile sources.

Many of the HAPs are either volatile organic compounds or particulate matter, and the measures and regulations developed to control criteria pollutants will also reduce the emissions of HAP. All of these measures combined are expected to greatly reduce emissions of and subsequent exposure to air toxics.

Intuitively, large sources like petrochemical facilities, petroleum refineries, gas stations, and incinerators come to mind as big contributors of air toxics emissions. However, almost all industries have air toxics emissions. Sources such as electric generating units, foundries, coke ovens, brick manufacturers, glass manufacturers, automobile manufacturing, surface coating, municipal waste landfills, and many other types of industry emit air toxics. In addition, many common smaller facilities such as gas stations and dry cleaners emit significant quantities of air toxics. As mentioned above, automobiles, trucks, and off-road mobiles sources (such as airplanes and construction equipment) emit air toxics.

Trends in the Air Toxics Data

Although EPA and the S/L/Ts collect data from most or all of the 187 HAPs listed in the Clean Air Act, EPA is only showing the data and trends from 40 air toxics in this booklet. We chose to describe the emissions and risks from only 40 of the 187 HAPs because these pollutants are the primary risk drivers for risks from inhalation in NATA or on the list of 33 HAPs identified as urban area source HAPs. In other words, these air toxics are the most prevalent and have higher potential to cause adverse health effects from chronic inhalation to the public. The selection of these HAPs is not based on other important routes of exposure that cause adverse health effects to humans including acute exposures and multi-pathway exposures to PB-HAPs or adverse ecological effects. Generally, all of the stakeholders, including EPA, State, Local, and Tribal Air Pollution Control Agencies, industry, and the public have made great strides in reducing air toxics emissions in the past 16 years. In total, the 2002 National Emissions Inventory shows air toxics emissions of 4.5 million tons per year which is down from 7.1 million tons per year in 1990. This is a 37 percent decrease and more reductions are expected in the near future as additional area source standards and mobile source rules are promulgated.

(1) Major sources' air toxics trends

Air Toxics emissions from major sources have been greatly reduced from 1990 to 2002. The National Emissions Inventory shows a more than 50 percent decrease from 1.9 million tons per year in 1990 to 0.9 tons in 2002. The primary reason for this decline is the implementation of the National Emission Standards for Hazardous Air Pollutants (NESHAP) that is technology standards known as Maximum Achievable Control Technology (MACT) standards. By 2002, most of the MACT standards had been promulgated and implemented and the emissions reductions achieved. Reduction of air toxics emissions from MACT standards were expected to be 1.7 million tons per year when all become fully implemented. One of the MACT standards that accounted for much air toxics reductions is the Hazardous Organic NESHAP that reduced emissions for Synthetic Organic Chemical Manufacturers. Generally, much of the emissions reductions are from the sources that emit the 40 air toxics described in this booklet.

(2) Area Source Air Toxics Trends

The air toxics emissions from area source also decreased from 1.9 million tons per year in 1990 to 1.7 million tons per year in 2002. Several standards, such as those regulating dry cleaners, and halogenated solvent degreasers, are responsible for much of the area source HAP emission reductions. However, one large source of air toxics emissions from area sources, fires (both prescribed and wild fires), increased from 0.2 million tons per year in 1990 to 0.3 million tons per year in 2002. One of the reasons for this increase may be the way in which emissions from fires are estimated. Fire estimation techniques improved from the 1990 to 2002 emission inventories. EPA is currently developing standards for the area source categories that were identified in The Integrated Urban Air Toxics Strategy (64 FR38706). Fifteen area source standards have been implemented previously as part of the MACT standards development.

(3) Mobile Sources' Air Toxics Trends

The air toxics emissions from onroad mobile sources decreased by more than 50 percent, 2.5 million tons per year to 1.2 million tons per year, from 1990 to 2002. The air toxics emissions from the nonroad mobile sources decreased slightly from 0.8 million tons per year in 1990 to 0.7 million tons per year. Further reductions are expected because EPA's Office of Transportation and Air Quality is working on other rules and projects to reduce mobile source emissions.

Changes in emissions of the 40 HAPs between 1990 and 2002 are shown in Table 3.

Table 3. Changes in Emissions of HAPs

Pollutant	Percent Changes in Emissions of HAPs[1] 1990-2002, % Change (Reductions shown in brackets)
1,1,2,2 - Tetrachlorethane	564%[2]
1,3 Butadiene	(49)%
1,3- Dichlorpropene	(39)%
2.4 – Toluene Diisocyanate	(39)%
Acetaldehyde	(36)%
Acrolein	(5)%
Acrylonitrile	(77)%
Antimony	(22)%
Arsenic Compounds	138%[3]
Benzene	(27)%
Benzidine	(82)%
Beryllium Compounds	349%
Cadmium Compounds	(55)%
Carbon Tetrachloride	(94)%
Chlorine	(87)%
Chloroform	(42)%
Chromium Compounds	(14)%
Coke Oven Emissions	(40)%
Ethylene dibromide	(51)%
Ethylene dichloride	(96)%
Ethylene oxide	(87)%
Formaldehyde	(28)%
Hexachlorobenzene	(78)%
Hexamethylene 1,6-diisocyanate	(87)%
Hydrazine	(70)%
Hydrochloric Acid	51%[3]
Maleic Anhydride	(98)%
Manganese Compounds	(26)%
Mercury Compounds	(54)%
Methylene Chloride	(62)%
Napthhalene	(37)%

Pollutant	Percent Changes in Emissions of HAPs[1] 1990-2002, % Change (Reductions shown in brackets)
Nickel Compounds	(3)%
Polychlorinated biphenyls (PCB)	28%
Polycyclic Organic Matter	11%[4]
Propylene dichloride	(74)%
Quinoline	(95)%
Tetrachloroethylene	(67)%
Trichlorethylene	(86)%
Triethylamine	(42)%
Vinyl Chloride	(79)%

[1] Source: 2002 NEI Version 1.
[2] Landfill emissions were not reported in 1990 and account for the increase in emissions reported for this pollutant.
[3] Sources such as industrial, commercial and institutional boilers and process heaters and utility boilers are significantly underestimated in the 1990 NEI resulting in the increase in emissions recorded for this HAP between 1990 and 2002.
[4] Categories such as residential wood combustion are underestimated in the 1990 NEI resulting reported increases in emissions of this pollutant between 1990 and 2002.

Individual Pollutant Analyses – Hazardous Air Pollutants

The individual pollutant analyses are included in Appendix B. Each pollutant sheet includes sector details of the individual pollutants and emission density maps. Comparisons of emissions are made in sector detail between 1990 and 2002. 2002 emissions are presented by detailed sector categorization for the important sectors for HAPs that may differ somewhat from the previously discussed. In addition to the detailed sector categorization emissions are shown for four major categories: transportation, fuel combustion, industrial process, and miscellaneous. Emissions densities are shown for each pollutant by county. The distribution of emissions are presented in thirds with the lowest emissions levels shown in light yellow, medium levels in orange and highest densities in red. Areas with no emissions are shown in white. A discussion of the individual pollutants follows:

1,1,2,2 – Tetrachlorethane – This pollutant is only emitted from stationary sources. Although emission reported in 2002 exceed emissions in 1990, this results from the fact that municipal landfill emissions were not available in the 1990 inventory. Emissions from landfills account for 81 percent of total emissions for this pollutant in 2002. Reductions in emissions of this pollutant have occurred due to the implementation of MACT standards for the HON and Rubber Tire Production.

1,3 Butadiene – Emissions of this pollutant decreased by approximated 50 percent between 1990 and 2002. Significant reductions have occurred in emissions due to implementation of MACT standards for the HON, Miscellaneous Organic Chemical Manufacturing and Polymers and Resins. Mobile sources account for 60 percent of the

1,3 Butadiene emissions in 2002. The emissions density map indicates that higher levels of emissions occur in the more populated counties in the U.S.

1,3- Dichloropropene – Emissions of this pollutant have declined by approximately 40 percent since 1990 due to the MACT standards for the HON and Hydrochloric Acid Production. Consumer and Commercial products account for 77% of the emissions of this pollutant in 2002. This HAP is emitted only from stationary non-point sources. Problems with consistent reporting in the nonpoint inventory exist.

2,4- Toluene Diisocyanate – Emissions of this HAP were reduced between 1990 and 2002 by approximately 40 percent due to MACT controls implemented for Flexible Polyurethane Foam Production, the HON, and Plastic Parts and Products Surface Coatings. This pollutant is emitted primarily from stationary surface coating processes and emissions of the pollutant tend to be higher in more populated counties of the country. Several categories of 2002 emissions including Printing and Publishing, Chemical Preparations, Architectural Surface Coating, and Leather Tanning were not reported in the 1990 NEI.

Acetaldehyde – 2002 emissions have decreased 36 percent from 1990 levels due to the MACT program. This toxic is emitted from a variety of stationary and mobile sources with 57 percent of 2002 emissions coming from mobile sources. The second largest source category is open burning and significant emission estimation methodology improvements have occurred for the 2002 inventory.

Acrolein – This pollutant is primarily emitted from combustion sources. Reductions of approximately 5 percent in annual emissions are reported between 1990 and 2002 due to a number of MACT standards. Open burning accounts for 66 percent of all emissions of this pollutant in 2002 and significant improvements in the estimation methods for this category are reflected in the 2002 NEI.

Acrylonitrile – 2002 emissions of this toxic reflect a 77 percent decline from those reported in 1990. Significant stationary source reductions have occurred due to a number of major MACT standards. Landfills, the largest source of emissions of this pollutant in 2002 (43 percent of total emissions) are not well characterized in the 1990 inventory.

Antimony Compounds – 2002 emissions show a drop of 22 percent for this toxic from 1990 levels. Antimony is emitted from a large number of source categories that contribute small amounts of emissions. Of the 164 source categories, 20 categories emit more than one ton. Antimony emissions are dominated by stationary point sources.

Arsenic Compounds – Emissions of this pollutant have increased 138 percent. However, categories such as industrial/institutional/commercial boilers and utility boilers burning oil are significantly underestimated in the 1990 NEI and account the increase in this toxic pollutant. Approximately 82 percent of 2002 emissions of this toxic are emitted from these two source categories. Arsenic is emitted from a large number of sources that

contribute small amounts to emissions. Of the 285 source categories for this pollutant, only 21 have emissions exceeding 1 ton.

Benzene – 2002 Benzene emissions declined by 27 percent from 1990 levels due to implementation of major MACT rules. The major source category of benzene emissions are mobile sources that accounts for 55 percent of the total. Emission trends for benzene agree well with ambient monitoring data trends. The emissions density map for benzene reflects that emissions are greater in more populated counties consistent with mobile sources accounting for over 50 percent of the emissions of this pollutant annually.

Benzidine –2002 emissions have dropped 82 percent from the levels reported in 1990 due to the MACT program. This pollutant is emitted only from stationary sources and some source categories reported in 2002 are not reported in 1990. This pollutant is only reported to be emitted in 11 counties in the continental United States.

Beryllium Compounds – Beryllium is emitted by a large number of sources that contribute small amounts of emissions. Of the 196 source contributing emissions only 12 categories emit more than 1 ton annually. Industrial, commercial and institutional boilers contribute 79 percent of the emissions of this HAP.

Cadmium Compounds – The 2002 emissions of this pollutant have decreased approximately 55 percent from reported 1990 amounts. A number of MACT standards have resulted in emission reductions of this toxic. A large number of source categories contribute small amounts to the total emissions of Cadmium Compounds with only 13 of the 301 source categories emitted more than one ton annually in 2002.

*Carbon Tetrachloride –E*missions of this toxic have decline significantly (by approximately 94%) since 1990 due to the phase out of the production and use of this chemical by the Montreal Protocol of 1990. Industrial sources account for the majority of emissions for this toxic. Synthetic Organic Chemical Manufacturing and pulp and paper production account for 34 percent and 27 percent of the annual 2002 emissions of this pollutant, respectively.

Chlorine – Emissions of chlorine have declined significantly from 1990 levels (87%). MACT standards for a number of source categories account for this decline. A number of source categories reported in 2002 were not reported or not well characterized in the 1990 NEI. The largest source of chlorine emissions comes from Primary Magnesium Refining in Utah with approximately 50 percent of the nationwide emissions coming from this source.

Chloroform – 2002 emissions declined by approximately 42 percent for 1990 levels for this toxic. Chloroform is emitted from stationary sources and the MACT program is responsible for these decreases. Swimming pools account for 90 percent all 2002 emissions of this pollutant and the inventory for the source was not well characterized in 1990.

Chromium Compounds– The MACT standards for a number of source categories have resulted in declines in the inventory of this toxic in 2002. Industrial sources explain 49 percent of this pollutants sources and fuel combustion sources account for an additional 46 percent of the total emissions for this pollutant.

Coke Oven Emissions – Coke Oven Emissions have declined 40 percent in 2002 from levels in 1990 due to implementation of the MACT standard. Coke oven estimates include 2 categories: Pushing, Quenching & Battery Stands and Charging, Top Side and Door Leaks. Coke oven emissions are emitted in 19 counties in the continental United States.

Ethylene Dibromide - 2002 emissions of this HAP show over 50 percent declines from 1990 estimates. Emissions of Ethylene Dibromide come from stationary sources only. Utility coal boilers account for 64 percent of the total reported emissions in 2002, and this source category was not reported in the 1990 NEI.

Ethylene dichloride – This HAP is emitted from stationary sources only and decreases of 96 percent have occurred between 1990 and 2002. These decreases are thee result of a number of MACT standards. Approximately 68 percent of 2002 emissions came from industrial sources

Ethylene Oxide – Emissions of this pollutant have decline approximately 87 percent since 1990 due to MACT standards for a number of source categories. This HAP is emitted by stationary sources only. Industrial processes account for 78 percent of all emissions for this HAP in 2002.

Formaldehyde – Emissions of this HAP have declined by 28 percent from 1990 reported emissions. Stationary and mobile source reductions have occurred since 1990. Mobile sources account for 44 percent of emissions and Open, Prescribed, and Wild Fires explain 42 percent of these HAP emissions in 2002. A number of the emission categories for this pollutant were not reported in 1990 or methodology improvements have occurred. Such is the case for the fire emissions. Formaldehyde has significant contributions in the ambient air from secondary formation.

Hexachlorbenzene – This HAP is emitted from stationary sources only. Reductions of 78 percent have occurred between 1990 and 2002 due to the MACT standards. Pesticide applications and open burning result in 28 percent and 16 percent of the 2002 total emissions of this HAP.

Hexamethylene 1,6-diisocyanate – Stationary source emission decreases of 87 percent have occurred since 1990 for this HAP. Industrial processes account for 92 percent of the total emissions of this HAP.

Hydrazine – This HAP is emitted from stationary sources and emission reductions have occurred from a number of MACT standards implementation. A number of source categories were not reported in the 1990 NEI. Industrial processes account for 99 percent

of total emissions of hydrazine in 2002. Emissions were reported only in 52 counties in the continental US in 2002.

Hydrochloric Acid – Emissions reported in 2002 are 51 percent greater for this HAP than in 1990 because the major source categories of utility boilers and industrial, commercial and institutional boilers and process heaters were underestimated in the 1990 NEI. This HAP is emitted from stationary sources only with utility boilers emitting 60 percent and industrial commercial and institutional boilers emitting 33 percent of total 2002 emissions of hydrochloric acid.

Maleic Anhydride – Emissions of this pollutant have declined 98 percent since 1990 due to MACT controls implemented for stationary sources. Synthetic Organic Chemical Manufacturing is the major source of emissions accounting for 68 percent of the total in 2002. This pollutant is emitted in only 160 counties in the United States.

Manganese Compounds – Reductions of emissions of Manganese Compounds occurred between 1990 and 2002 (26 percent). These reductions are the result of MACT standards for a number of source categories. Industrial sources emit 64 percent of 2002 emissions and fuel combustion sources 34 percent.

Mercury Compounds – 2002 reported mercury emissions show reductions of approximately 54 percent since 1990. Significant stationary source emission decreases have resulted from MACT implementations for a number of source categories. Utility boilers emitted 43 percent of the total reported mercury compound emissions for 2002.

Methylene Chloride – Emissions of this HAP declined by 62 percent from 1990 to 2002. This HAP is emitted only by stationary sources and implemented MACT standards are responsible for the decline in emissions. In 2002 paint stripping was the largest souce category resulting in 39 percent of total emissions of this HAP.

Napthalene – Emissions of naphthalene have been reduced by 37 percent since 1990. Both stationary source regulations (MACT) and mobile source regulations have reduced these emissions during the period 1990 and 2002. Emission estimation methodologies have been improved for a number of source categories for this HAP in the 2002 NEI. Mobile source emissions are 31 percent, fuel combustion 25 percent, and industrial sources 22 percent of total 2002 NEI reported emission of napthalene.

Nickel Compounds – Emissions of this pollutant declined 3 percent between 1990 and 2002. Stationary source reductions have occurred due to implementation of a number of MACT standards. Fuel combustion sources are the major source of emissions in 2002 and emissions for certain of these categories were underestimated in the 1990 NEI.

PCBs – Emissions of PCBs increased by 28 percent in 2002 when compared to 1990 levels. PCBs are emitted from stationary sources only. The major sources of 2002 emissions are from open burning of residential waste and the emissions from an incinerator located in UT.

Polycyclic Organic Matter – Emissions of this pollutant increased 11 percent between 1990 and 2002. In general emissions have declined for most of the source categories due to the MACT program. However, emission methodologies have improved for open burning and residential wood combustion in the 2002 NEI. Residential wood combustion emissions explain 51 percent and open burning 29 percent of the total 2002 emissions of POM.

Propylene dichloride – Emissions of this HAP decreased by approximately 74 percent in 2002 when compared to 1990. This HAP is emitted from stationary sources and reductions come from the MACT standards for a number of source categories. Industrial processes represent 80 percent of emissions of this HAP in 2002.

Quinoline – Emissions of this pollutant declined 95 percent between 1990 and 2002. This decline is the result of the MACT for the HON. Industrial processes are the major source of emissions of quinoline in the 2002 NEI. Emissions of this HAP are reported in only 26 counties in the US in 2002.

Tetrachloroethylene – This HAP is emitted only by stationary sources and a number of MACT standards have resulted in a 67 percent decline in emissions since 1990. In 2002, dry cleaning facilities account for 63 percent of tetrachloroethylene emissions in the US. The density map of emission reflects that emissions of this HAP are greater in more populated counties in the country.

Trichloroethylene – Emissions of trichloroethylene have declined by 86 percent between 1990 and 2002. These decreases have resulted from the MACT program. Industrial sources account form 92 percent of all 2002 emission of this HAP.

Triethylamine – Emissions of Triethylamine have declined 42 percent in the 2002 NEI when compared to 1990 levels. This reduction is due to the MACT program for the HON, Pharmaceutical Production and Surface Coatings.

Vinyl chloride – Emissions of vinyl chloride were 1,308 tons in 2002 a decrease of almost 80 percent from 1990. This decrease results from a number of MACT standards. Municipal landfills represent 46 percent of 2002 emission and emissions from this source were not well characterized in the 1990 NEI.

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Appendix A – Source Categorization Detail for Figures 1, 2, and 3

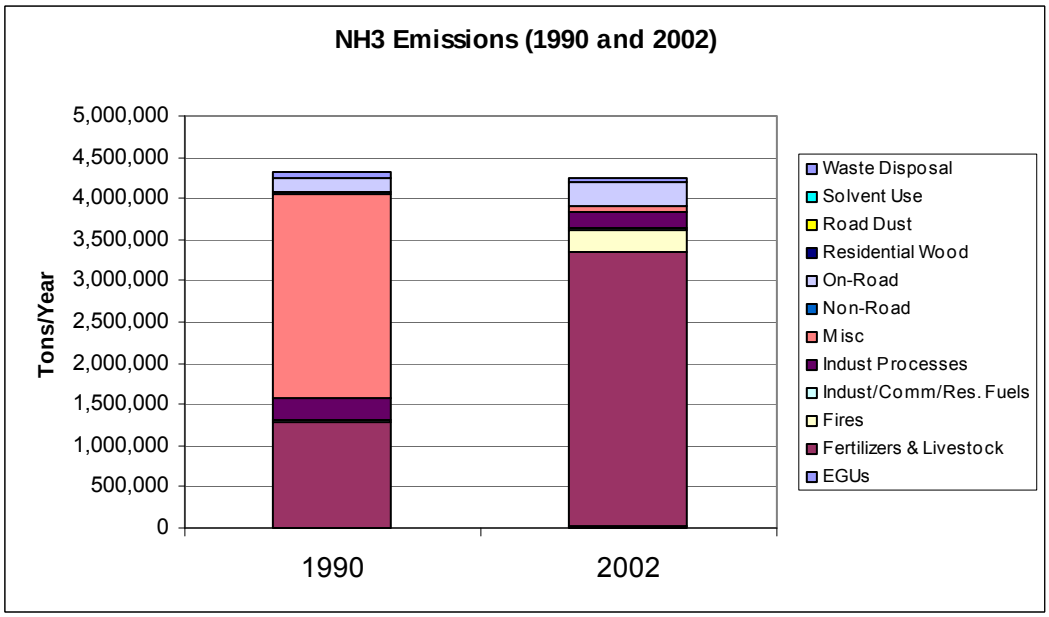
42 Sector Category Names	12 Sector Category Names
Livestock Waste	**Fertilizer and Livestock**
Fertilizer Application	
Fuel Comb - Electric Utility	**EGUs**
Fuel Comb - Industrial Boilers, Internal Combustion Engines	**Industrial, Commercial and Residential Fuel Combustion**
Fuel Comb - Commercial/Institutional	
Fuel Comb - Residential Fossil	
Fuel Comb - Residential Fireplaces	**Residential Wood**
Fuel Comb - Residential Woodstoves	
Waste Disposal	**Waste Disposal**
Waste Disposal - Open Burning	
Wildfires	**Fires**
Prescribed Fires	
Agricultural Field Burning	
Logging Slash Burning	
Indus Process – NEC	**Industrial Processes**
Commercial Cooking	
Industrial Process – Metals	
Industrial Process - Chemical Manufacturing	
Industrial Process - Storage & Transfer	
Industrial Process - Petroleum Refineries	
Industrial Process - Oil & Gas Production	
Industrial Process - Pulp & Paper	
Industrial Process - Cement Manufacturing	
On-Road Vehicles - Gasoline	**On -Road**
On-Road Vehicles - Diesel	
Non-Road Equipment - Gasoline	**Non-Road**
Non-Road Equipment - Diesel	
Planes, Trains, & Ships	
Unpaved Roads	**Road_Dust**
Paved Roads	
Solvent - Non-industrial	**Solvent Use**
Surface Coating - Industrial	
Degreasing	
Surface Coating - Architectural	
Graphic Arts	
Solvent – Not Elsewhere Classified	
Dry Cleaning	
Agriculture - Crop Tilling & Livestock Dust	**Miscellaneous**
Construction	
Gas Stations	
Bulk Gasoline Terminals	
Miscellaneous Sources	

Appendix B. Individual Pollutant Analysis

Ammonia (NH_3)

Emissions by Source Type

- 2002 Total NH3 Emissions: 4,235 thousand tons



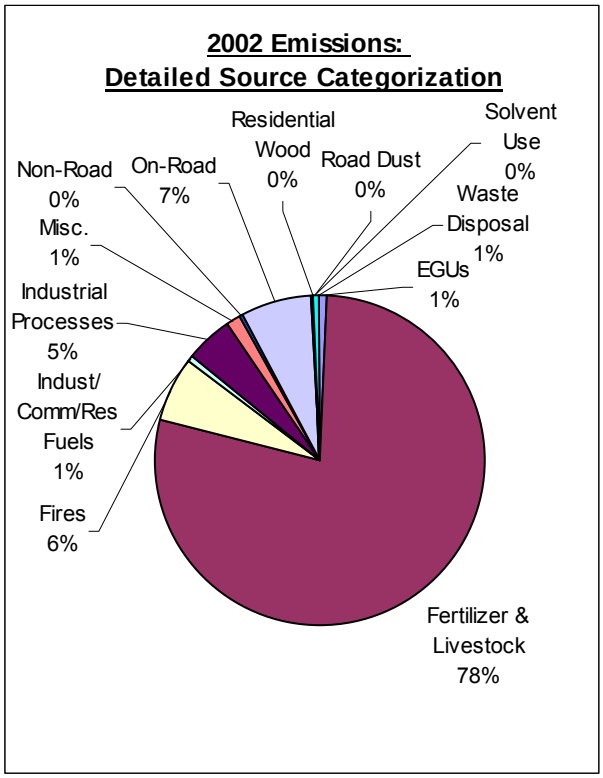
Emissions (tons)

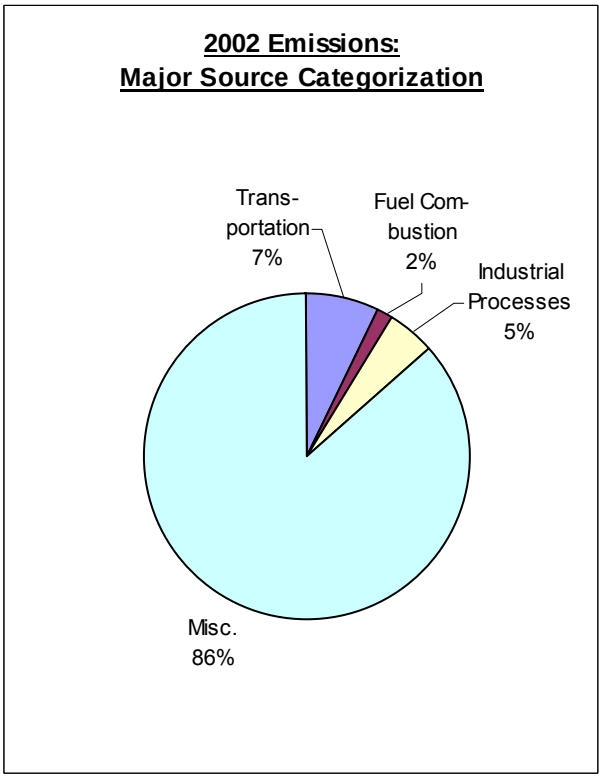
NH3	1990	2002	Pct Change
EGUs	0	35,710	
Fertilizers & Livestock	1,285,882	3,310,506	157%
Fires [1]		261,369	
Indust/Comm/Res. Fuels	25,246	24,455	-3%
Indust Processes	268,943	208,505	-22%
Misc	2,471,250	56,353	-98%
Non-Road	30,724	13,509	-56%
On-Road	154,859	289,567	87%
Residential Wood [1]		10,155	
Road Dust [1]		0	
Solvent Use [1]		303	
Waste Disposal	81,763	25,536	-69%
TOTAL	**4,318,667**	**4,235,970**	**-2%**

[1] Category not estimated in 1990

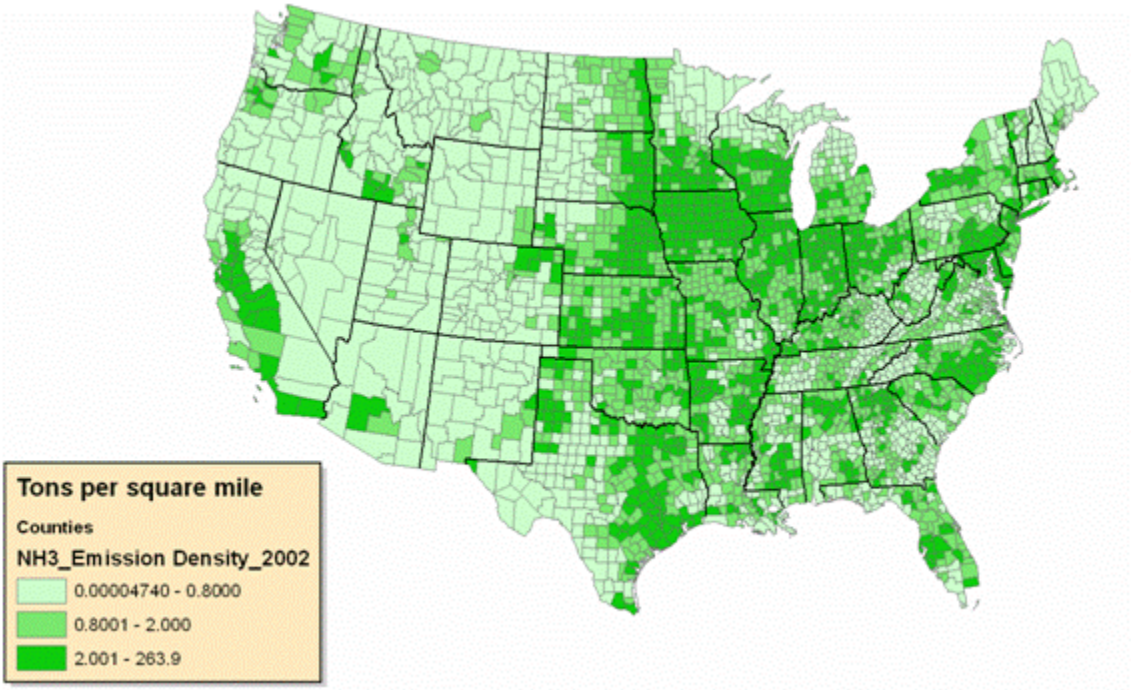
Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

Ammonia (NH_3) (cont.)





2002 Emissions Density Map

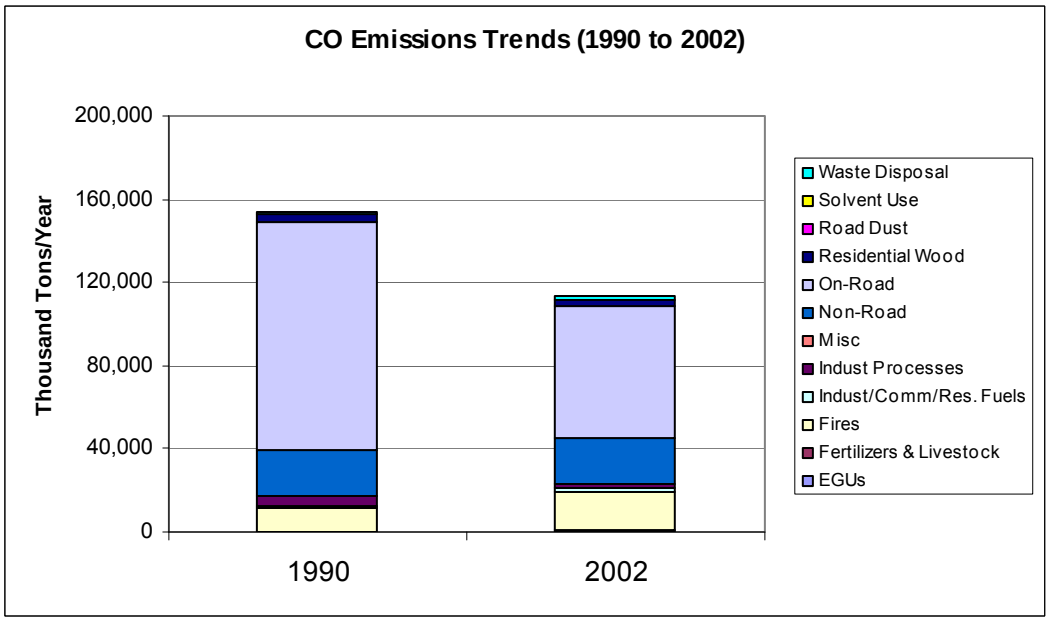


Source: 2002 National Emissions Inventory, version 1.

Carbon Monoxide (CO)

Emissions by Source Type

- 2002 Total CO Emissions: 113,447 thousand tons



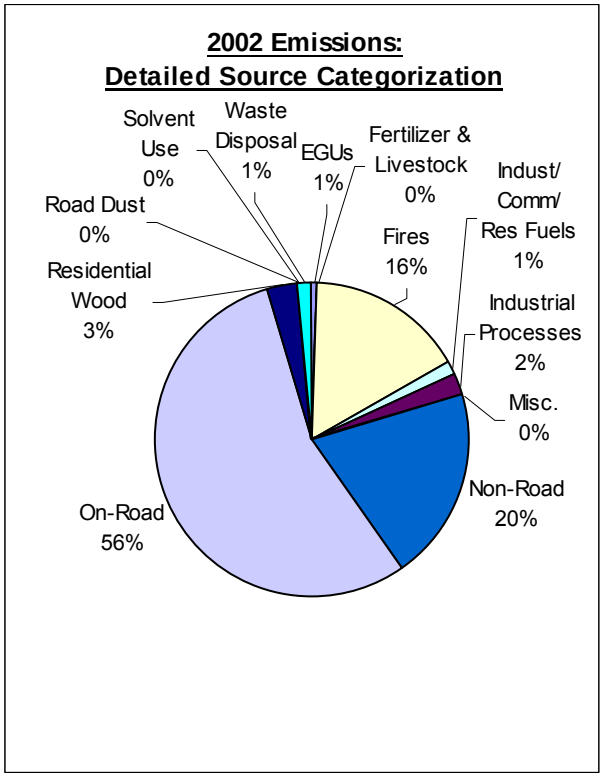
Emissions (Tons)

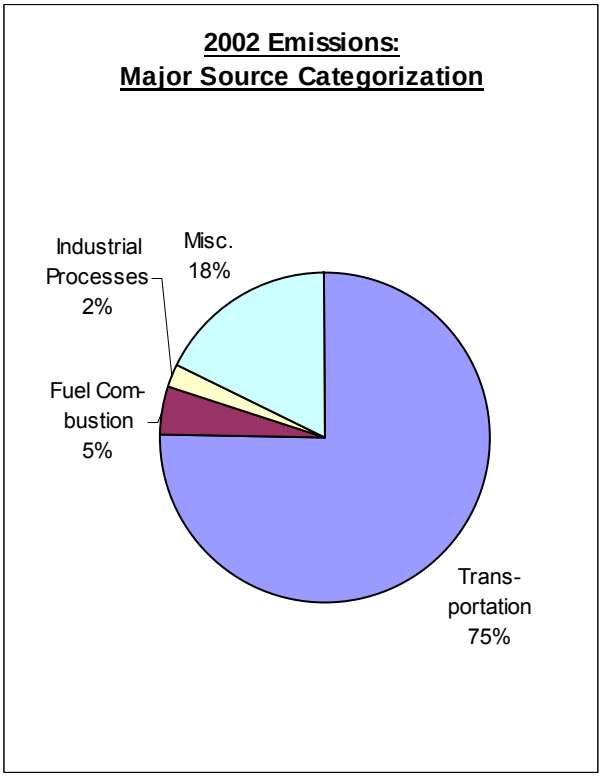
CO	1990	2002	Pct Change
EGUs	359,392	659,798	84%
Fertilizers & Livestock [1]		0	
Fires	10,998,710	18,509,341	68%
Indust/Comm/Res. Fuels	1,294,830	1,575,352	22%
Indust Processes	4,861,326	2,418,714	-50%
Misc	105,236	37,081	-65%
Non-Road	21,446,892	22,360,711	4%
On-Road	110,255,188	62,957,908	-43%
Residential Wood	3,780,932	3,330,580	-12%
Road Dust [1]		0	
Solvent Use	5,057	3,291	-35%
Waste Disposal	1,078,793	1,594,442	48%
TOTAL	**154,186,357**	**113,447,220**	**-26%**

[1] Category not estimated in 1990

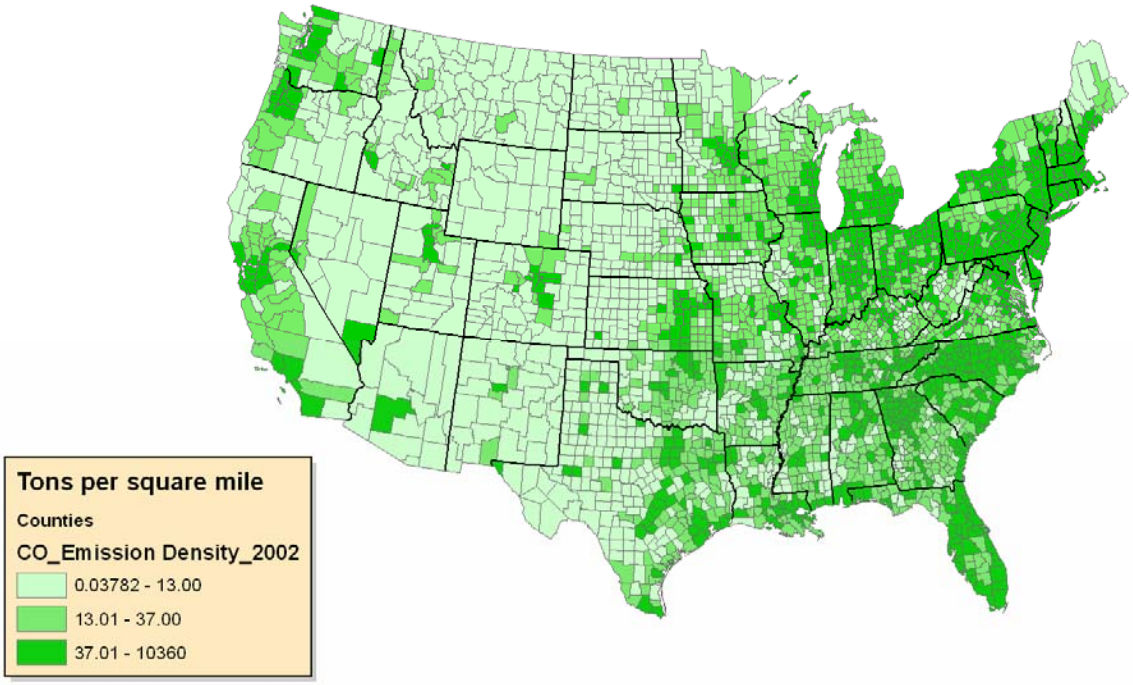
Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

Carbon Monoxide (CO) (cont.)





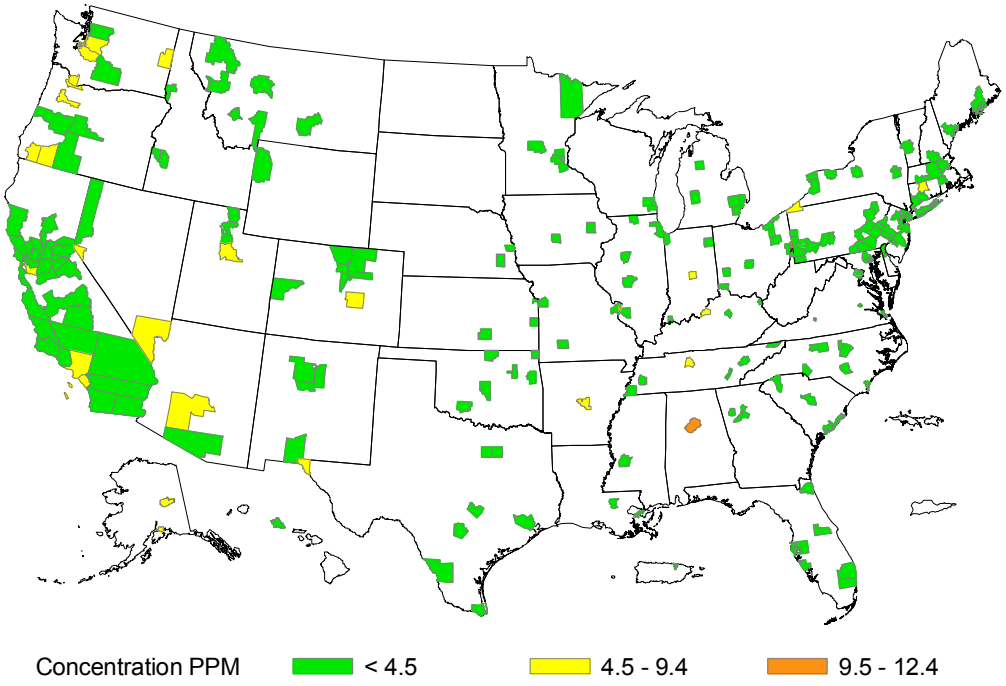
2002 Emissions Density Map



Source: 2002 National Emission Inventory, Version 1.

Carbon Monoxide (CO) (cont.)

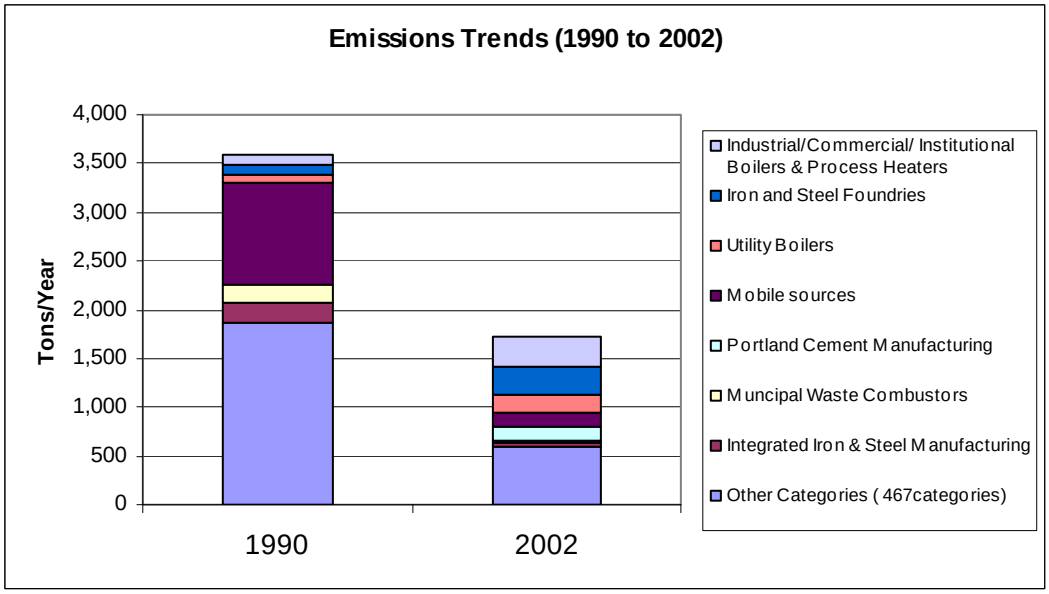
Ambient CO by County, 2002: second-high non-overlapping 8-hr average



The level of the CO 8-hour standard is 9 ppm (9.5 is above the level of the standard).

Lead Compounds

- HAP Category Name: Lead Compounds
- Includes 26 compounds in the NEI
- Toxicity: Potential NonCancer Effects
- 521 Source Categories
- 2002 Total Emissions: 1,726 tons



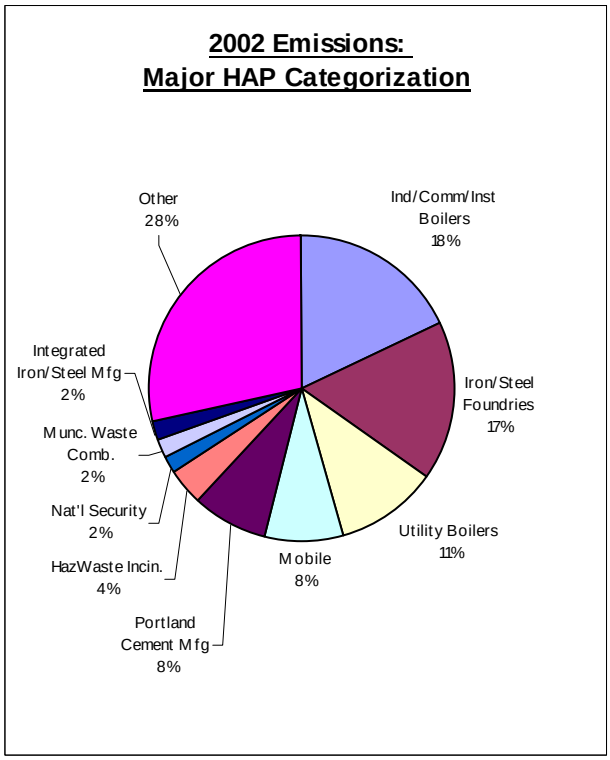
Emissions (Tons)

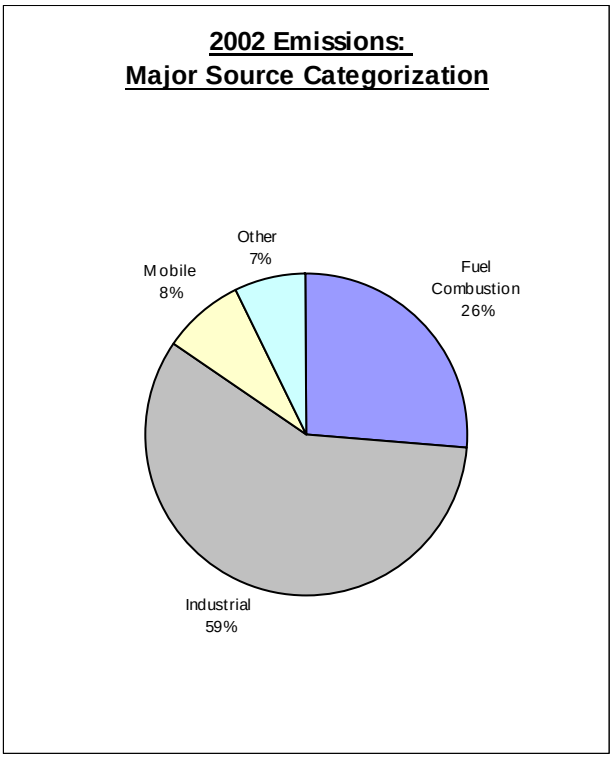
	1990	2002	Pct Change
Industrial/Commercial/ Institutional Boilers & Process Heaters	106.16	310.94	192.9%
Iron and Steel Foundries	98.27	288.07	193.1%
Utility Boilers	93.65	186.79	99.5%
Mobile sources	1,041.89	142.83	-86.3%
Portland Cement Manufacturing	10.86	134.05	1134.3%
Muncipal Waste Combustors	180.46	32.84	-81.8%
Integrated Iron & Steel Manufacturing	190.15	32.71	-82.8%
Other Categories (467categories)	1,876.74	597.83	-68.1%
TOTAL	**3,598.2**	**1,726.1**	**-52.0%**

- Stationary source and mobile source regulations have reduced lead compounds emissions by approximately 52 % since 1990. Lead compounds are emitted from a variety of stationary and mobile sources.
- Significant stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for Primary Lead Smelting, Integrated Iron & Steel Manufacturing, Pulp & Paper Production, Secondary Lead Smelting, Secondary Copper Smelting, and Primary Copper Smelting sources.
- Categories such as utility and industrial/commercial/institutional boilers are underestimated in the 1990 NEI.
- Mobile sources present in 2002 are from nonroad categories.

Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

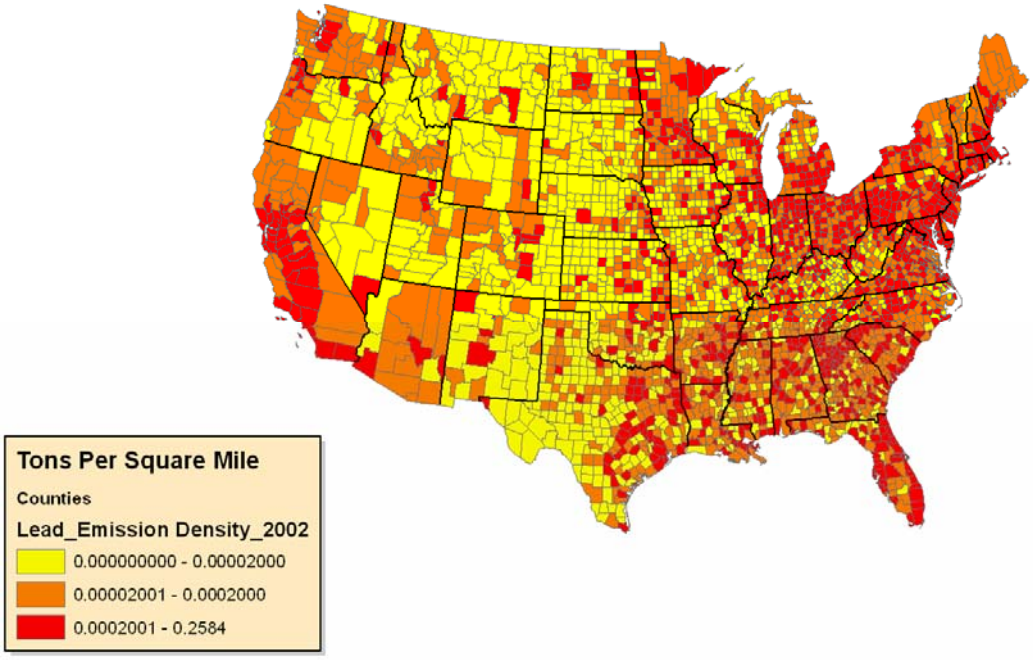
Lead Compounds (cont.)





- The "Other" Category shown in the Major Source Categorization pie chart includes open burning, landfills, and incineration categories.

2002 Emissions Density Map

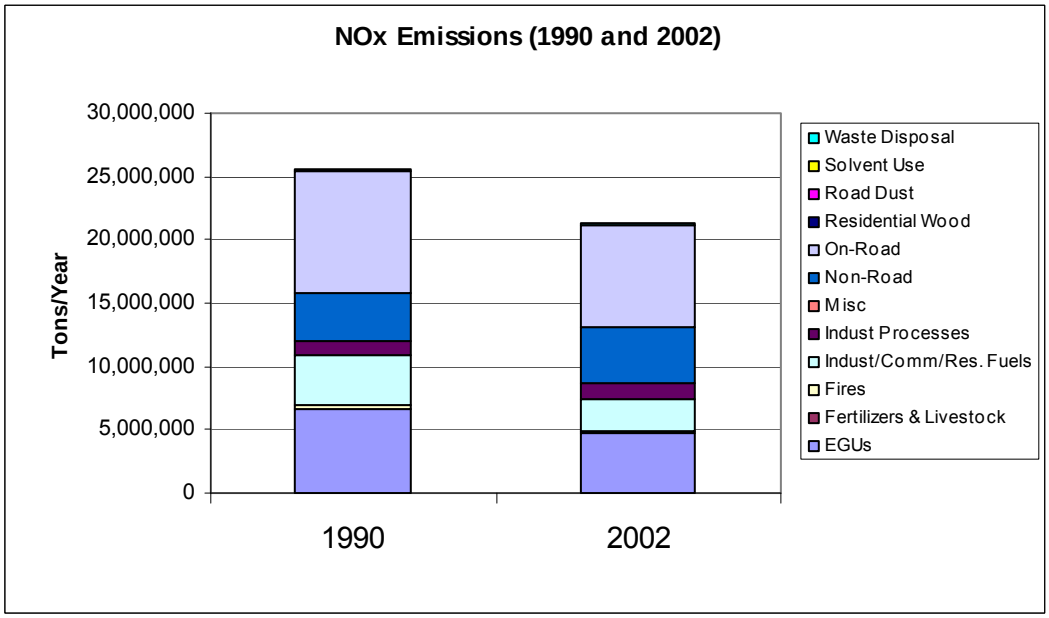


- The emissions density map shows that lead compounds are emitted in higher concentrations in areas with greater population. Counties in Montana and Idaho with high emission densities are due to agricultural field burning.

Nitrogen Oxides (NO_x)

Emissions by Source Type

- 2002 Total NO_x Emissions: 21,343 thousand tons



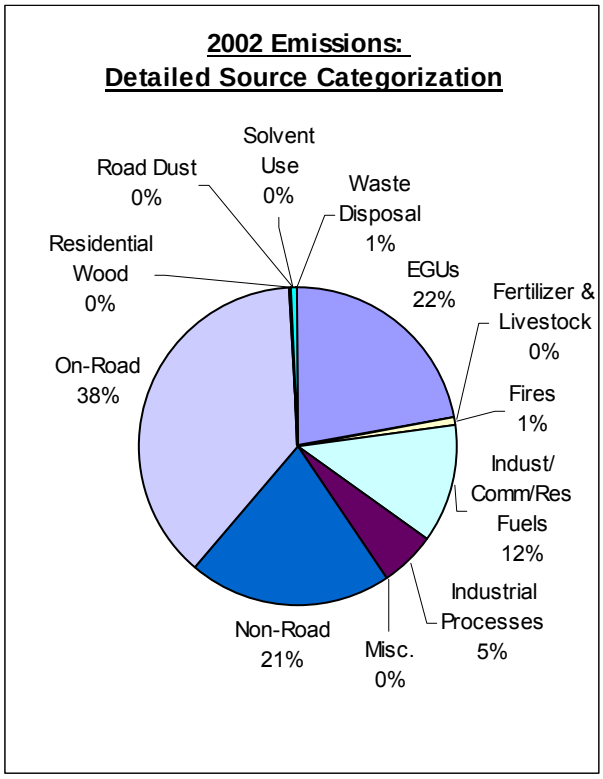
Emissions (Tons)

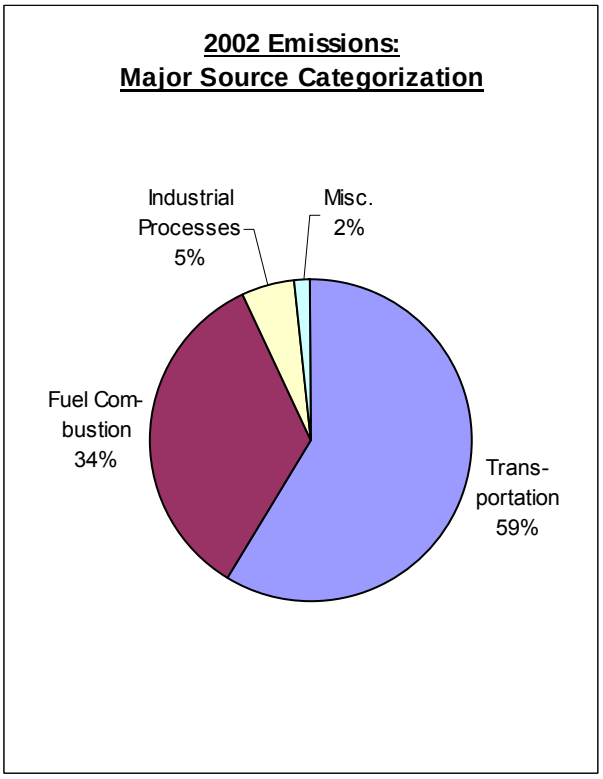
NOx	1990	2002	Pct Change
EGUs	6,640,871	4,722,007	-29%
Fertilizers & Livestock [1]		2,099	
Fires	366,016	208,453	-43%
Indust/Comm/Res. Fuels	3,869,900	2,533,942	-35%
Indust Processes	1,105,535	1,164,770	5%
Misc	32,960	12,250	-63%
Non-Road	3,780,845	4,402,837	16%
On-Road	9,592,113	8,133,567	-15%
Residential Wood	45,863	43,596	-5%
Road Dust [1]		0	
Solvent Use	3,245	8,987	177%
Waste Disposal	91,482	110,348	21%
TOTAL	**25,528,828**	**21,342,858**	**-16%**

[1] Category not estimated in 1990

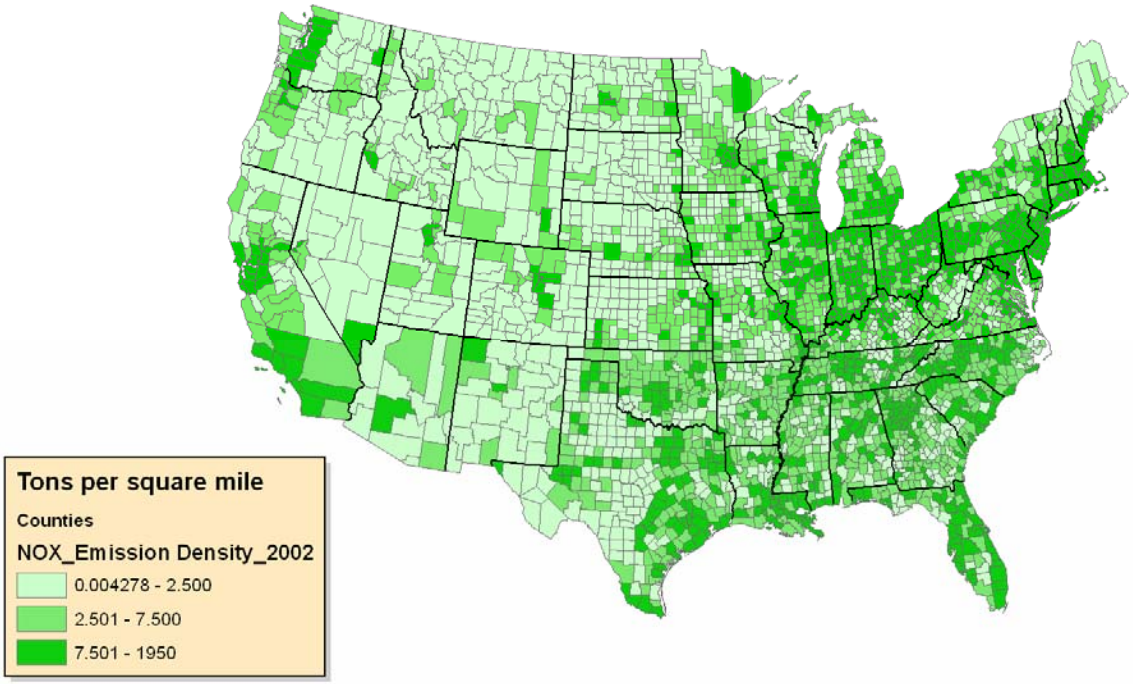
Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

Nitrogen Oxides (NO_x) (cont.)





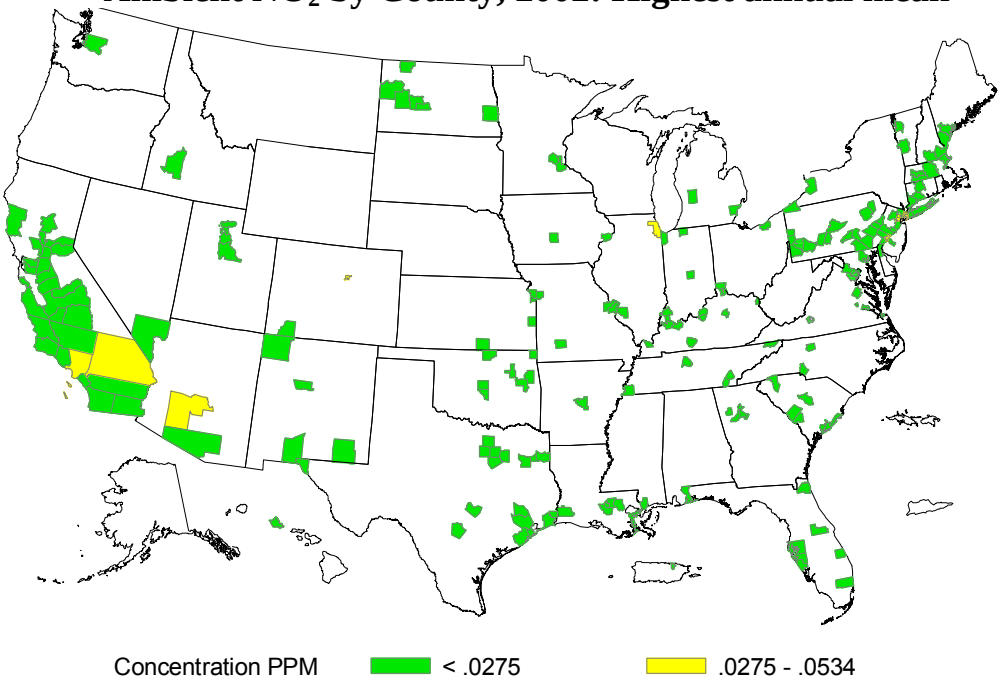
2002 Emissions Density Map



Source: 2002 National Emissions Inventory, version 1.

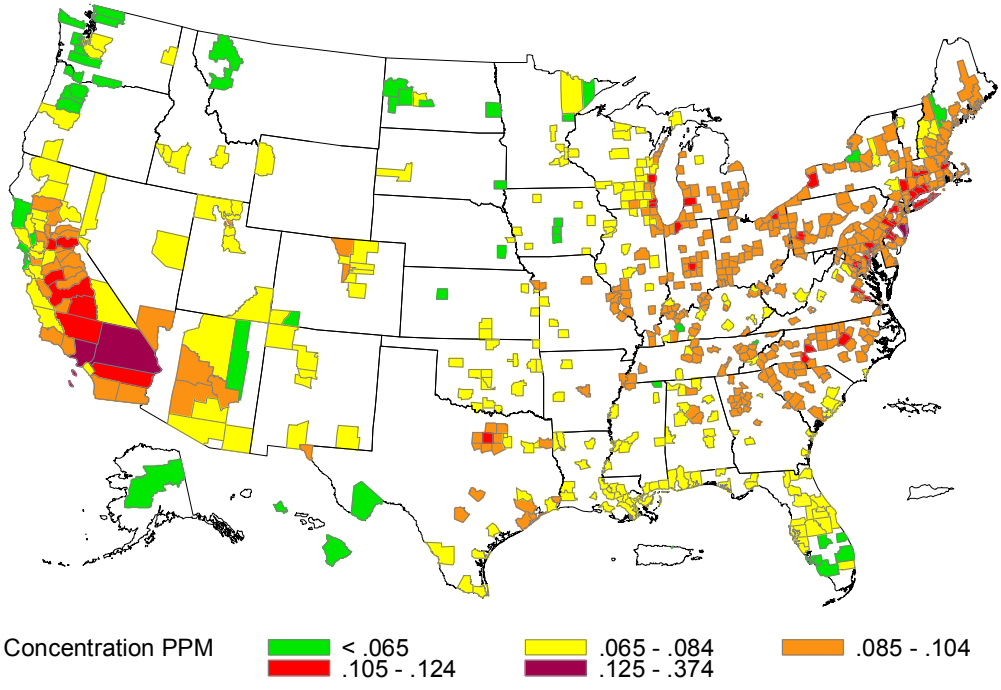
Nitrogen Oxides (NO_x) (cont.)

Ambient NO_2 by County, 2002: Highest annual mean



The level of the NO_2 standard is 0.053 ppm (0.0535 is considered above the level of the standard).

Ambient O_3 by County, 2002: Fourth highest daily maximum 8-hr average

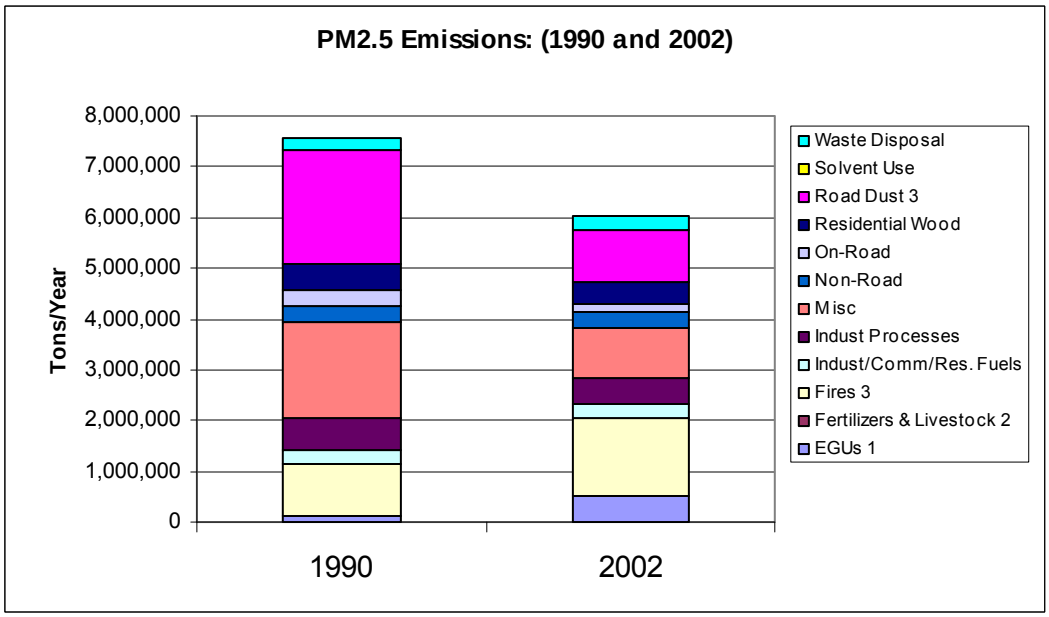


The level of the O_3 8-hour standard is 0.08 ppm (0.085 is considered above the level of the standard).

Particulate Matter (PM2.5)

Emissions by Source Type

- 2002 Total PM2.5 Emissions: 6,031 thousand tons



Emissions (Tons)

PM2.5	1990	2002	Pct Change
EGUs [1]	121,325	514,319	324%
Fertilizers & Livestock [2]		4,444	
Fires [3]	1,016,599	1,526,650	50%
Indust/Comm/Res. Fuels	264,023	299,290	13%
Indust Processes	642,419	494,629	-23%
Misc	1,907,451	991,821	-48%
Non-Road	300,147	301,334	0%
On-Road	322,831	148,433	-54%
Residential Wood	501,281	430,004	-14%
Road Dust [3]	2,244,771	1,044,146	-53%
Solvent Use	3,942	7,030	78%
Waste Disposal	233,526	269,251	15%
TOTAL	**7,558,315**	**6,031,351**	**-20%**

[1] 1990 excludes PM-Condensible fraction

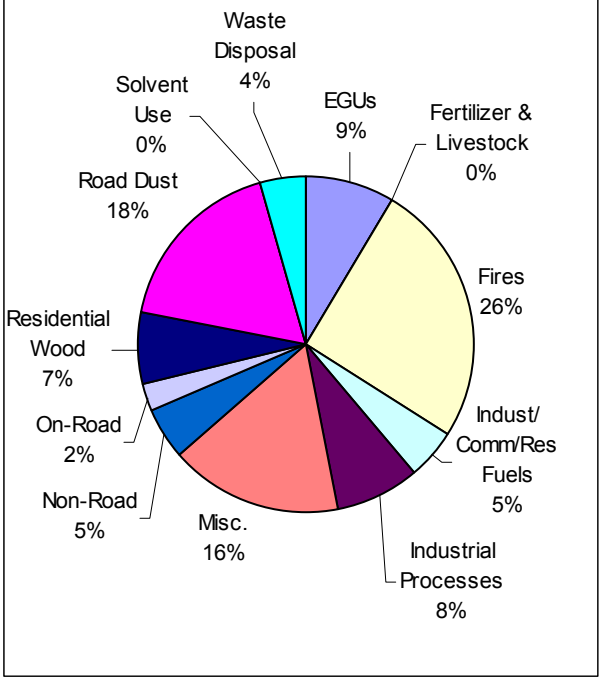
[2] Category not estimated in 1990

[3] Methodology changes between years

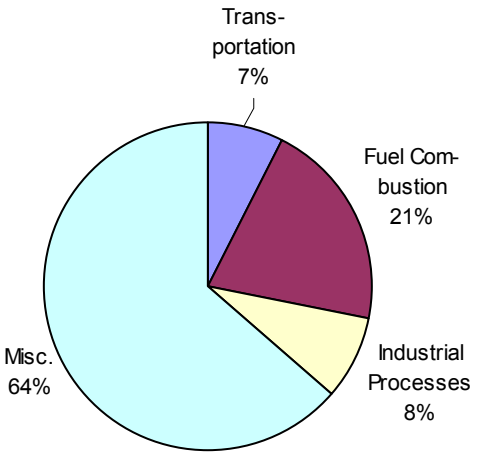
Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

Particulate Matter (PM2.5) (cont.)

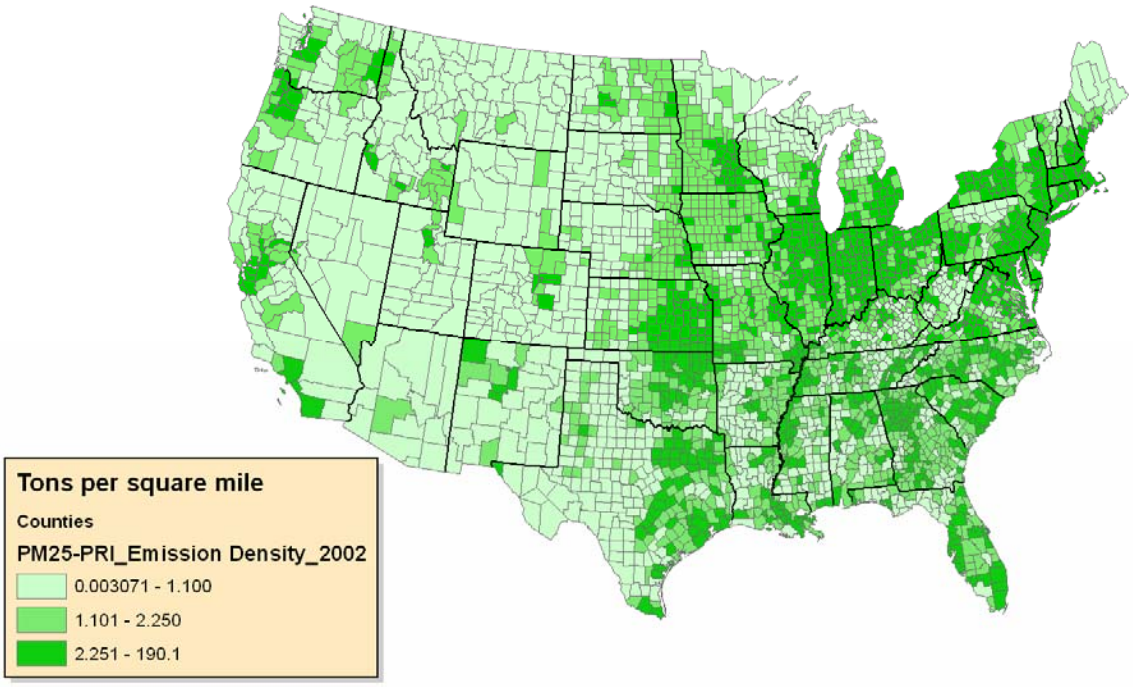
2002 Emissions:
Detailed Source Categorization



2002 Emissions:
Major Source Categorization

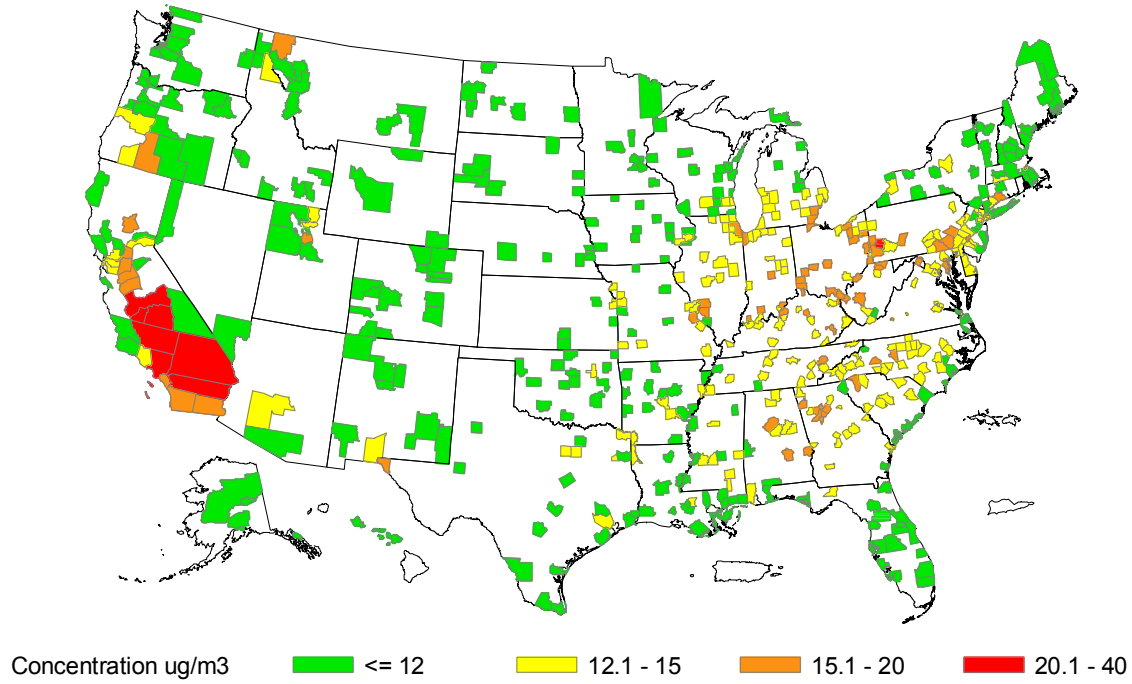


2002 Emissions Density Map



Particulate Matter (PM2.5) (cont.)

Ambient $PM_{2.5}$ by County, 2002: Annual mean

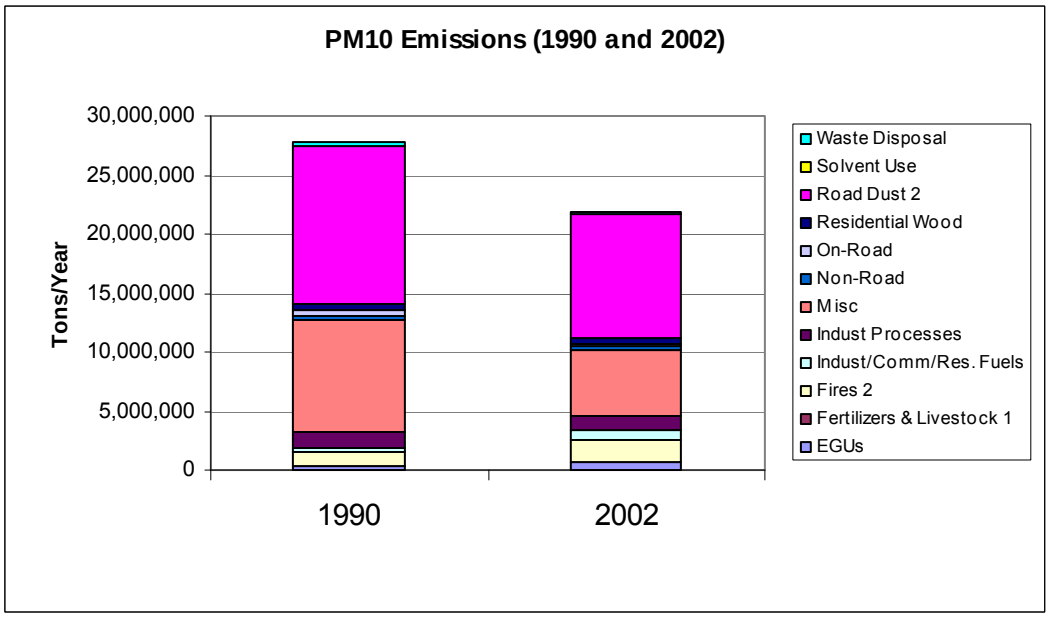


The level of the $PM_{2.5}$ annual standard is 15.0 µg/m^3 (15.1 µg/m^3 is above the level of the standard).

Particulate Matter (PM10)

Emissions by Source Type

- 2002 Total PM10 Emissions: 21,919 thousand tons



Emissions (Tons)

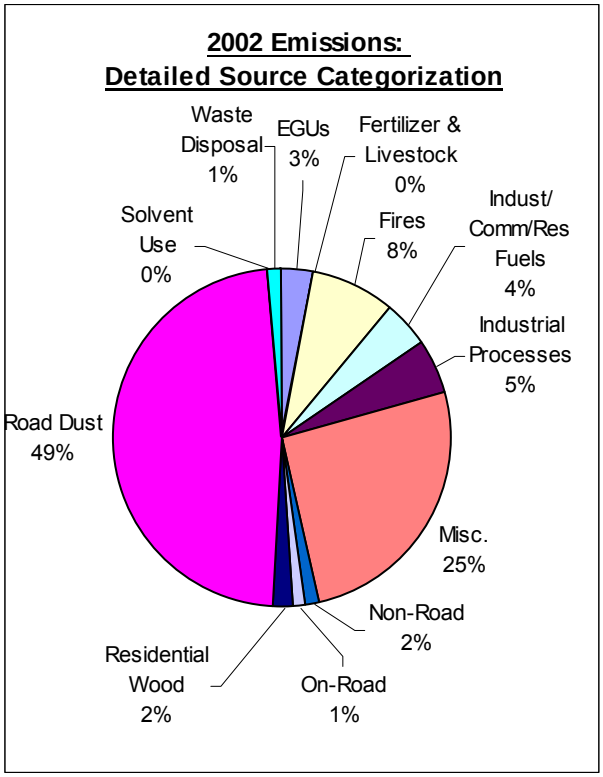
PM10	1990	2002	Pct Change
EGUs	294,850	644,966	54%
Fertilizers & Livestock [1]		15,230	
Fires [2]	1,158,794	1,801,525	55%
Indust/Comm/Res. Fuels	375,154	926,880	147%
Indust Processes	1,392,570	1,205,201	-13%
Misc	9,572,518	5,560,069	-42%
Non-Road	327,567	331,510	1%
On-Road	385,337	203,260	-47%
Residential Wood	501,281	443,989	-11%
Road Dust [2]	13,466,540	10,488,288	-22%
Solvent Use	4,446	8,374	88%
Waste Disposal	271,176	289,913	7%
TOTAL	**27,750,231**	**21,919,204**	**-27%**

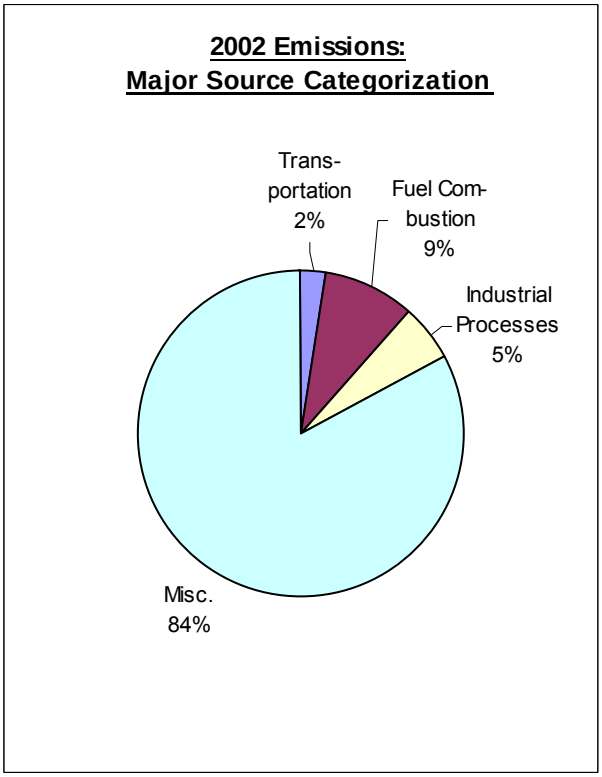
[1] Category not estimated in 1990

[2] Methodology changes between years

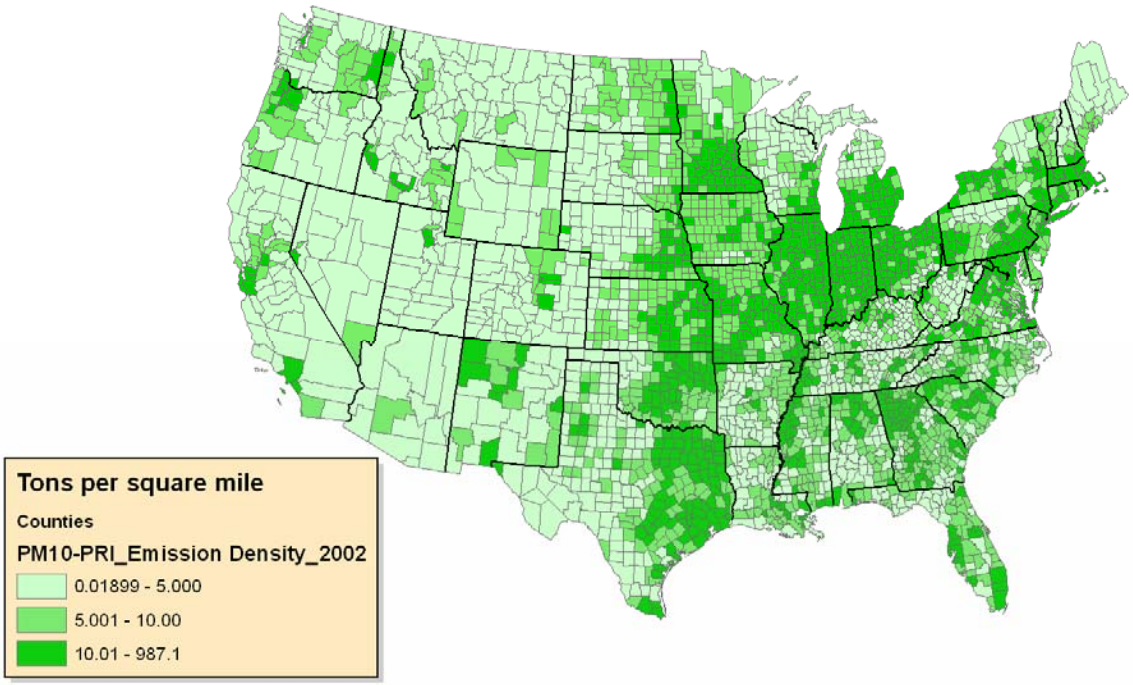
Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

Particulate Matter (PM10) (cont.)





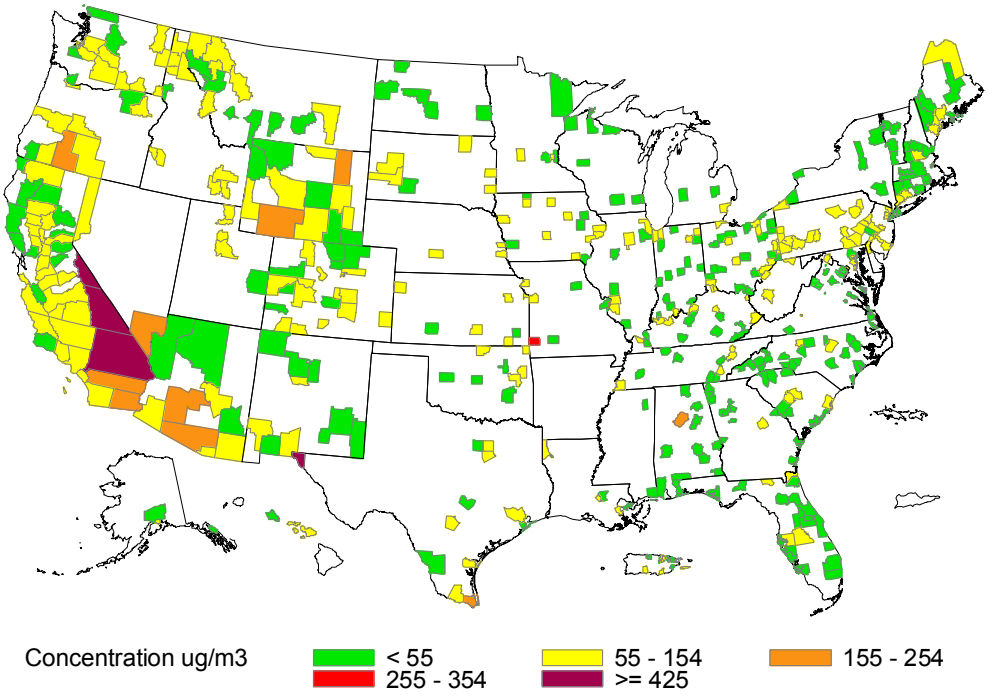
2002 Emissions Density Map



Source: 2002 National Emissions Inventory, version 1.

Particulate Matter (PM10) (cont.)

Ambient PM_{10} by County, 2002: Second-high 24-hr average

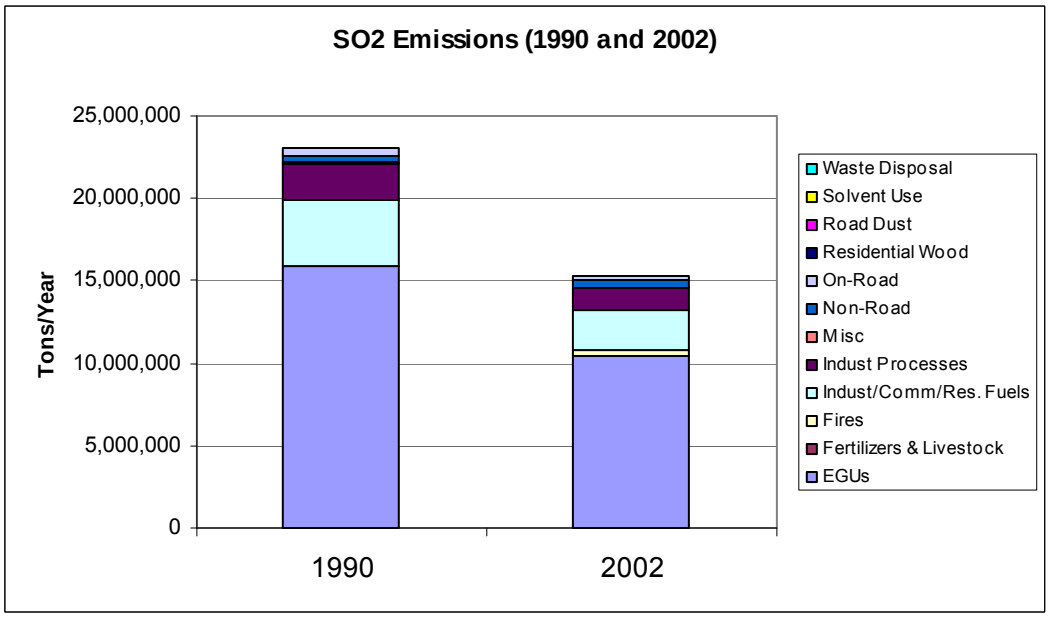


The level of PM_{10} 24-hour standard is 150 mg/m^3 (155 mg/m^3 is above the level of the standard).

Sulfur Dioxide (SO_2)

Emissions by Source Type

- 2002 Total SO2Emissions: 15,293 thousand tons



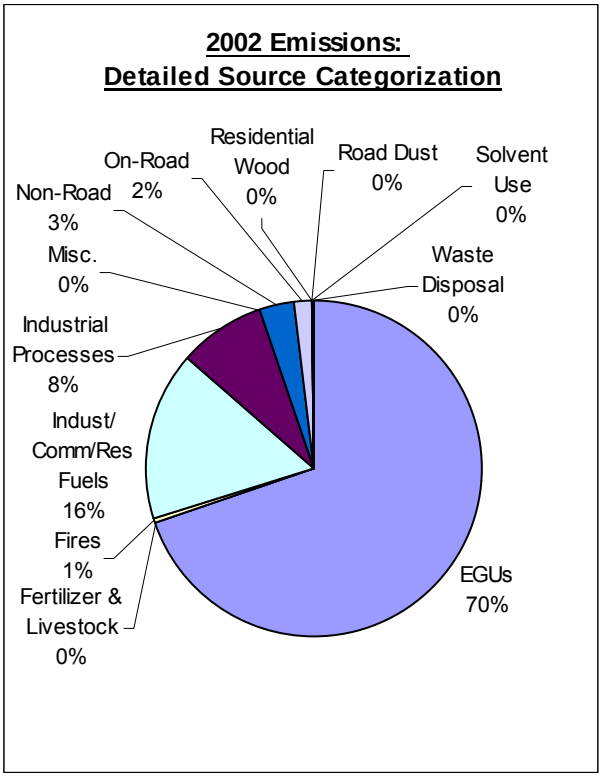
Emissions (Tons)

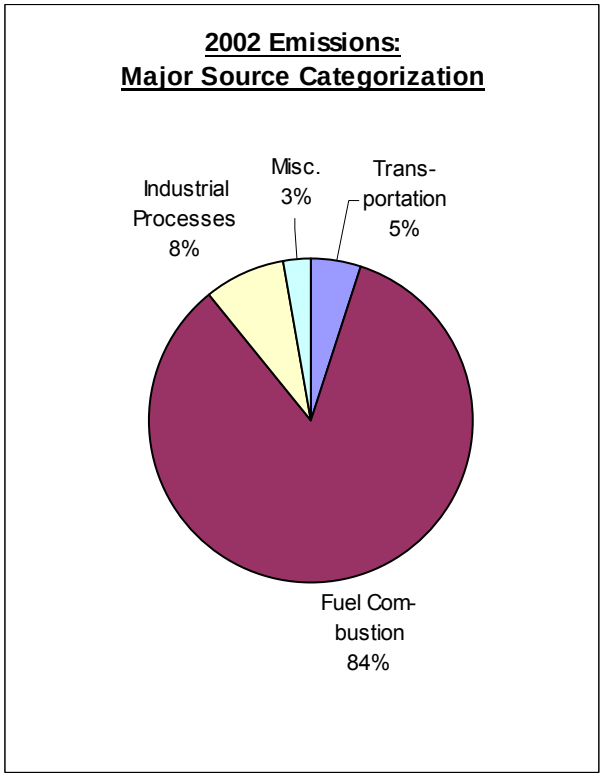
SO2	1990	2002	Pct Change
EGUs	15,908,598	10,454,869	-34%
Fertilizers & Livestock [1]		0	
Fires	11,851	386,125	3158%
Indust/Comm/Res. Fuels	3,974,205	2,416,256	-39%
Indust Processes	2,209,403	1,247,230	-44%
Misc	44,921	6,350	-86%
Non-Road	370,573	493,334	33%
On-Road	502,998	257,519	-49%
Residential Wood	6,539	6,120	-6%
Road Dust [1]		0	
Solvent Use	2,342	1,048	-55%
Waste Disposal	44,749	24,368	-46%
TOTAL	**23,076,179**	**15,293,220**	**-34%**

[1] Category not estimated in 1990

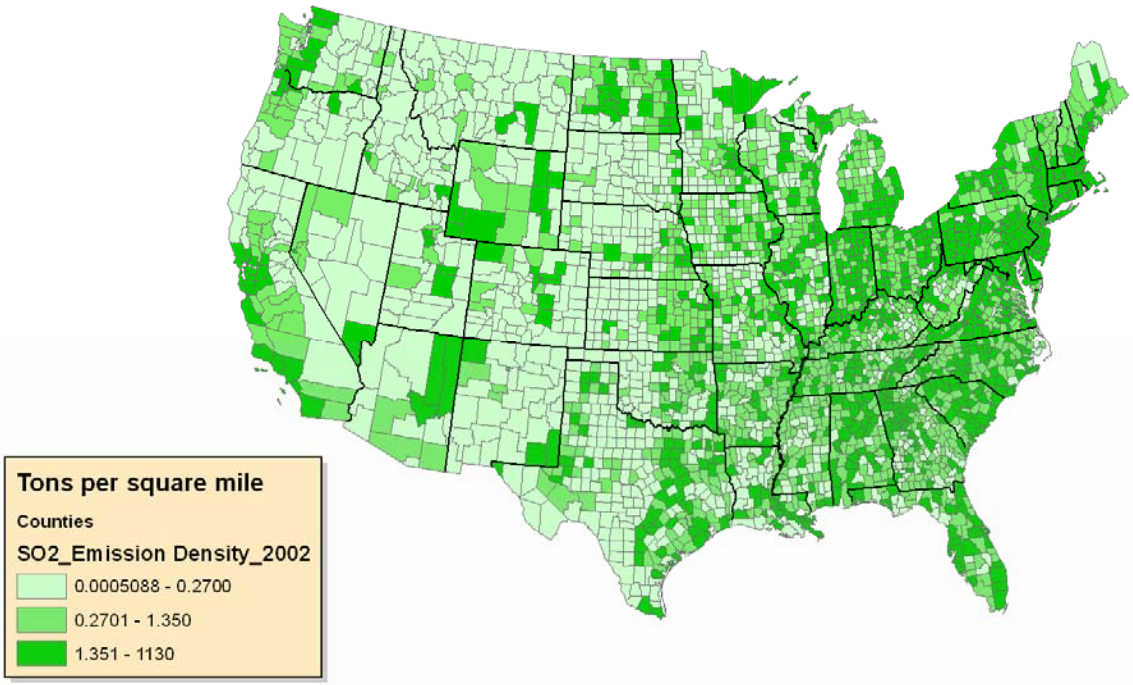
Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

Sulfur Dioxide (SO_2) (cont.)





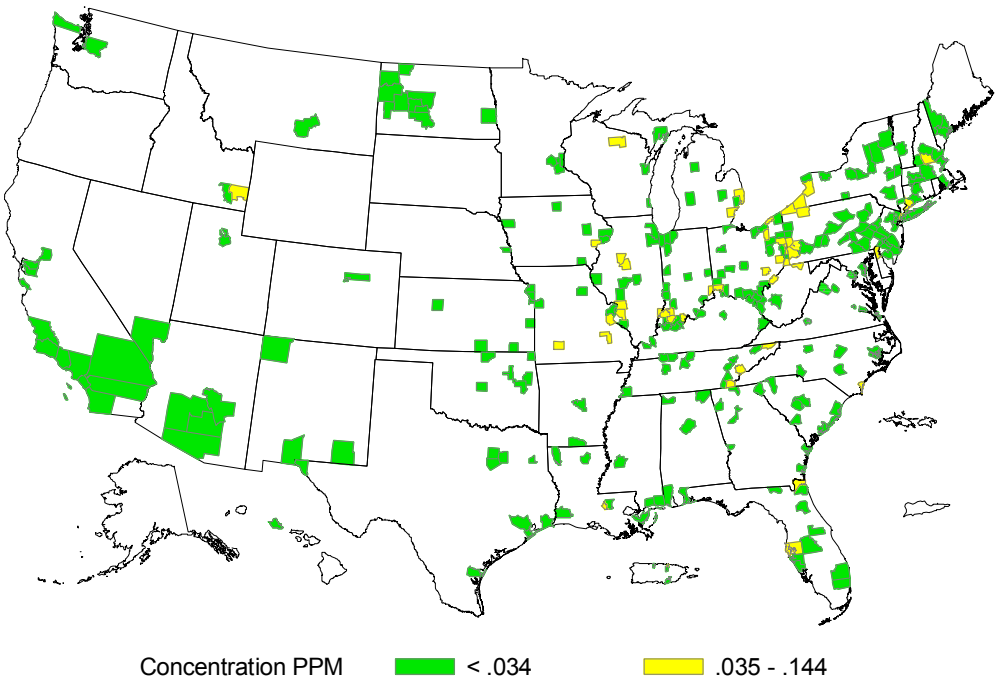
2002 Emissions Density Map



Source: 2002 National Emission Inventory, version 1.

Sulfur Dioxide (SO_2) (cont.)

Ambient SO_2 by County, 2002: Second-high 24-hr average

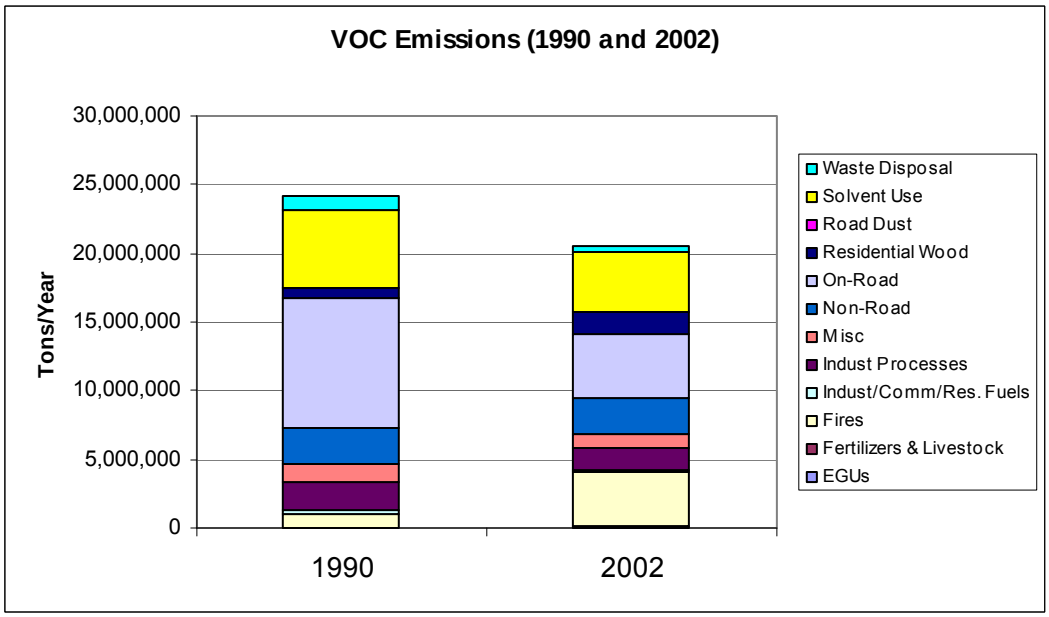


The level of the SO_2 24 standard is 0.14 ppm (0.145 is above the level of the standard).

Volatile Organic Compounds (VOC)

Emissions by Source Type

- 2002 Total VOC Emissions: 20,481 thousand tons



Emissions (Tons)

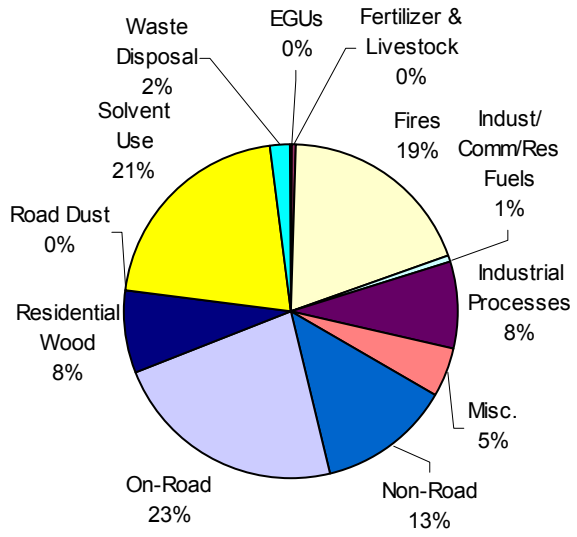
VOC	1990	2002	Pct Change
EGUs	46,431	49,709	7%
Fertilizers & Livestock [1]		42,192	
Fires	1,031,297	3,924,916	281%
Indust/Comm/Res. Fuels	195,307	149,947	-23%
Indust Processes	2,122,066	1,687,766	-20%
Misc	1,241,365	975,299	-21%
Non-Road	2,661,723	2,626,373	-1%
On-Road	9,388,018	4,660,578	-50%
Residential Wood	717,517	1,662,020	132%
Road Dust [1]		1	
Solvent Use	5,751,230	4,315,040	-25%
Waste Disposal	952,876	387,523	-59%
TOTAL	**24,107,830**	**20,481,365**	**-15%**

[1] Category not estimated in 1990

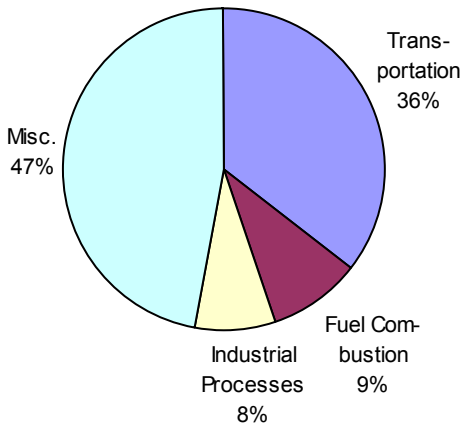
Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

Volatile Organic Compounds (VOC) (cont.)

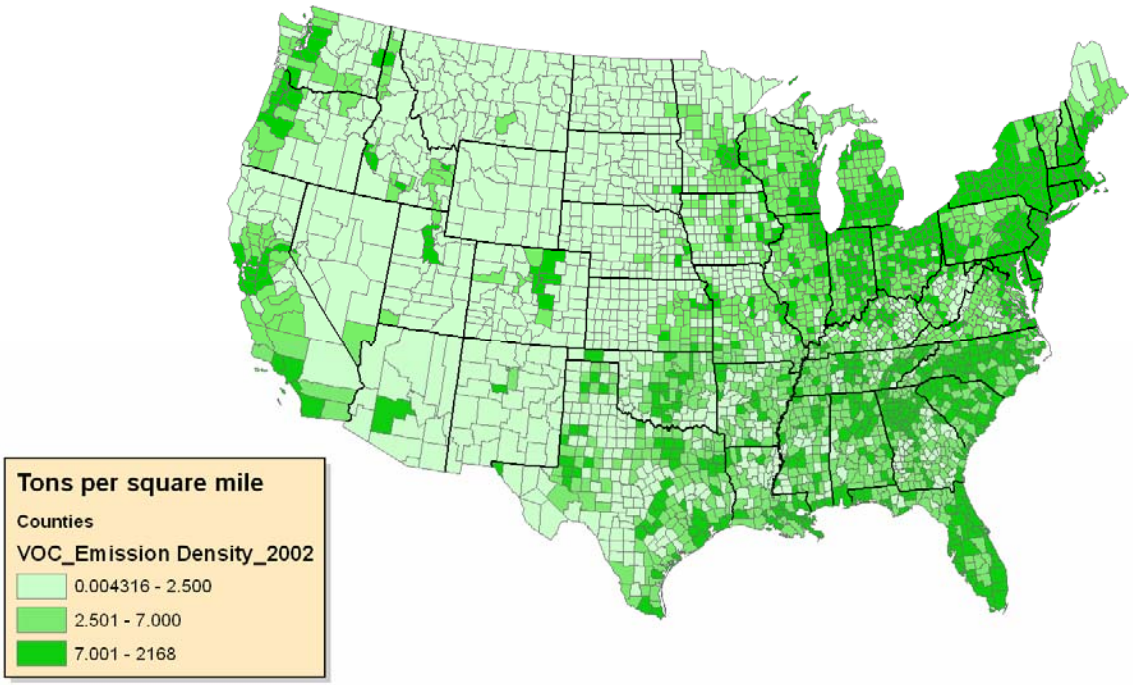
2002 Emissions:
Detailed Source Categorization



2002 Emissions:
Major Source Categorization

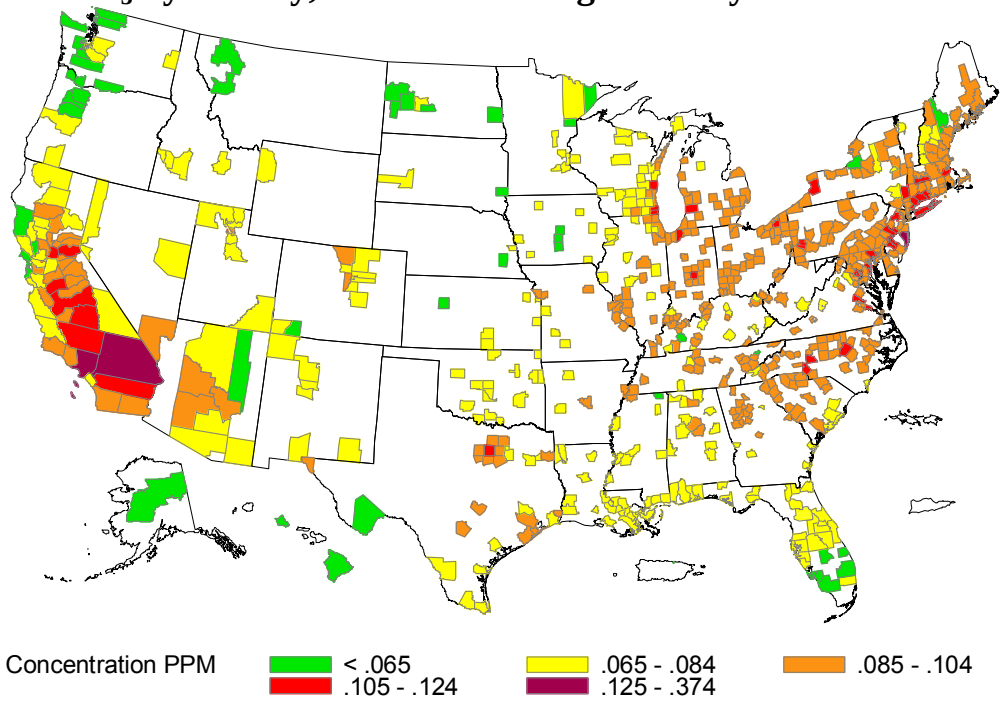


2002 Emissions Density Map



Volatile Organic Compounds (VOC) (cont.)

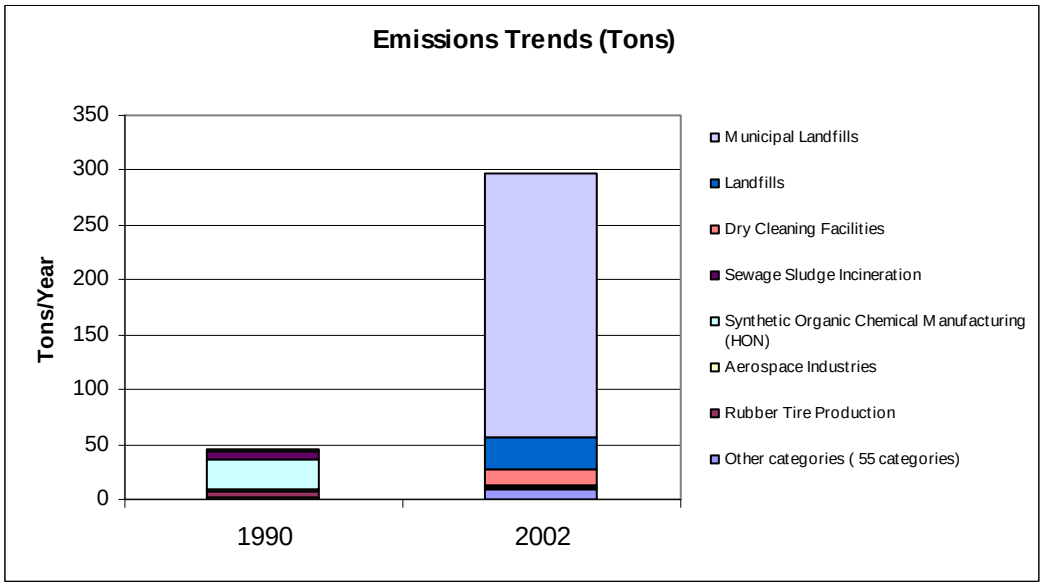
Ambient O_3 by County, 2002: Fourth highest daily maximum 8-hr average



The level of the O_3 8-hour standard is 0.08 ppm (0.085 is above the level of the standard).

1,1,2,2-Tetrachloroethane

- HAP Category Name: 1,1,2,2-Tetrachloroethane
- CAS Number: 79-34-5
- Chemical Formula: $C_2H_2Cl_4$ Molecular Weight: 167.85
- Toxicity: Potential Cancer Risks
- 84 Source Categories (2002)
- 2002 Total Emissions: 297 tons



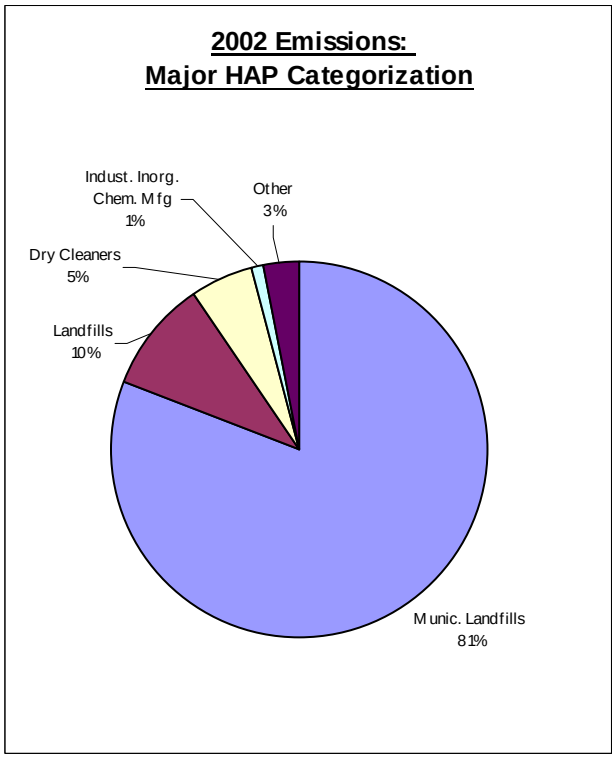
Emissions (Tons)

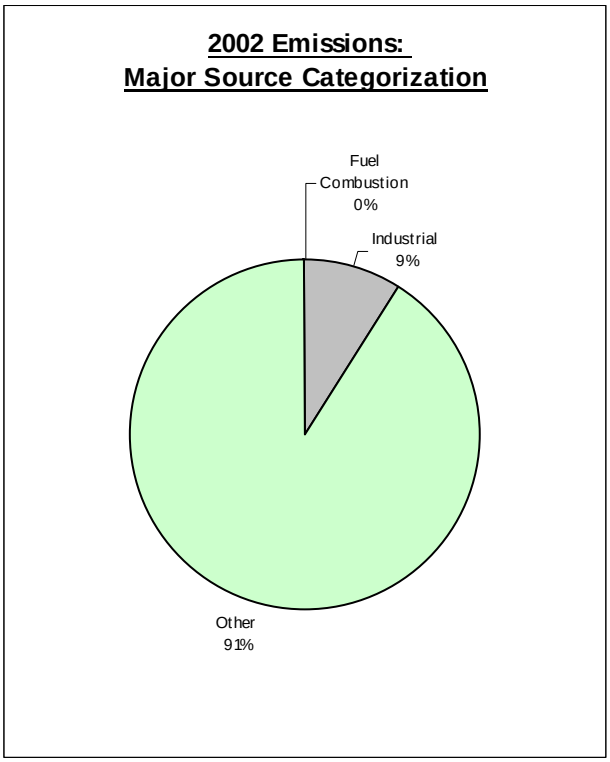
	1990	2002	Pct Change
Municipal Landfills	0.59	240.2	40611.9%
Landfills		28.64	
Dry Cleaning Facilities		15.42	
Sewage Sludge Incineration	6.87	1.32	-80.8%
Synthetic Organic Chemical Manufactu	28.65	1.05	-96.3%
Aerospace Industries	0.62	0.62	0.0%
Rubber Tire Production	6.21	0.1	-98.4%
Other categories (55 categories)	1.81	9.66	433.7%
TOTAL	**44.75**	**297.01**	**563.7%**

- 1,1,2,2-Tetrachloroethane is only emitted from stationary sources.
- Stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the HON and Rubber Tire Production sources.
- Landfills, the largest source of emissions in the 2002 NEI, were not reported in the 1990 NEI.

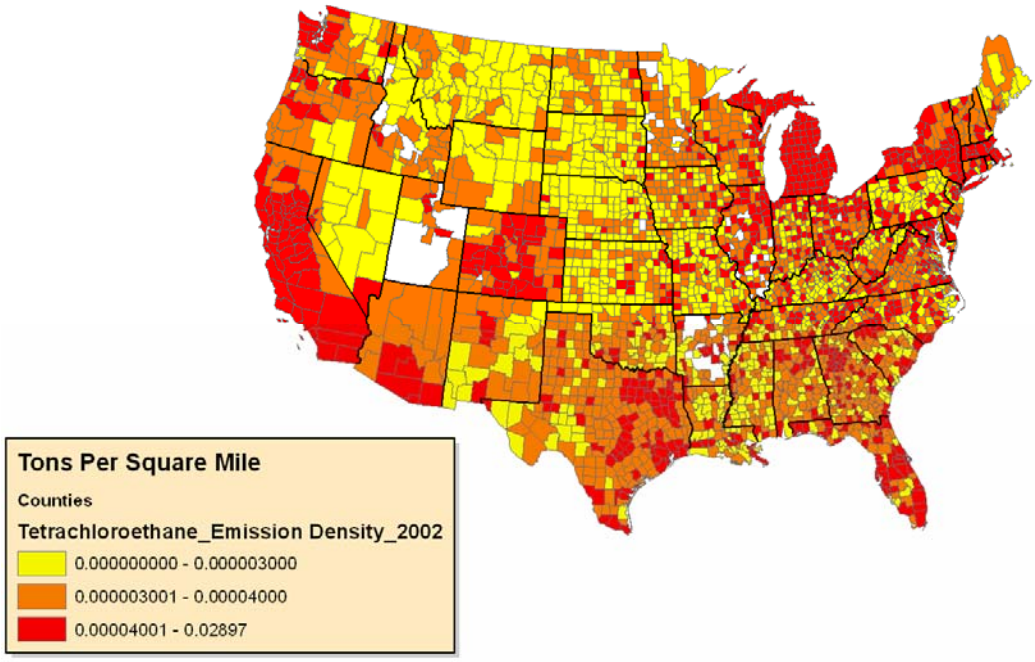
Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

1,1,2,2-Tetrachloroethane (cont.)





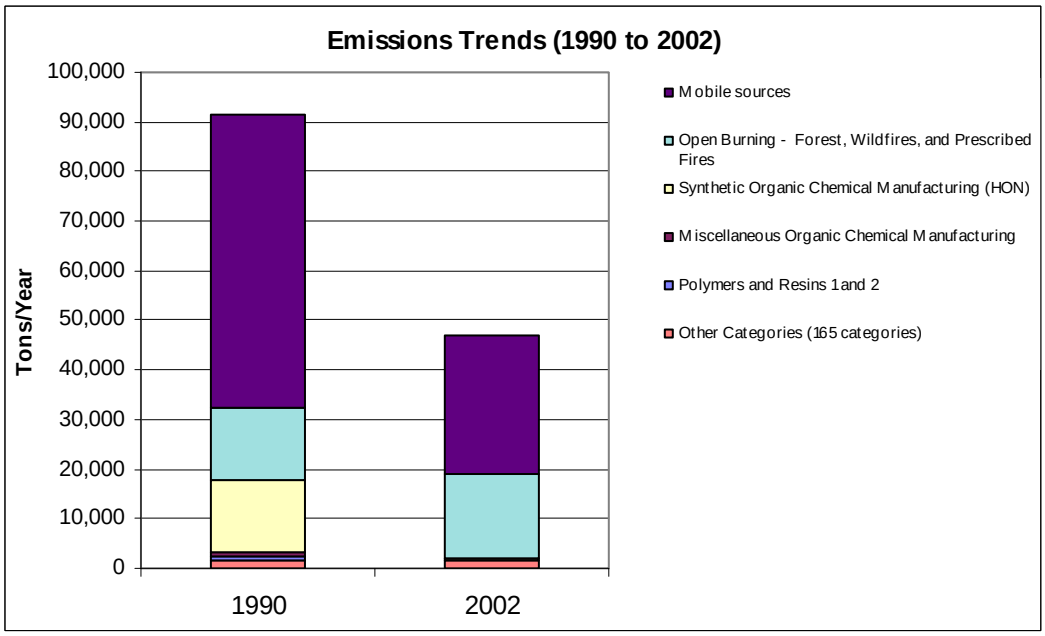
2002 Emissions Density Map



- The County Density map shows that 1,1,2,2-tetrachloroethane is emitted in 3051 counties of the 3141 counties in the 50 states.
- Lowest range extends below 10^{-9} tons/sq. mi. White areas identify counties with actual zero emissions.

1,3-Butadiene

- HAP Category Name: 1,3-Butadiene
- CAS Number: 106-99-0
- Chemical Formula: C_4H_6 Molecular Weight: 54.09
- Toxicity: Potential Cancer Risks and NonCancer Effects
- 174 Source Categories (2002)
- 2002 Total Emissions: 46,950 tons



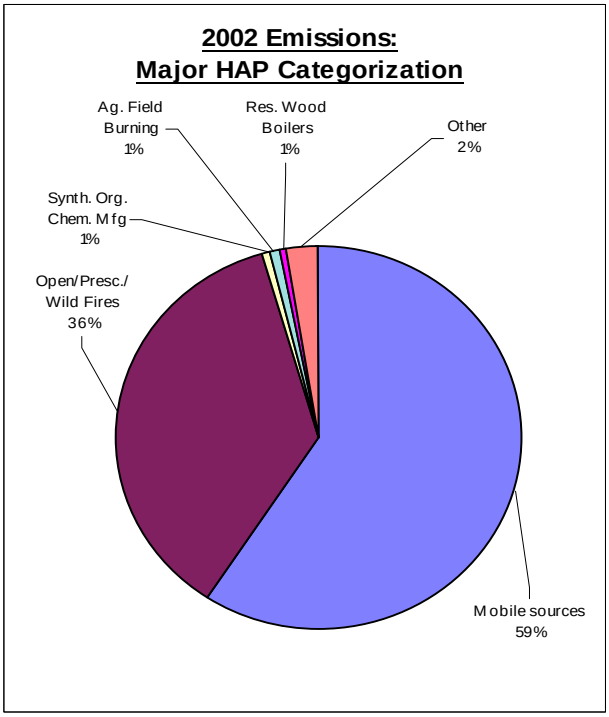
Emissions (Tons)

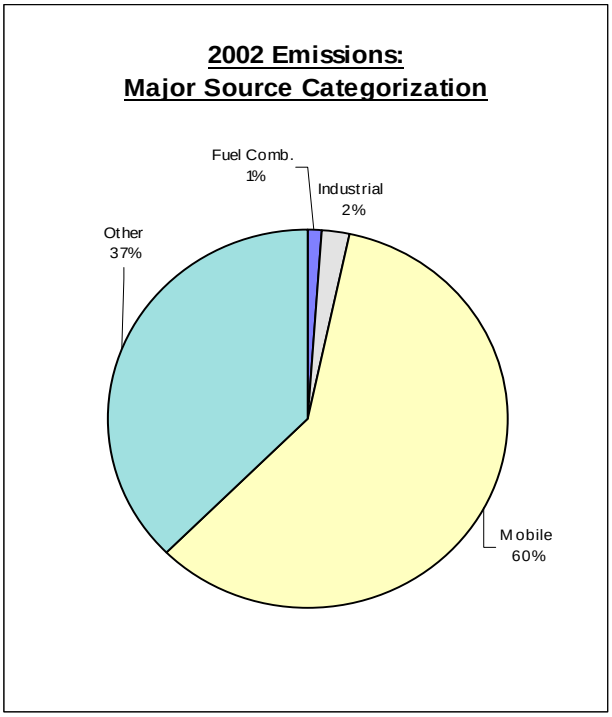
	1990	2002	Pct Change
Mobile sources	59,122	27,770	-53%
Open Burning - Forest, Wildfires, and Prescribed Fires	14,639	17,064	17%
Synthetic Organic Chemical Manufacturing (HON)	14,323	319	-98%
Miscellaneous Organic Chemical Manufacturing	872	89	-90%
Polymers and Resins 1 and 2	920	5	-99%
Other Categories (165 categories)	1,605	1,703	6%
TOTAL	**91,480**	**46,950**	**-49%**

- Stationary source and mobile source regulations have reduced 1,3-butadiene emissions by approximately 50 % since 1990.
- Significant stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the HON, Miscellaneous Organic Chemical Manufacturing, and Polymers and Resins sources.
- Emission estimation methodologies are different in 1990 and 2002 for the categories of: Open Burning: Forest and Wildfires and Prescribed Burns.
- Categories such as Agricultural Field Burning, Burning of Land Clearing Debris, and Residential Wood Combustion are reported in 2002 NEI but were not reported in the 1990 NEI.

Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

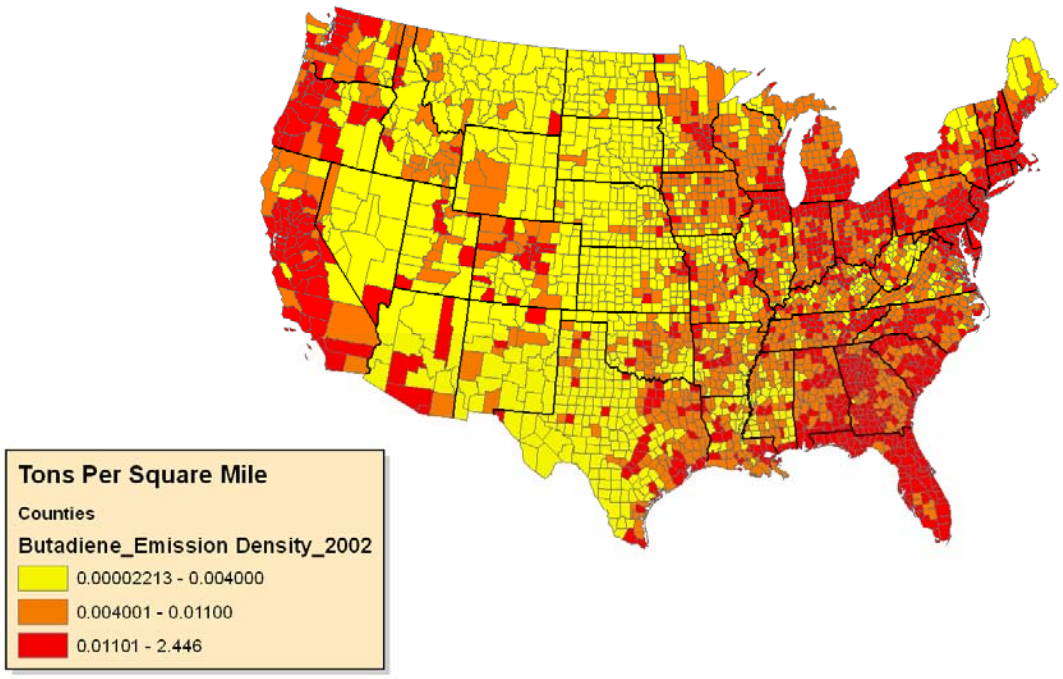
1,3 Butadiene (cont.)





- The "Other" Category shown in the Major Source. Categorization pie chart includes open burning categories, which have the significant emissions in 2002.

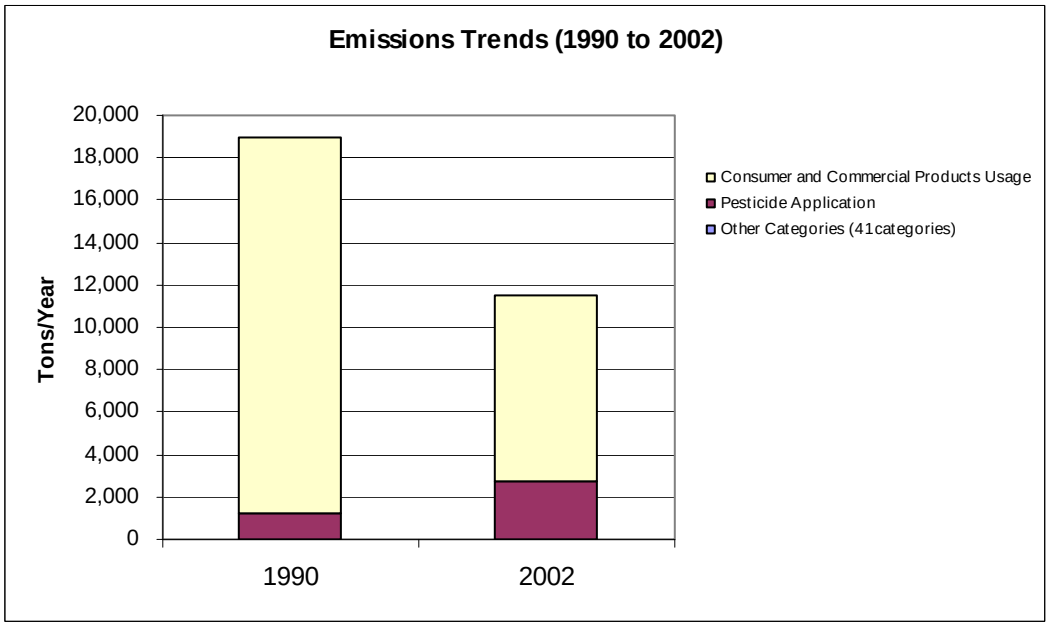
2002 Emissions Density Map



- The emissions density map shows that 1,3-butadiene is emitted in higher concentrations in areas with greater population. The primary source of 1,3-butadiene emissions in 2002 is mobile sources, which can be correlated to population. The counties in Montana and Idaho with high emission densities are due to agricultural field burning

1,3-Dichloropropene

- HAP Category Name: 1,3-Dichloropropene
- CAS Number: 542-75-6
- Chemical Formula: $C_3H_4Cl_2$ Molecular Weight: 110.97
- Toxicity: Potential Cancer Risks and NonCancer Effects
- 48 Source Categories (2002)
- 2002 Total Emissions: 11,521 tons



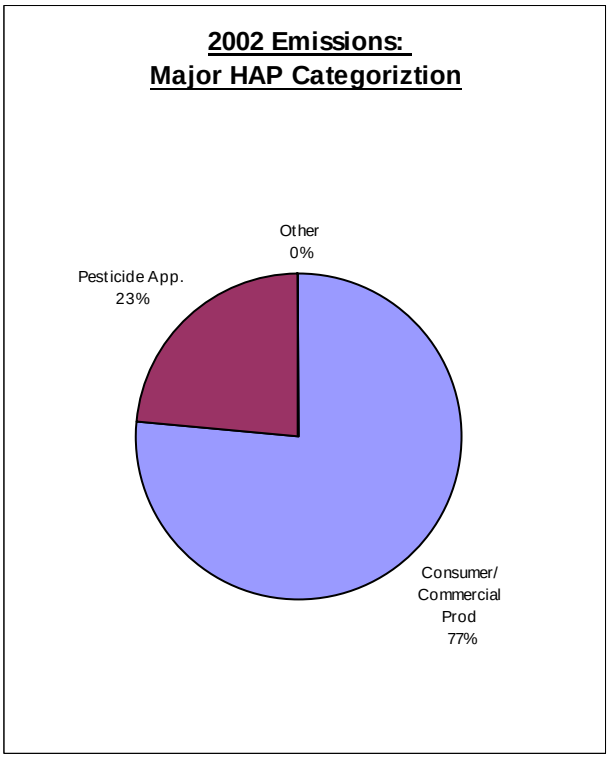
Emissions (Tons)

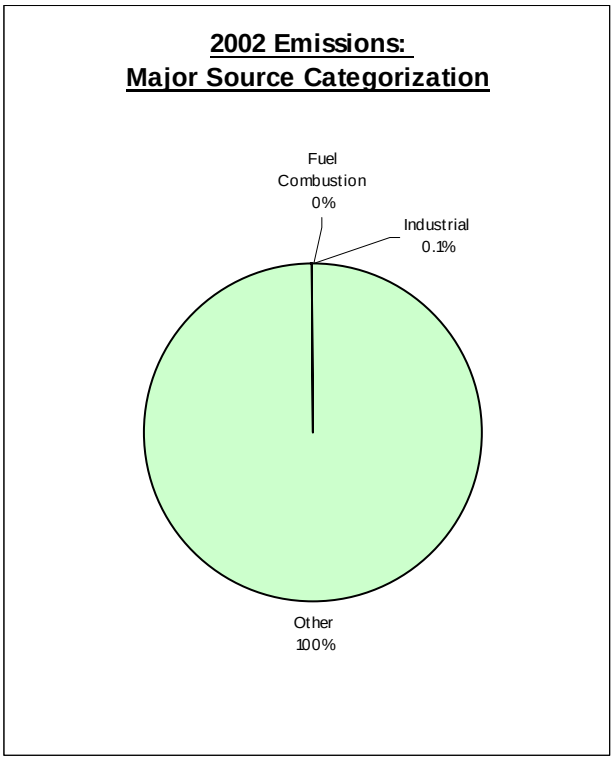
	1990	2002	Pct Change
Consumer and Commercial Products Usage	17,717.17	8,816.06	-50.2%
Pesticide Application	1,175.35	2,698.61	129.6%
Other Categories (41 categories)	44.44	6.53	-85.3%
TOTAL	**18,936.96**	**11,521.20**	**-39.2%**

- 1,3-Dichloropropene is only emitted from stationary sources. Stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the HON and Hydrochloric Acid Production.
- The second largest source present in the 2002 NEI, Pesticide Application, is not present in the 1990 NEI.

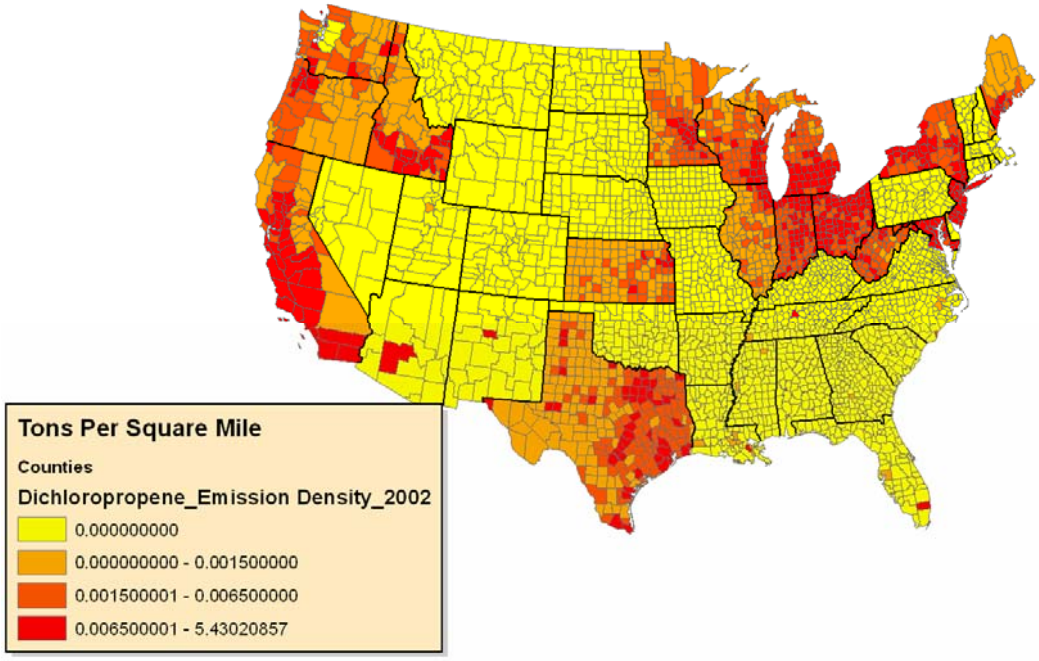
Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

1,3-Dichloropropene (cont.)





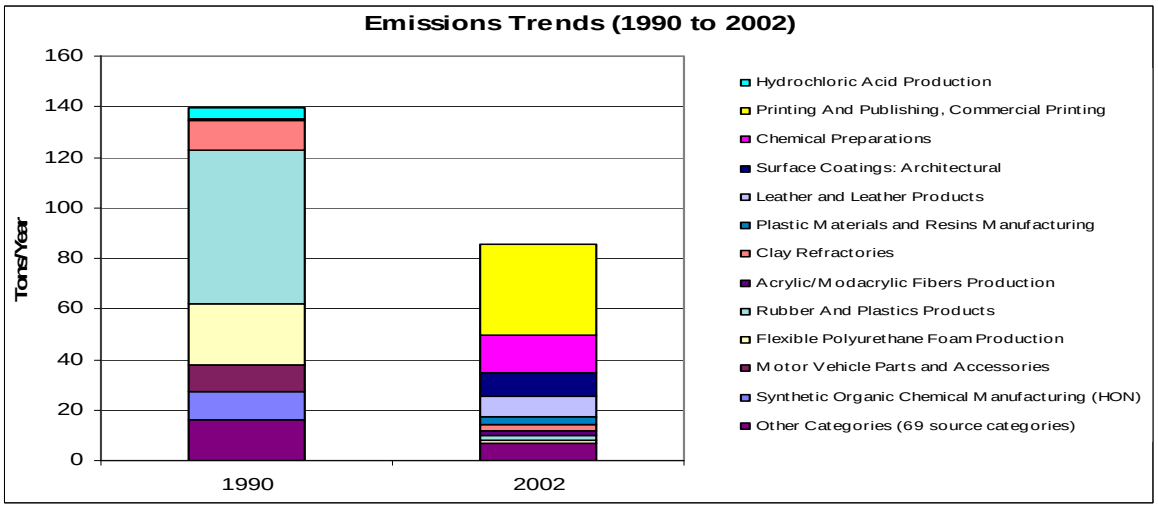
2002 Emissions Density Map



- The County Density map shows that 1, 3-dichloropropene is emitted in 1256 counties of the 3141 counties in the 50 states. The majority of emissions is in the nonpoint inventory and reported by states. Coverage of categories is not complete. Problems with consistent reporting in the nonpoint inventory exist.

2,4-Toluene Diisocyanate

- HAP Category Name: 2,4-Toluene Diisocyanate
- CAS Number: 26471-62-5
- Chemical Formula: $C_9H_6N_2O_2$ Molecular Weight: 174.16
- Toxicity: Potential Cancer Risk and NonCancer Effects
- 67 Source Categories (2002)
- 2002 Total Emissions: 86 tons



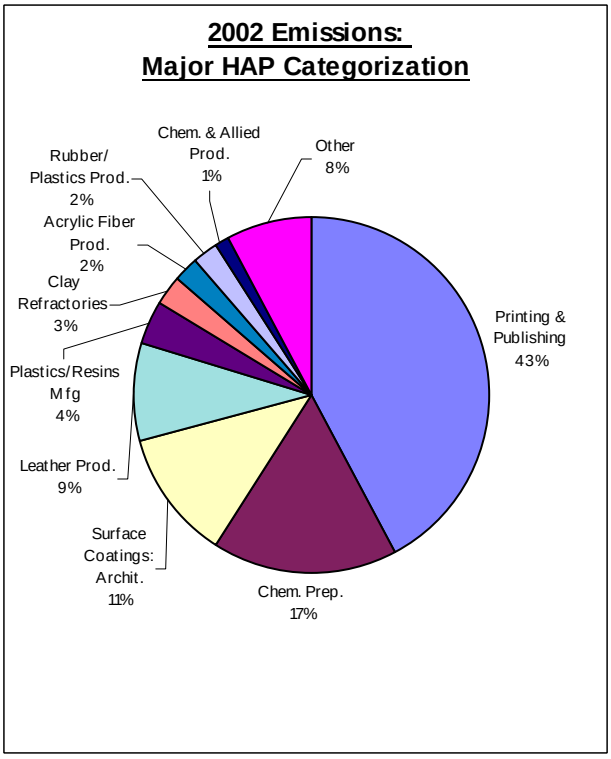
Emissions (Tons) 11/20/06

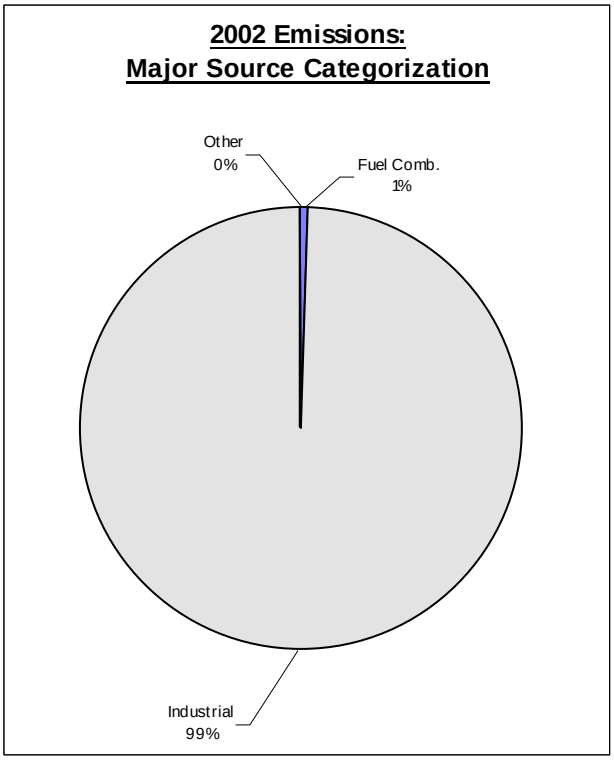
	1990	2002	Pct Change
Printing And Publishing, Commercial Printing		36.17	
Chemical Preparations	0.01	14.75	147400%
Surface Coatings: Architectural		9.82	
Leather and Leather Products		7.65	
Plastic Materials and Resins Manufacturing	0.54	3.45	539%
Clay Refractories	11.96	2.37	-80%
Acrylic/Modacrylic Fibers Production		2	
Rubber And Plastics Products	60.44	1.89	-97%
Flexible Polyurethane Foam Production	24.61	0.73	-97%
Motor Vehicle Parts and Accessories	10.16	0.37	-96%
Synthetic Organic Chemical Manufacturing (HON)	11.08	0.17	-98%
Hydrochloric Acid Production	4.51		-100%
Other Categories (69 source categories)	16.42	6.52	-60%
TOTAL	**139.7**	**85.9**	**-39%**

- 2,4-Toluene Diisocyanate is only emitted from stationary source categories. It is primarily emitted from surface coating processes.
- Several categories listed above are part of RTR; the 2002 emissions for these RTR categories will be significantly revised.
- Stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the Flexible Polyurethane Foam Production, HON, and Plastic Parts & Products (Surface Coating).
- Many categories such as Printing and Publishing, Chemical Preparations, Architectural Surface Coating, and Leather Tanning, are reported in the 2002 NEI but were not reported in the 1990 NEI.

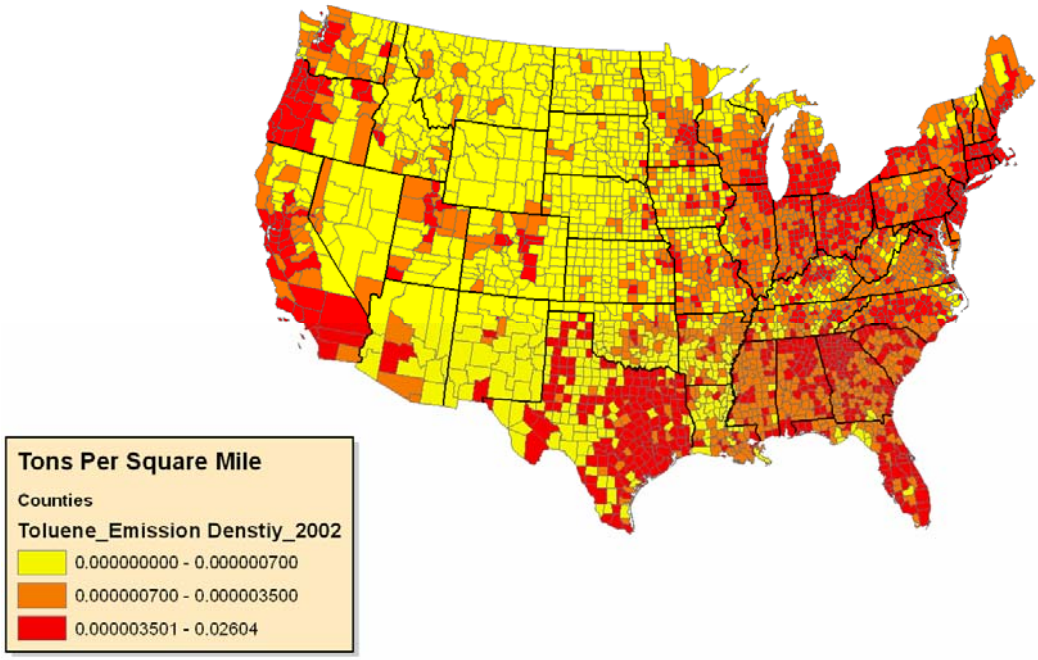
Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

2,4-Toluene Diisocyanate (cont.)





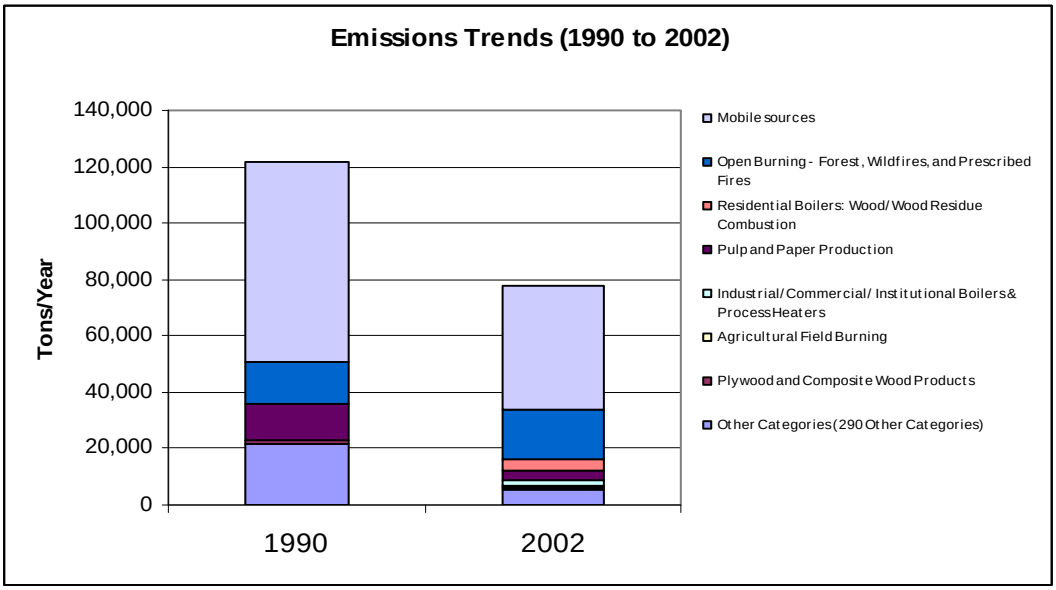
2002 Emissions Density Map



- The emissions density map shows that 2,4-toluene diisocyanate is emitted in higher concentrations in areas with greater population.
- The primary source of 2,4-toluene diisocyanate emissions in 2002 is surface coating operations, which can be correlated to population.

Acetaldehyde

- HAP Category Name: Acetaldehyde
- CAS Number: 75-07-0
- Chemical Formula: C_2H_4O Molecular Weight: 44.05
- Toxicity: Potential Cancer Risks and NonCancer Effects
- 326 Source Categories (2002)
- 2002 Total Emissions: 77,563 tons



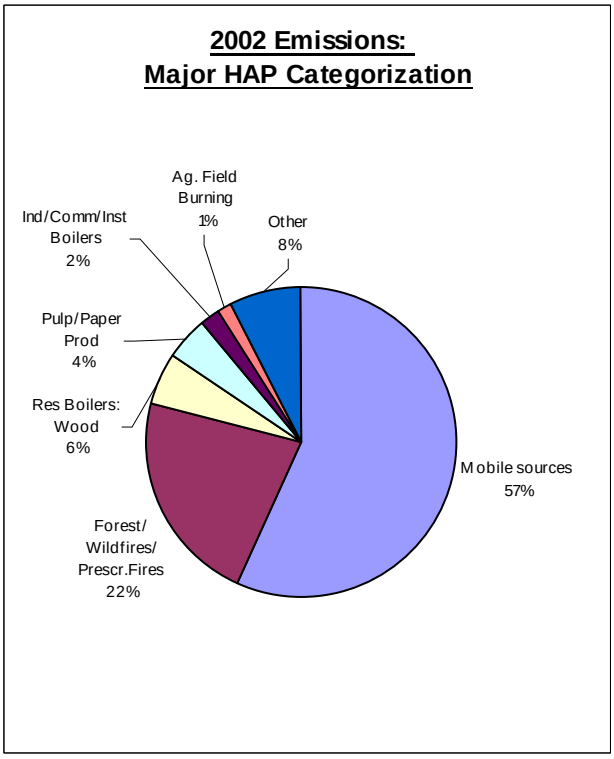
Emissions (Tons)

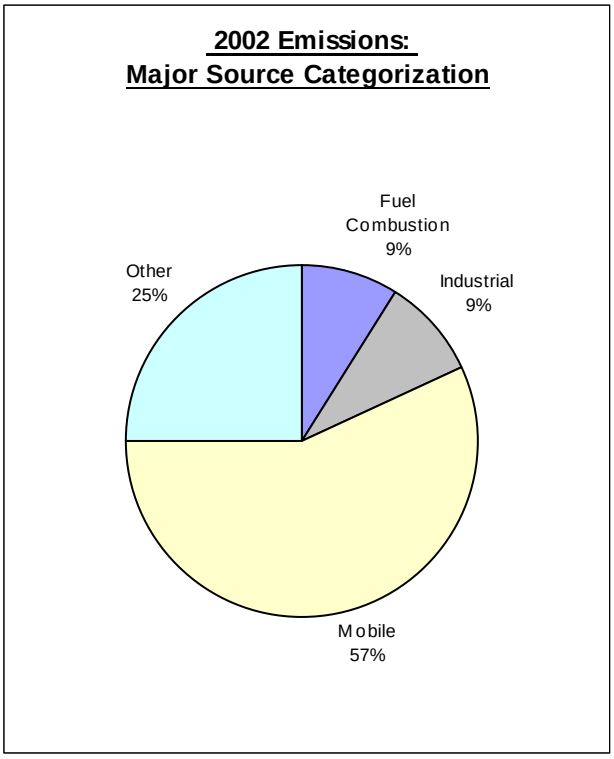
	1990	2002	Pct Change
Mobile sources	70,974	44,011	-38.0%
Open Burning - Forest, Wildfires, and Prescribed Fires	14,747	17,201	16.6%
Residential Boilers: Wood/Wood Residue Combustion	0	4,327	
Pulp and Paper Production	12,821	3,317	-74.1%
Industrial/Commercial/ Institutional Boilers & Process Heaters	48	1,798	3619.2%
Agricultural Field Burning		1,038	
Plywood and Composite Wood Products	1,517	615	-59.4%
Other Categories (290 Other Categories)	21,700	5,255	-75.8%
TOTAL	**121,808**	**77,563**	**-36.3%**

- Stationary source and mobile source regulations have reduced acetaldehyde emissions by approximately 36% since 1990. Acetaldehyde is emitted from a variety of stationary sources and from mobile sources.
- Significant stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for Pulp and Paper Production, HON, Plywood and Composite Wood Products Production, Polymers and Resins, and Miscellaneous Organic Chemical Manufacturing sources.
- Emission estimation methodologies are different in 1990 and 2002 for the categories of: Open Burning: Forest and Wildfires and Prescribed Burns.
- Categories such as Agricultural Field Burning, Residential Wood Combustion, Burning of Logging Debris and Charbroiling are reported in 2002 NEI but were not reported in the 1990 NEI. Note that the 1990 emissions for residential wood boilers are rounded to 0; the reported value is 0.02 tons.

Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

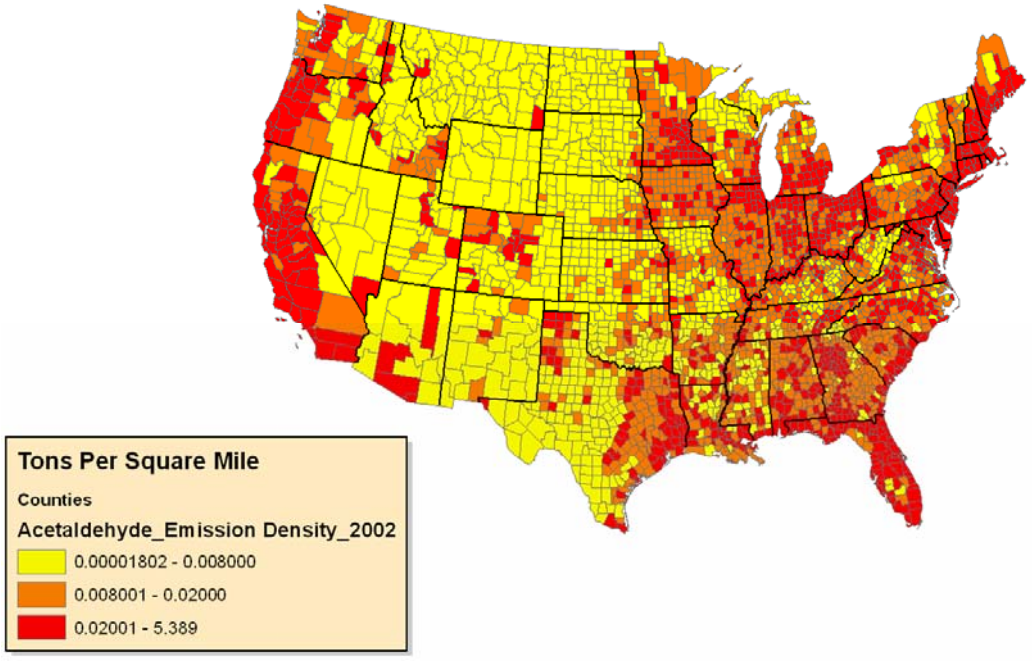
Acetaldehyde (cont.)





The "Other" Category shown in the Major Source Categorization pie chart includes open burning categories.

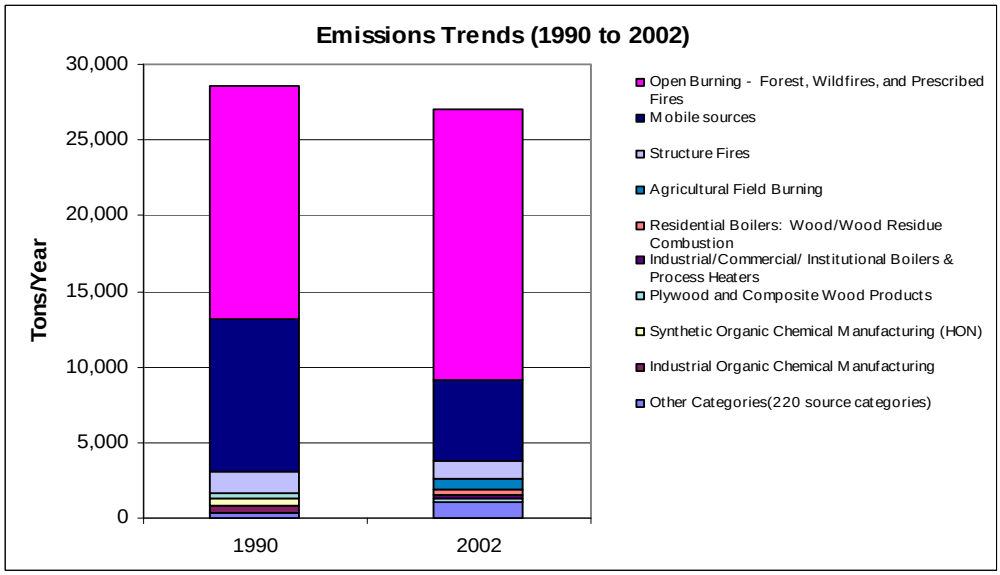
2002 Emissions Density Map



- The emissions density map shows that acetaldehyde is emitted in higher concentrations in areas with greater population. The primary source of acetaldehyde emissions in 2002 is mobile sources, which can be correlated to population. The counties in Montana and Idaho with high emission densities are due to agricultural field burning.

Acrolein

- HAP Category Name: Acrolein
- CAS Number: 107-02-8
- Chemical Formula: C_3H_4O Molecular Weight: 56.06
- Toxicity: Potential NonCancer Effects
- 231 Source Categories (2002)
- Total Emissions: 27,003 tons



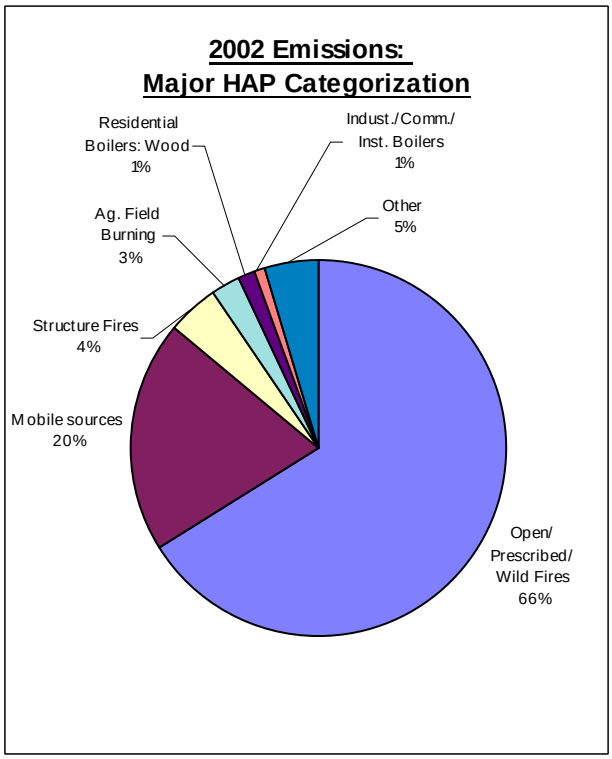
Emissions (Tons) 11/20/06

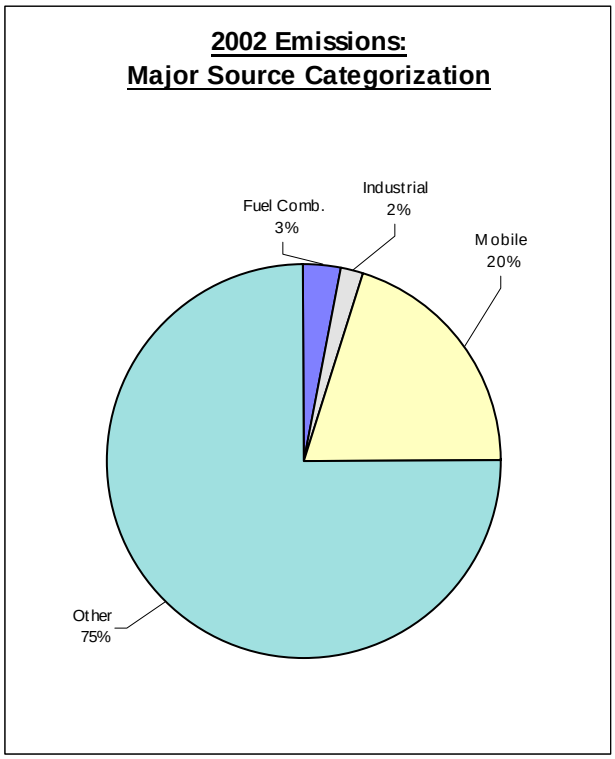
	1990	2002	Pct Change
Open Burning - Forest, Wildfires, and Prescribed Fires	15,326	17,864	17%
Mobile sources	10,125	5,387	-47%
Structure Fires	1,410	1,201	-15%
Agricultural Field Burning		691	
Residential Boilers: Wood/Wood Residue Combustion		337	
Industrial/Commercial/ Institutional Boilers & Process Heaters	22	272	1121%
Plywood and Composite Wood Products	339	176	-48%
Synthetic Organic Chemical Manufacturing (HON)	527	9	-98%
Industrial Organic Chemical Manufacturing	394	8	-98%
Other Categories(220 source categories)	377	1,059	181%
TOTAL	**28,520**	**27,003**	**-5%**

- Stationary source and mobile source regulations have reduced acrolein emissions. Significant stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the HON, Miscellaneous Organic Chemical Manufacturing, Pulp and Paper Production, and Plywood and Composite Wood Products Production sources.
- Acrolein is primarily emitted from combustion sources
- Emission estimation methodologies are different in 1990 and 2002 for the categories of: Open Burning: Forest and Wildfires and Prescribed Burns.
- Categories such as Agricultural Field Burning, and Residential Wood Combustion are reported in 2002 NEI but were not reported in the 1990 NEI. Other categories such as industrial/institutional/commercial boilers, stationary reciprocating internal combustion engines, and utility boilers are not characterized well in the 1990 NEI.

Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

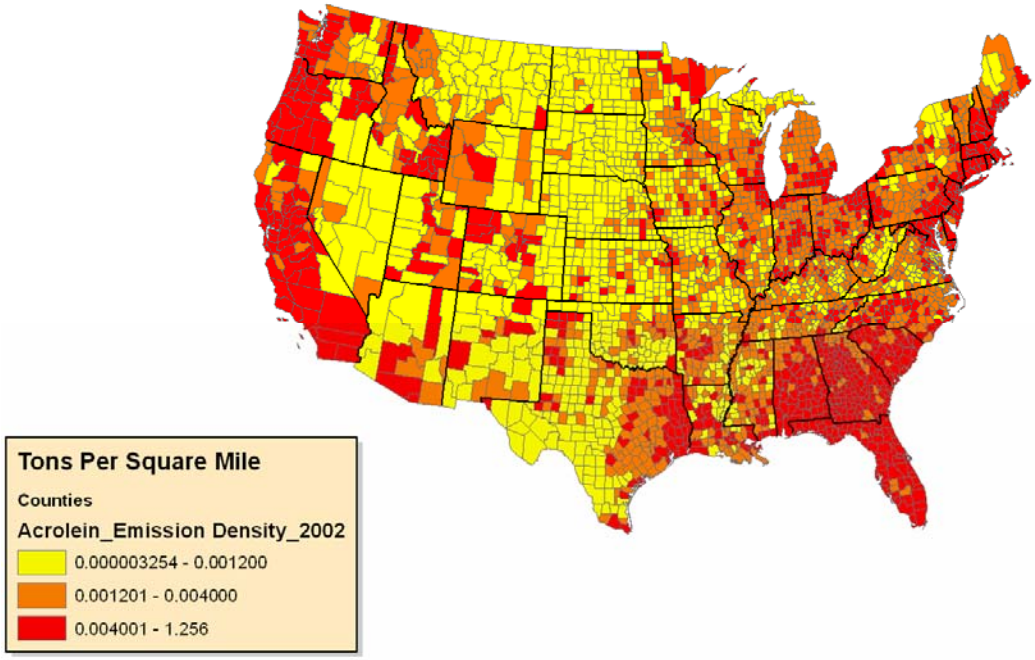
Acrolein (cont.)





- The "Other" Category shown in the Major Source Categorization pie chart includes open burning categories, which have the largest emissions in 2002.

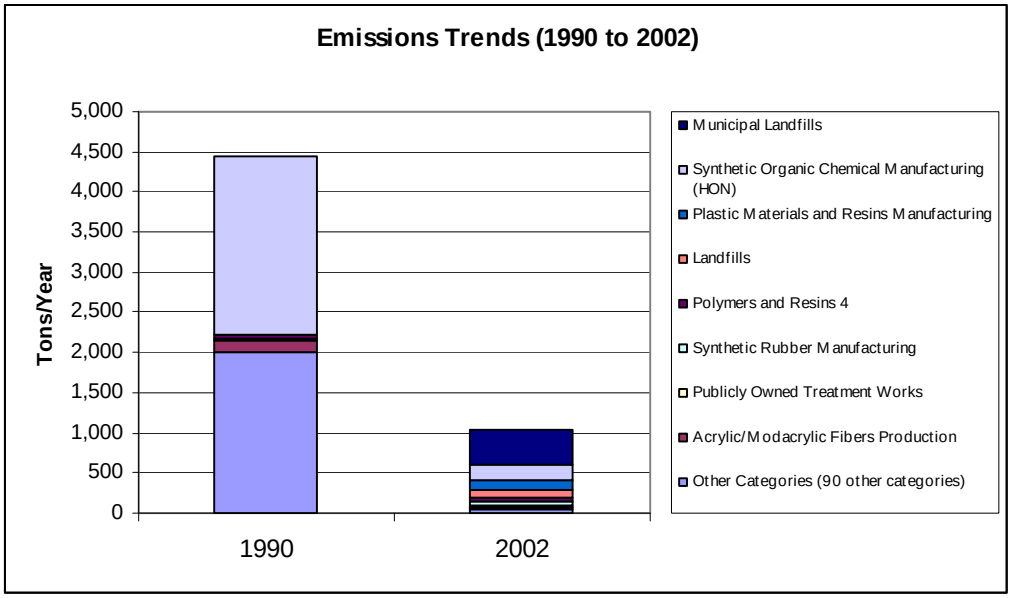
2002 Emissions Density Map



- The emissions density map shows that acrolein is emitted in higher concentrations in areas with greater population due to mobile sources.

Acrylonitrile

- HAP Category Name: Acrylonitrile
- CAS Number: 107-13-1
- Chemical Formula: C_3H_3N Molecular Weight: 53.06
- Toxicity: Potential Cancer Risks and NonCancer Effects
- 109 Source Categories (2002)
- 2002 Total Emissions: 1,041 tons



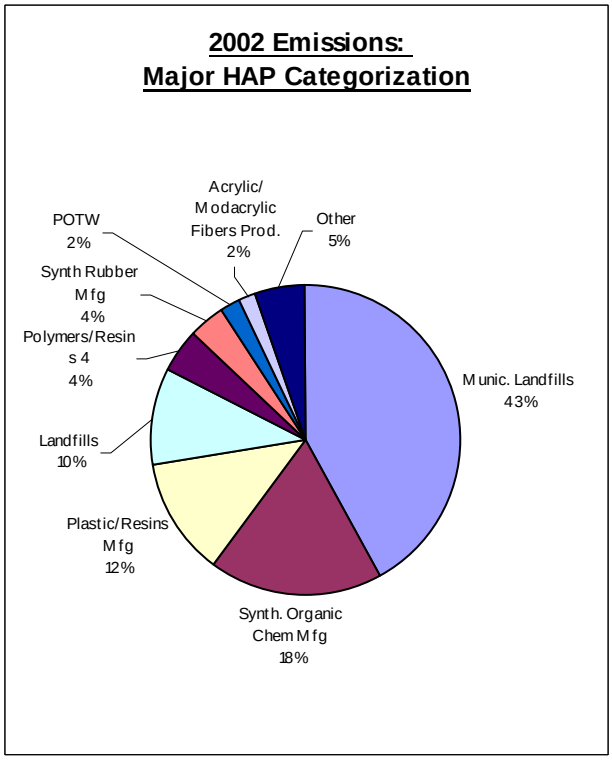
Emissions (Tons)

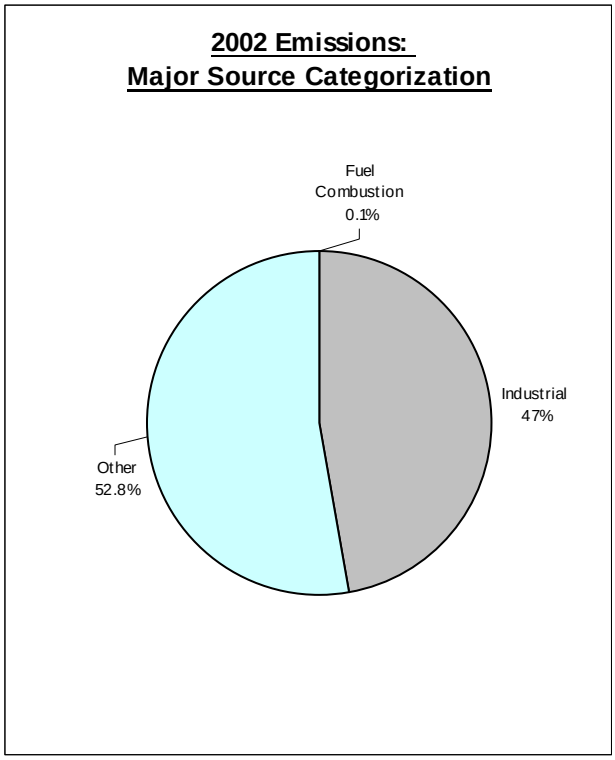
	1990	2002	Pct Change
Municipal Landfills	6.16	436.43	6984.9%
Synthetic Organic Chemical Manufacturing (HON)	2208.21	189.79	-91.4%
Plastic Materials and Resins Manufacturing	1.27	125.03	9744.9%
Landfills		108.38	
Polymers and Resins 4	46.43	46.62	0.4%
Synthetic Rubber Manufacturing		41.05	
Publicly Owned Treatment Works	22.75	22.94	0.8%
Acrylic/Modacrylic Fibers Production	149.74	16.19	-89.2%
Other Categories (90 other categories)	2008.25	54.965	-97.3%
TOTAL	**4,442.81**	**1,041.40**	**-76.6%**

- Significant stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the HON, Miscellaneous Organic Chemical Manufacturing, Polymers and Resins and Acrylic/Modacrylic Fibers Production sources.
- Landfills, the largest source category in the 2002 NEI, are not well characterized in the 1990 NEI.

Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

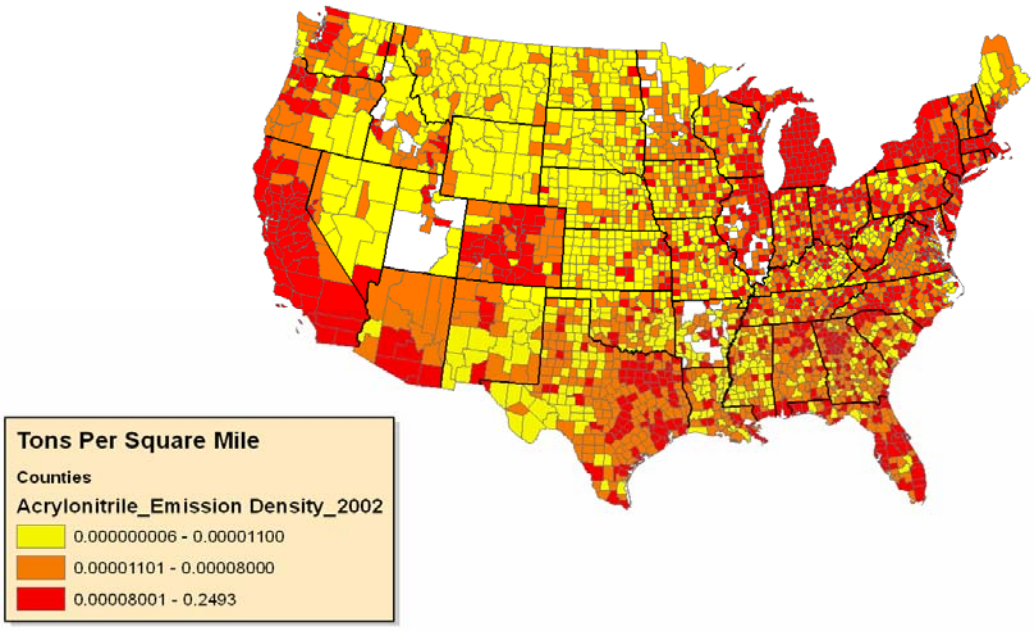
Acrylonitrile (cont.)





- The "Other" Category shown in the Major Source Categorization pie chart includes landfills, which have the significant emissions in 2002.

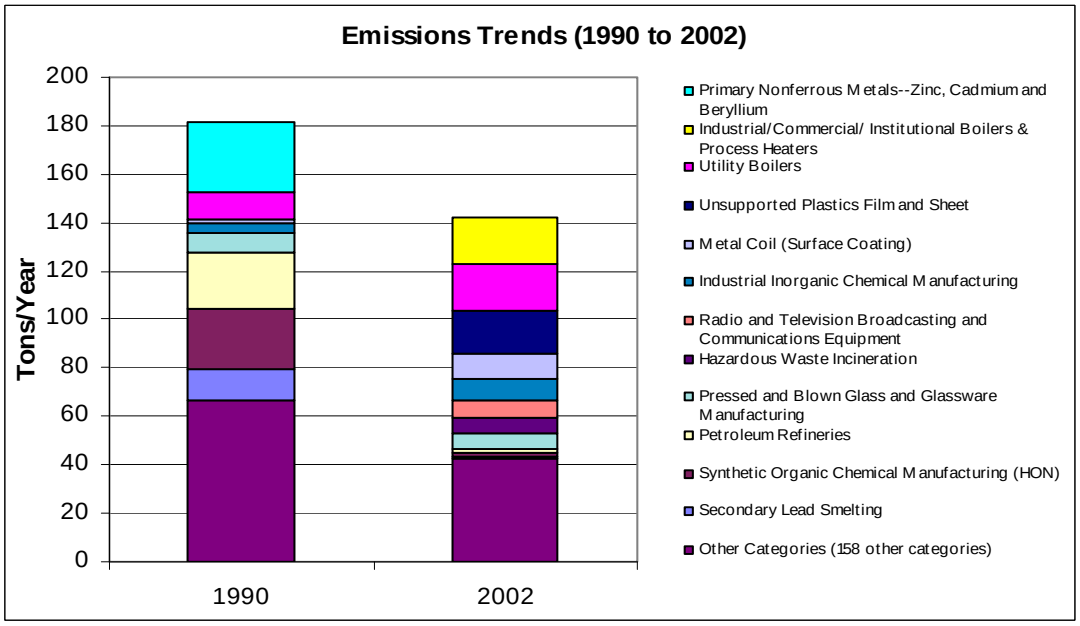
2002 Emissions Density Map



- The County Density map shows that acrylonitrile is emitted in 3044 counties of the 3141 counties in the 50 states. Landfills are not present in all counties.
- White areas identify counties with actual zero emissions.

Antimony Compounds

- HAP Category Name: Antimony Compounds
- Includes 8 compounds in the NEI
- Toxicity: Potential NonCancer Effects
- 164 Source Categories (2002)
- 2002 Total Emissions: 142 tons



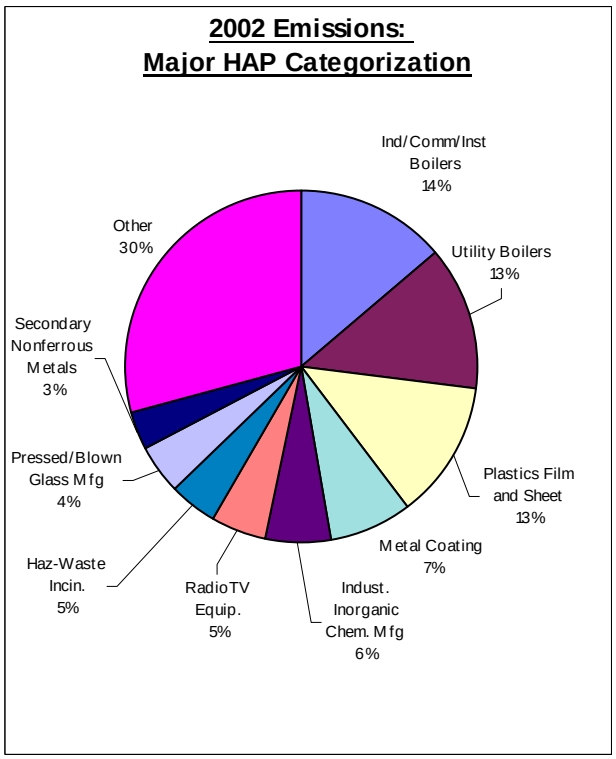
Emissions (Tons) 11/20/06

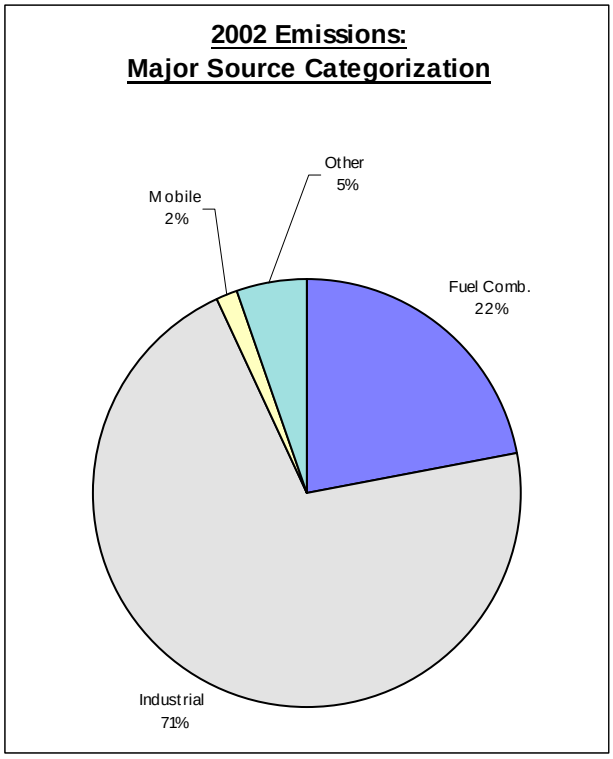
	1990	2002	Pct Change
Industrial/Commercial/ Institutional Boilers & Process Heaters	0.5	19.7	3554%
Utility Boilers	11.0	18.8	70%
Unsupported Plastics Film and Sheet		18.0	
Metal Coil (Surface Coating)	2.0	10.6	444%
Industrial Inorganic Chemical Manufacturing	4.0	8.7	119%
Radio and Television Broadcasting and Communications Equipment		7.1	
Hazardous Waste Incineration		6.5	
Pressed and Blown Glass and Glassware Manufacturing	7.5	6.4	-14%
Petroleum Refineries	23.8	2.0	-92%
Synthetic Organic Chemical Manufacturing (HON)	24.5	1.2	-95%
Secondary Lead Smelting	13.2	0.5	-96%
Primary Nonferrous Metals--Zinc, Cadmium and Beryllium	28.8		-100%
Other Categories (158 other categories)	66.4	43.0	-35%
TOTAL	**181.7**	**142.4**	**-22%**

- Stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the Secondary Lead Smelting, Iron and Steel Foundries, Primary Copper Smelting and Primary Lead Smelting sources.
- Antimony is emitted from a large number of source categories that contribute small amounts of emissions. Of 164 source categories, 20 categories emit more than 1 ton.
- Categories such as industrial/institutional/commercial boilers, hazardous waste incineration, and utility boilers burning oil are not well characterized in the 1990 NEI.

Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

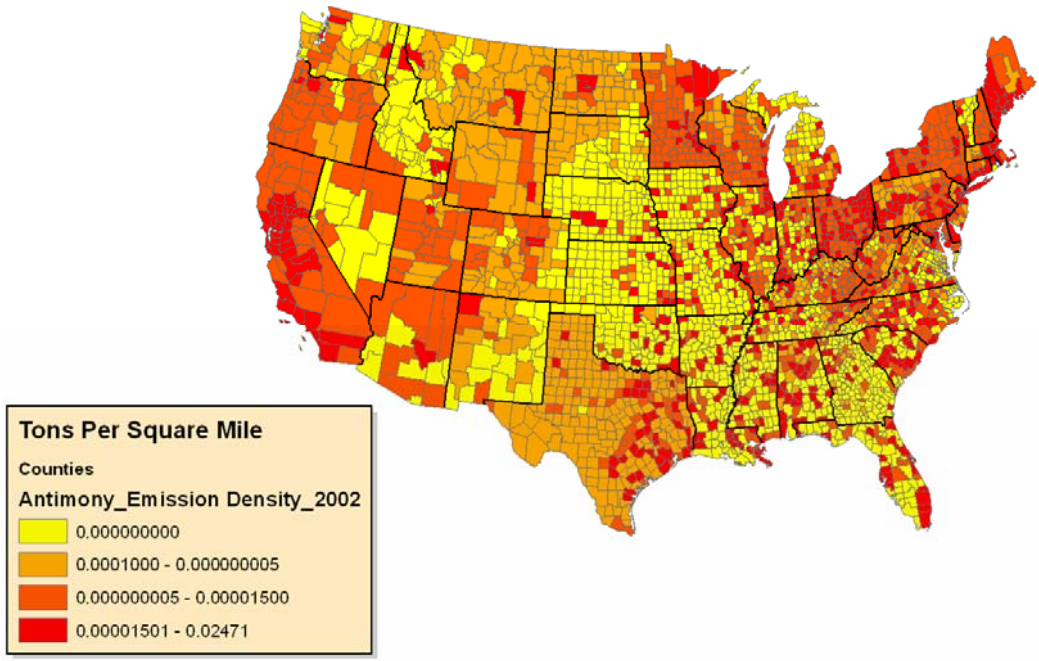
Antimony Compounds (cont.)





- The "Other" Category shown in the Major Source Categorization pie chart includes incineration categories.

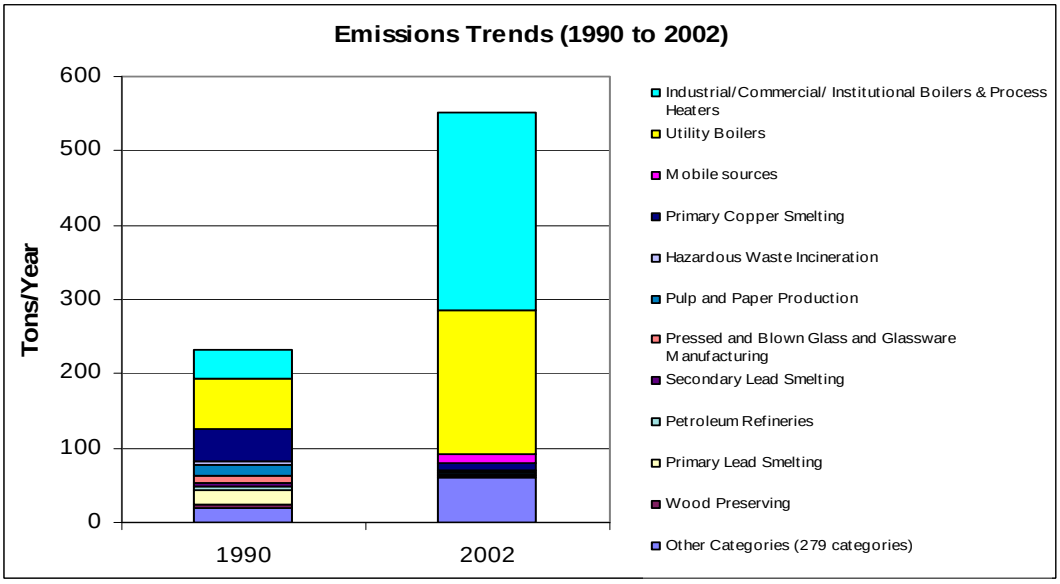
2002 Emissions Density Map



- The County Density map shows that antimony is emitted in 1938 counties of the 3141 counties in the 50 states. Antimony emissions are dominated by stationary point sources that are not located in all counties. Mobile source emissions are present for some nonroad categories.

Arsenic Compounds

- HAP Category Name: Arsenic Compounds
- Includes 7 compounds in the NEI
- Toxicity: Potential Cancer Risks and NonCancer Effects
- 285 Source Categories (2002)
- 2002 Total Emissions: 551 tons



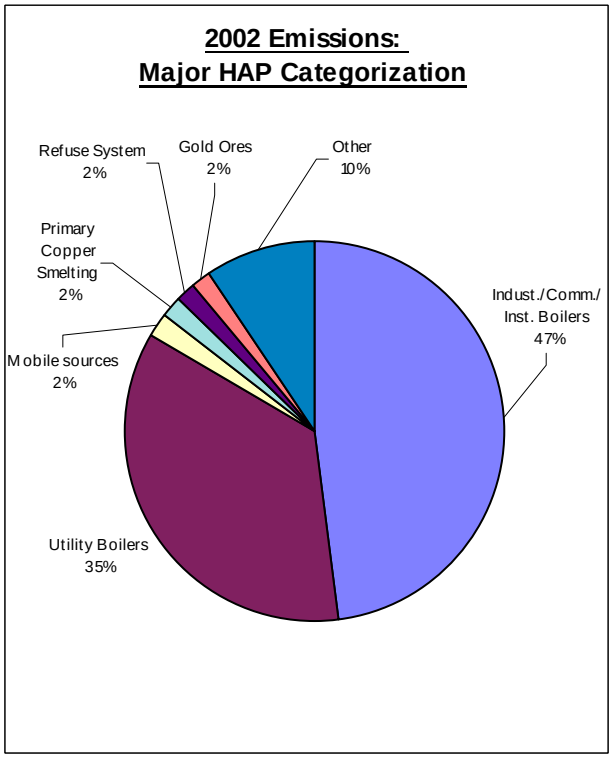
Emissions (Tons) 11/20/06

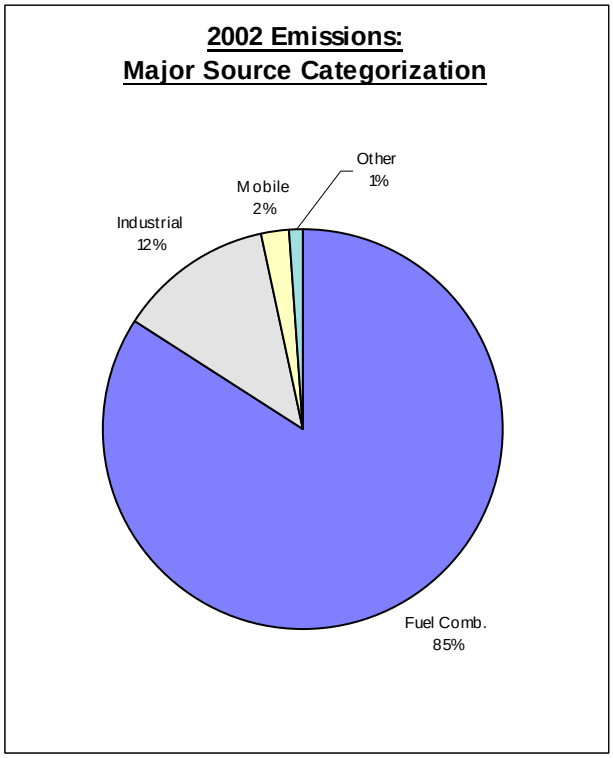
	1990	2002	Pct Change
Industrial/Commercial/ Institutional Boilers & Process Heaters	38.15	264.64	594%
Utility Boilers	66.92	194.22	190%
Mobile sources		12.71	
Primary Copper Smelting	43.32	9.01	-79%
Hazardous Waste Incineration	5.76	3.39	-41%
Pulp and Paper Production	14.15	2.57	-82%
Pressed and Blown Glass and Glassware Manufacturing	9.55	1.54	-84%
Secondary Lead Smelting	5.63	0.6	-89%
Petroleum Refineries	4.05	0.34	-92%
Primary Lead Smelting	20.79	0.27	-99%
Wood Preserving	3.47	0.25	-93%
Other Categories (279 categories)	19.8	61.42	210%
TOTAL	**231.6**	**551.0**	**138%**

- Stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the Secondary Lead Smelting, Iron and Steel Foundries, Primary Copper Smelting, Pulp and Paper Production, and Primary Lead Smelting sources.
- Arsenic is emitted from a large number of source categories that contribute small amounts of emissions. Of 285 source categories, 21categories emit more than 1 ton.
- Categories such as industrial/institutional/commercial boilers and utility boilers burning oil are significantly underestimated in the 1990 NEI. Mobile sources present in 2002 are from nonroad categories.

Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

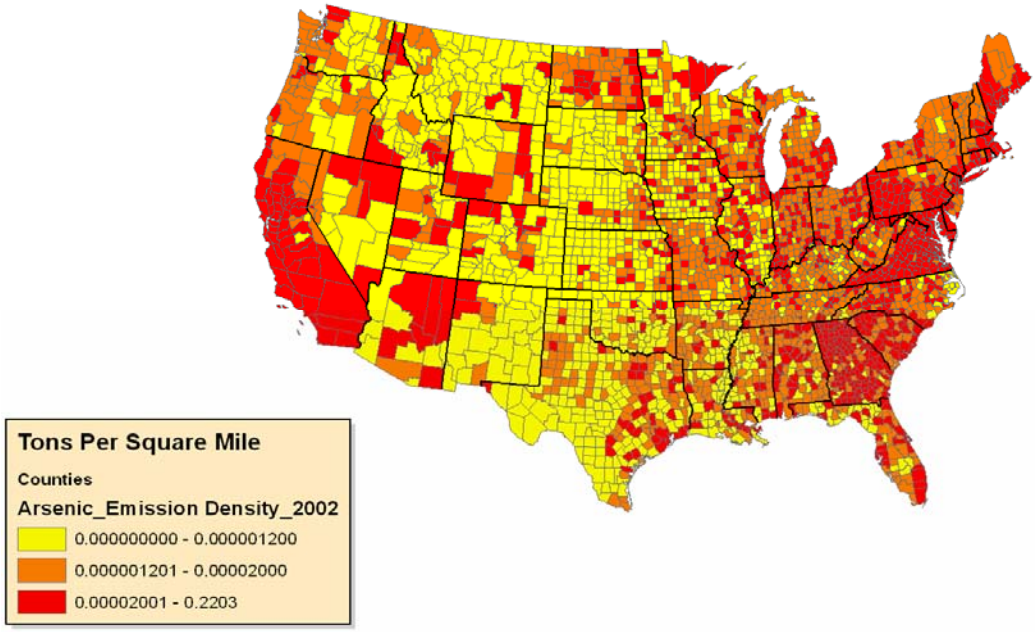
Arsenic Compounds (cont.)





- The "Other" Category shown in the Major Source Categorization pie chart includes open burning and incineration categories.

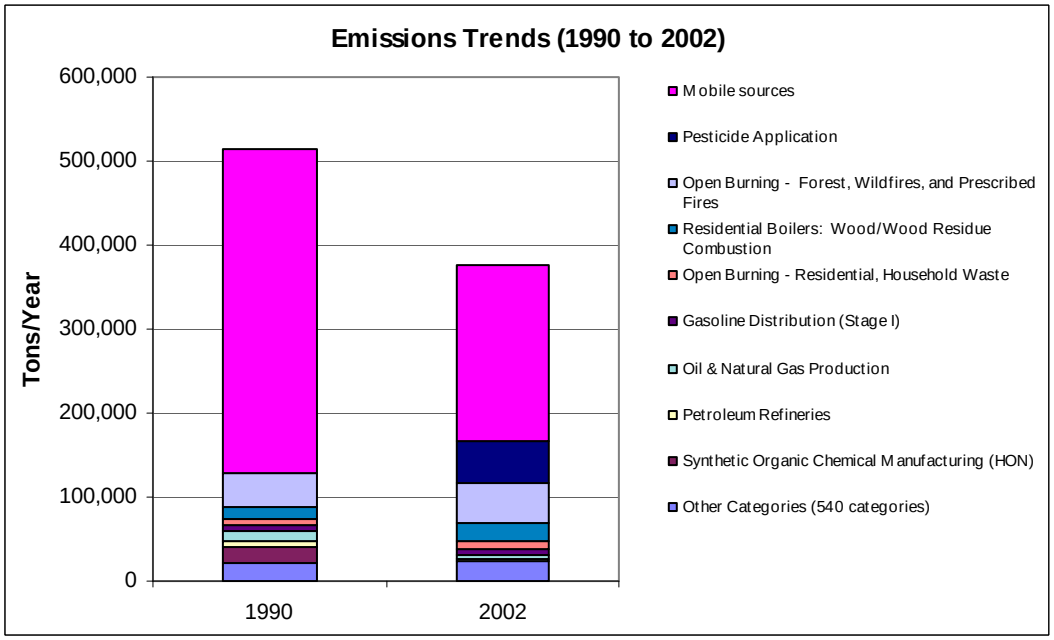
2002 Emissions Density Map



- The emissions density map shows that arsenic compounds are emitted in higher concentrations in areas with greater population. Counties in Montana and Idaho with high emission densities are due to agricultural field burning.

Benzene

- HAP Category Name: Benzene
- CAS Number: 71-43-2
- Chemical Formula: C_6H_6 Molecular Weight: 78.11
- Toxicity: Potential Cancer Risks and NonCancer Effects
- 540 Source Categories (2002)
- 2002 Total Emissions: 376,154 tons



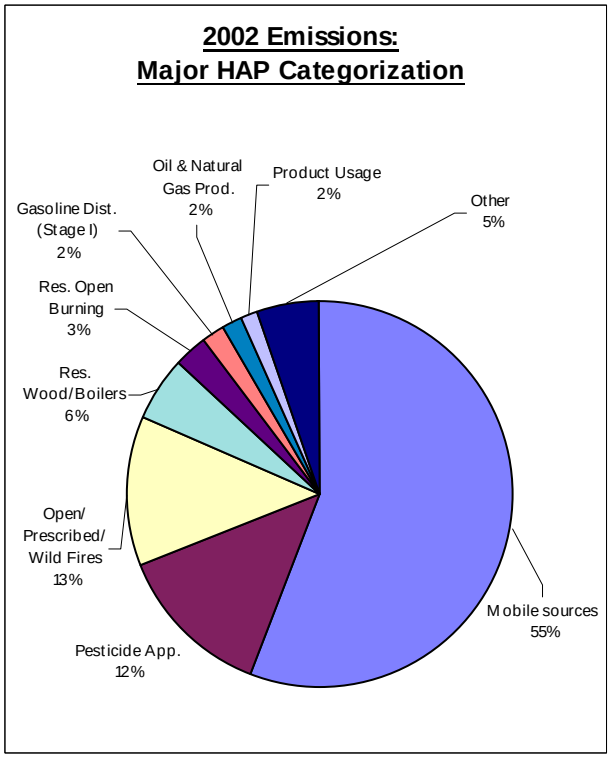
Emissions (Tons) 11/20/06

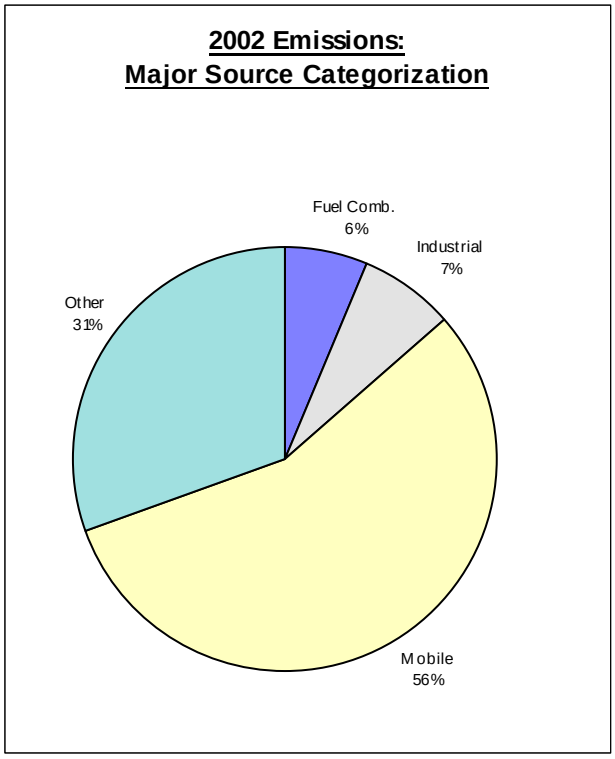
	1990	2002	Pct Change
Mobile sources	384,228.0	210,034.5	-45%
Pesticide Application		48,616.8	
Open Burning - Forest, Wildfires, and Prescribed Fires	40,844.0	47,399.4	16%
Residential Boilers: Wood/Wood Residue Combustion	13,417.8	21,437.2	60%
Open Burning - Residential, Household Waste	8,909.4	9,678.9	9%
Gasoline Distribution (Stage I)	5,668.6	7,913.4	40%
Oil & Natural Gas Production	12,224.4	5,918.9	-52%
Petroleum Refineries	6,772.9	881.9	-87%
Synthetic Organic Chemical Manufacturing (HON)	19,767.9	507.1	-97%
Other Categories (540 categories)	21,318.7	23,766.2	11%
TOTAL	**513,151**	**376,154**	**-27%**

- Mobile source regulations have significantly reduced benzene since 1990.
- Significant stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the Oil & Natural Gas Production, Petroleum Refineries, and HON sources.
- Emission estimation methodologies are different in 1990 and 2002 for the categories of: Open Burning: Forest and Wildfires and Prescribed Burns. Some categories such as Pesticide Application are not present in 1990 NEI.
- Emission Inventory trends for benzene agree well with ambient monitoring data trends. NATA results are in good agreement with ambient monitoring data.

Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

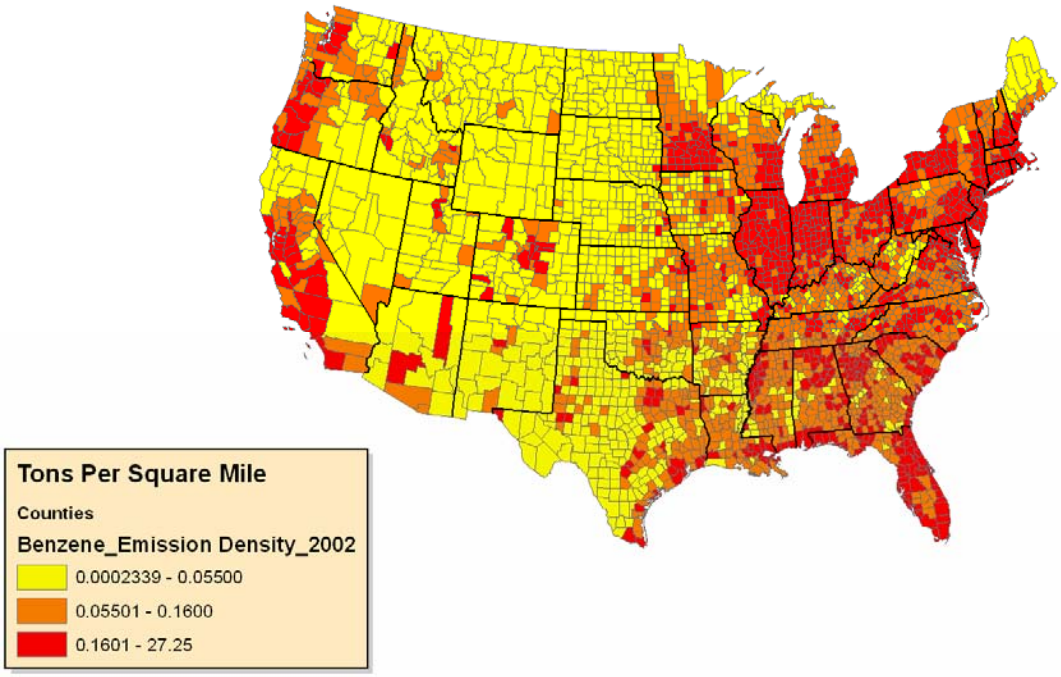
Benzene (cont.)





- The "Other" Category shown in the Major Source Categorization pie chart includes open burning categories, pesticide application, incineration, paving, and landfills.

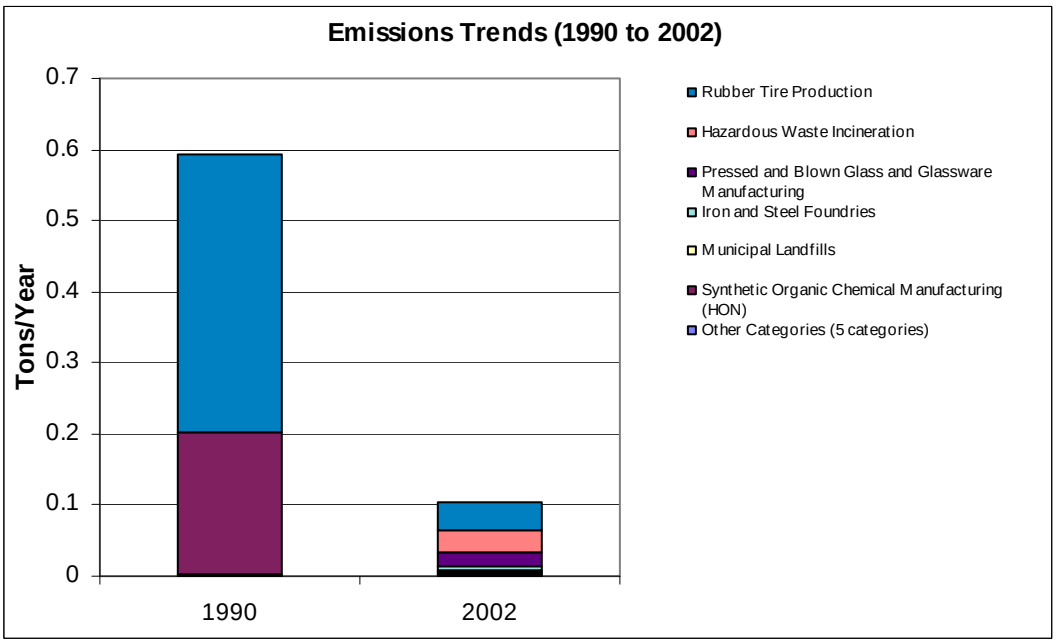
2002 Emissions Density Map



- The emissions density map shows that benzene is emitted in higher concentrations in areas with greater population. The primary source of benzene emissions in 2002 is mobile sources, which can be correlated to population.

Benzidine

- HAP Category Name: Benzidine
- CAS Number: 92-87-5
- Chemical Formula: $C_{12}H_{12}N_2$ Molecular Weight: 184.24
- Toxicity: Potential Cancer Risks and NonCancer Effects
- 11 Source Categories (2002)
- 2002 Total Emissions: 0.104 tons



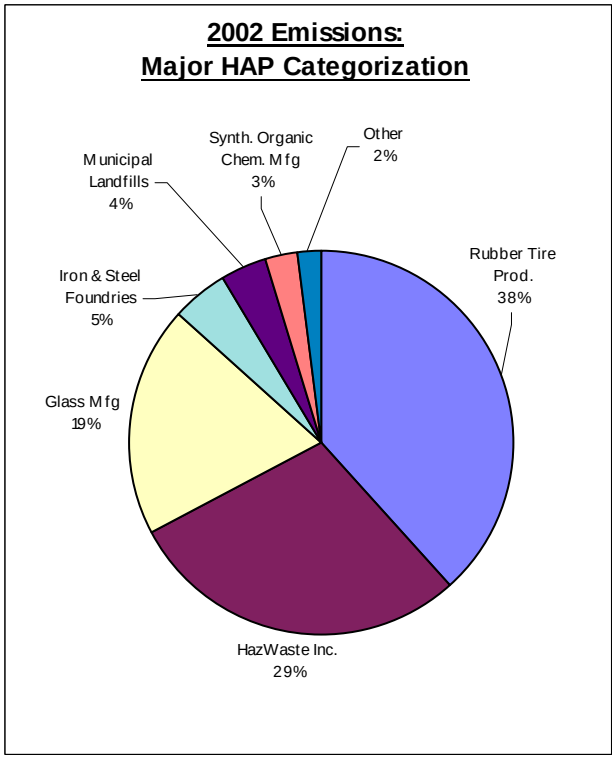
Emissions (Tons) 11/20/06

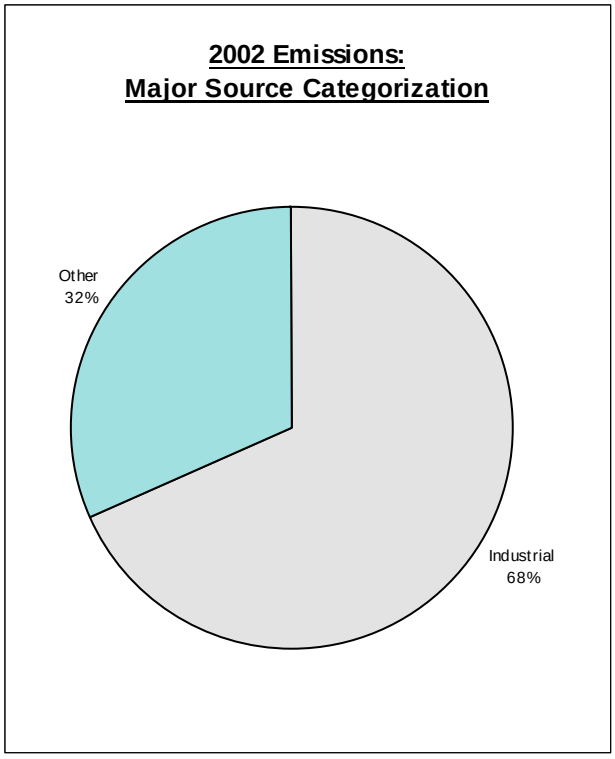
	1990	2002	Pct Change
Other Categories (5 categories)	0.003	0.002	-33%
Synthetic Organic Chemical Manufacturing (HON)	0.2	0.003	-99%
Municipal Landfills		0.004	
Iron and Steel Foundries		0.005	
Pressed and Blown Glass and Glassware Manufacturing		0.02	
Hazardous Waste Incineration		0.03	
Rubber Tire Production	0.39	0.04	-90%
TOTAL	**0.593**	**0.104**	**-82%**

- Benzidine is only emitted from stationary sources.
- Significant stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the HON and Rubber Tire Production sources.
- Some sources present in 2002 NEI are not present in the 1990 NEI.

Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

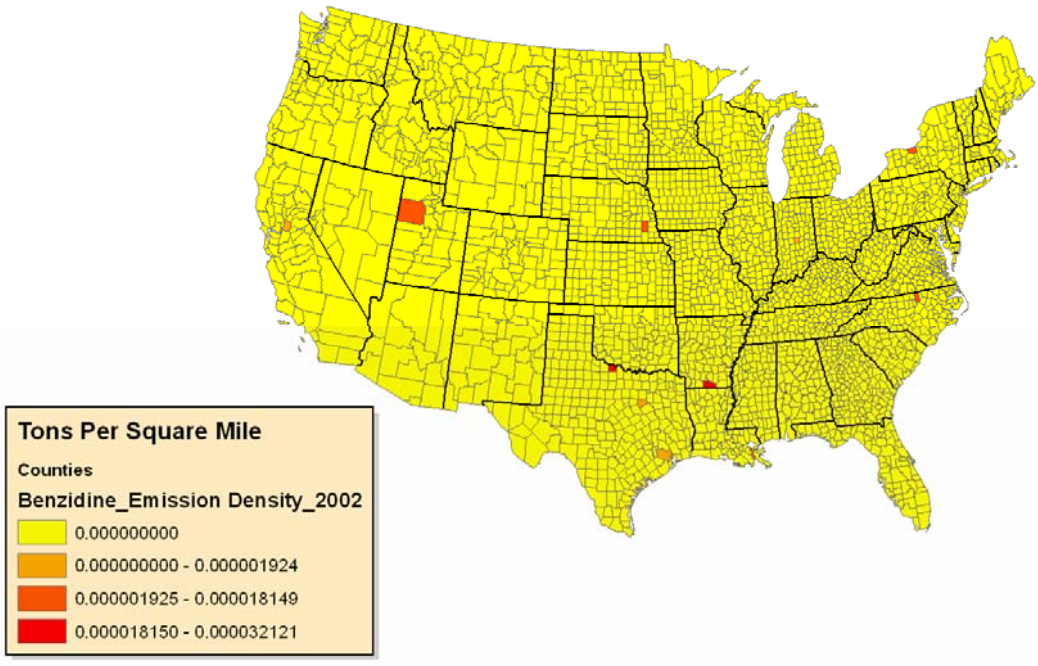
Benzidine (cont.)





- The "Other" Category shown in the Major Source Categorization pie chart includes incinerators and landfills.

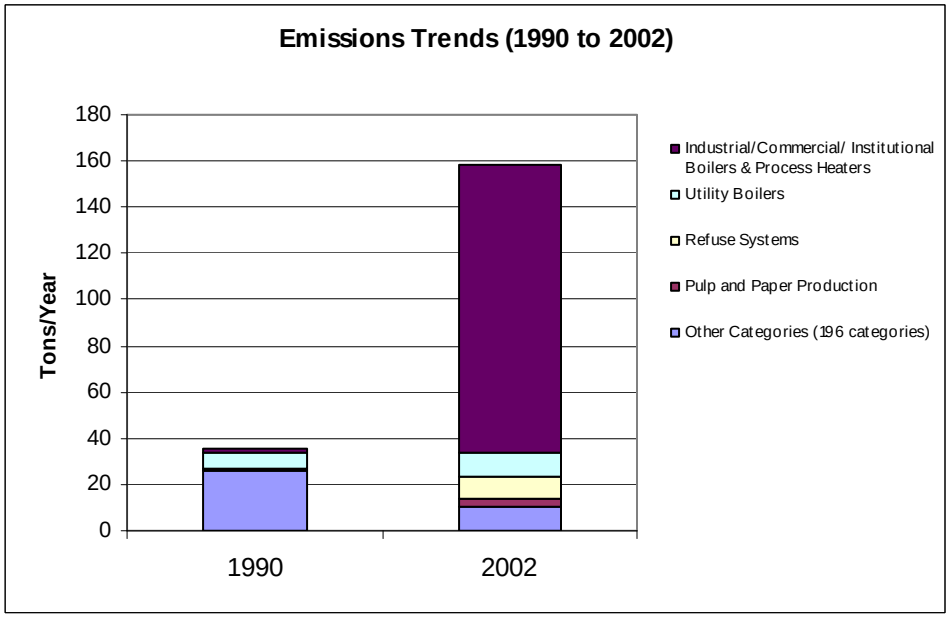
2002 Emissions Density Map



- The County Density map shows that benzidine is emitted in 11 counties of the 3141 counties in the 50 states.

Beryllium Compounds

- HAP Category Name: Beryllium Compounds
- Includes 7 compounds in the NEI
- Toxicity: Potential Cancer Risks and NonCancer Effects
- 196 Source Categories (2002)
- 2002 Total Emissions: 158 tons



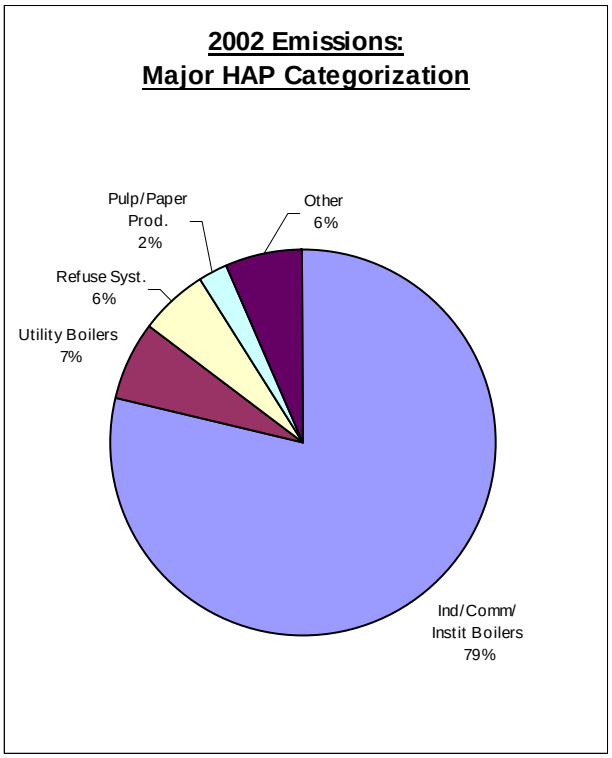
Emissions (Tons)

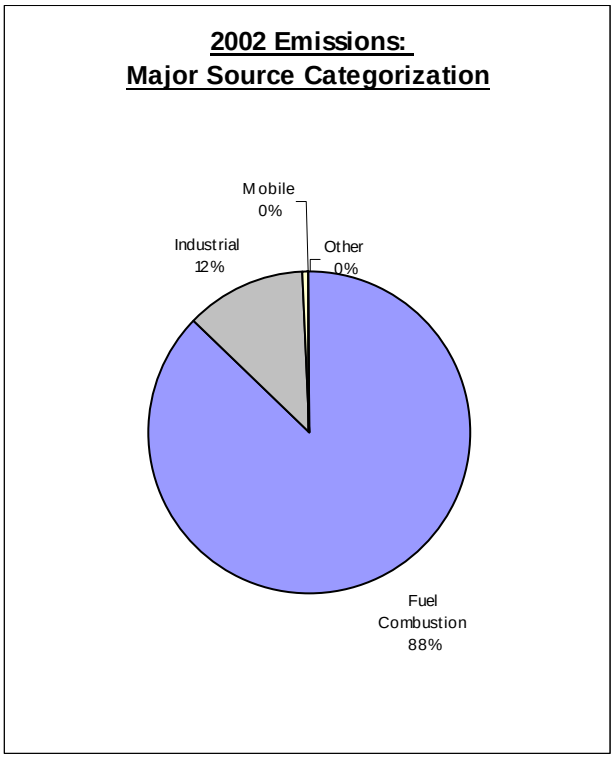
	1990	2002	Pct Change
Industrial/Commercial/ Institutional Boilers & Process Heaters	1.38	124.39	8913.8%
Utility Boilers	7.13	10.52	47.5%
Refuse Systems	0	9.45	
Pulp and Paper Production	0.6	3.82	536.7%
Other Categories (196 categories)	26.14	10.06	-61.5%
TOTAL	**35.25**	**158.24**	**348.9%**

- Beryllium is emitted from a large number of source categories that contribute small amounts of emissions. Of 196 source categories, 12 categories emit more than 1 ton.
- Categories such as industrial/institutional/commercial boilers are significantly underestimated in the 1990 NEI. Uncertainty also exists with 2002 boiler estimates. Mobile sources present in 2002 are from nonroad categories.

Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

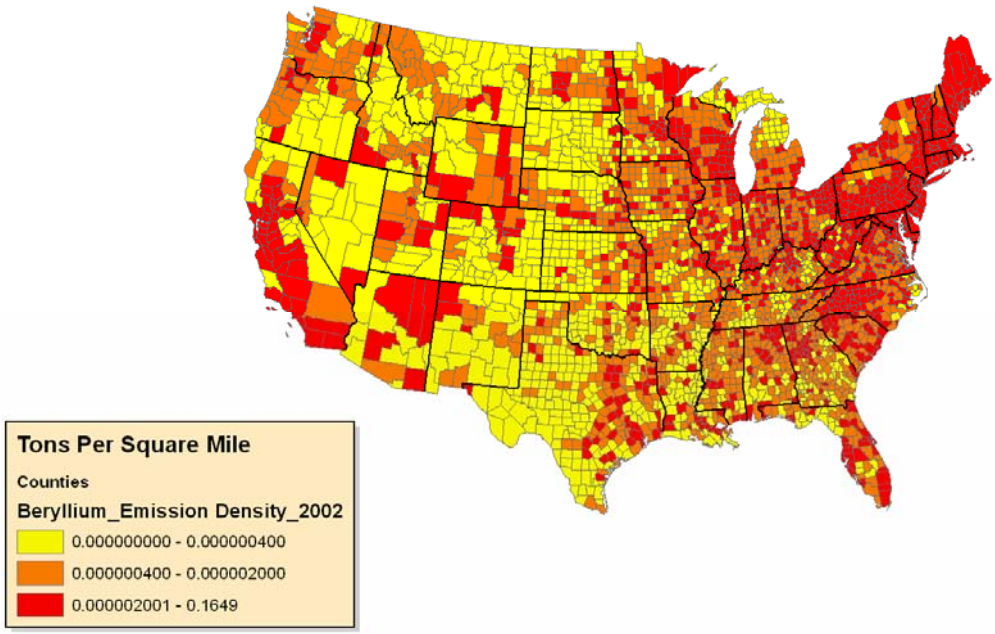
Beryllium Compounds (cont.)





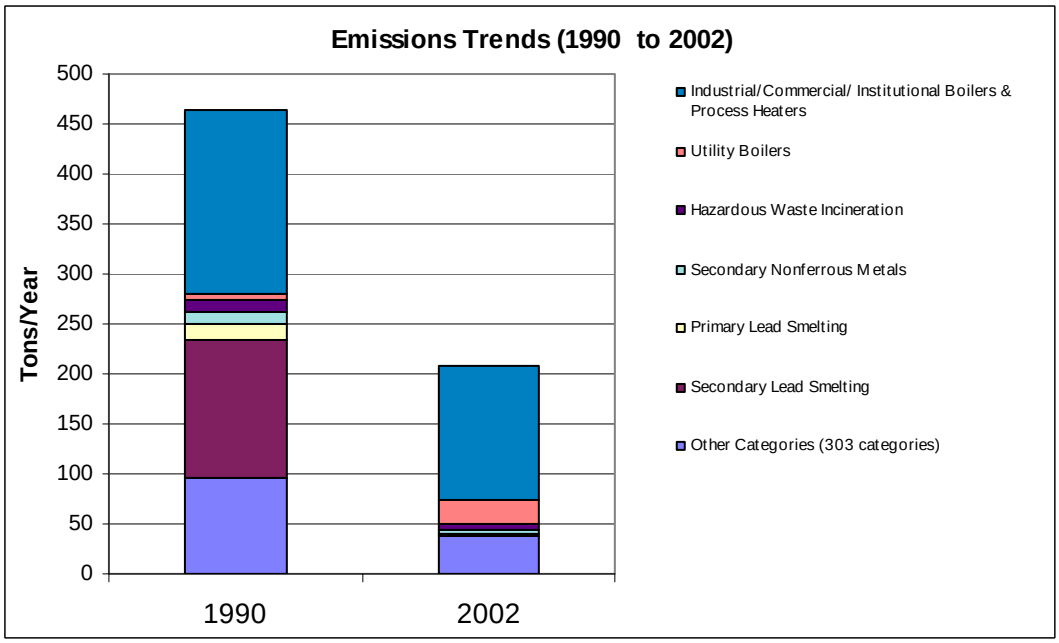
- The "Other" Category shown in the Major Source Categorization pie chart includes incineration categories.

2002 Emissions Density Map



Cadmium Compounds

- HAP Category Name: Cadmium Compounds
- Includes 11 compounds in the NEI
- Toxicity: Potential Cancer Risks and NonCancer Effects
- 301 Source Categories (2002)
- 2002 Total Emissions: 207 tons



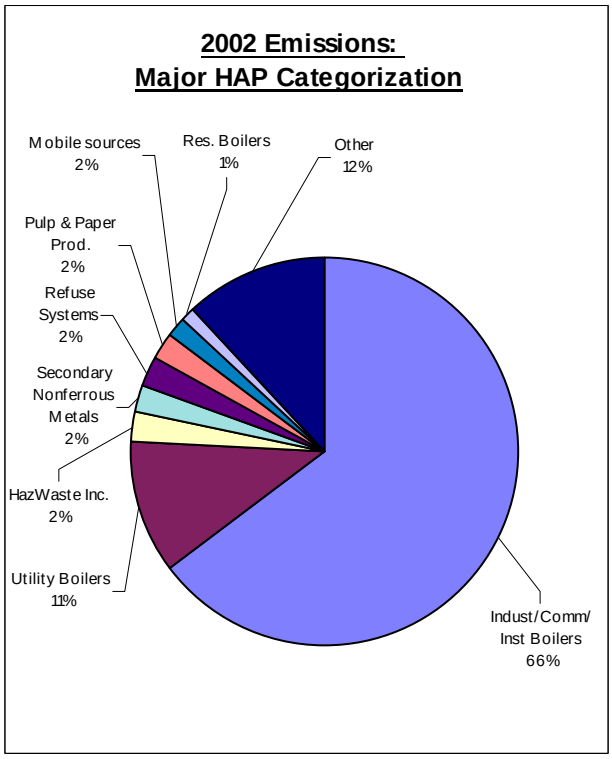
Emissions (Tons) 11/20/06

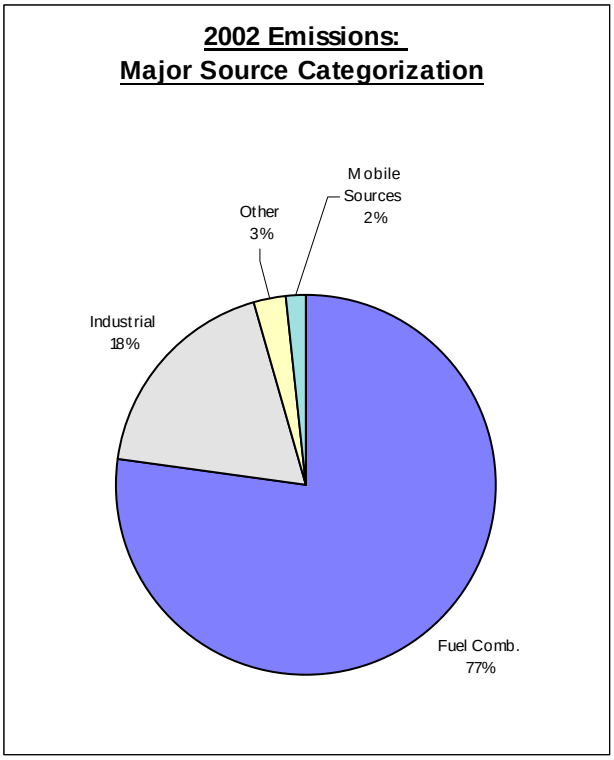
	1990	2002	Pct Change
Industrial/Commercial/ Institutional Boilers & Process Heaters	183.11	134.03	-27%
Utility Boilers	6.37	23.04	262%
Hazardous Waste Incineration	10.99	5.1	-54%
Secondary Nonferrous Metals	13.43	4.97	-63%
Primary Lead Smelting	15.72	0.68	-96%
Secondary Lead Smelting	137.99	0.59	-100%
Other Categories (303 categories)	95.64	38.73	-60%
TOTAL	**463.3**	**207.1**	**-55%**

- Stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the Secondary Lead Smelting, Primary Lead Smelting, Primary Copper Smelting, Municipal Waste Combustion, Medical Waste Incineration, and Hazardous Waste incineration sources.
- Cadmium is emitted from a large number of source categories that contribute small amounts of emissions. Of 301 source categories, 13 categories emit more than 1 ton.
- Categories such as utility boilers are underestimated in the 1990 NEI. Other categories such as Electric Arc Furnaces are not in the 2001 version of the 1990 NEI.
- Mobile sources present in 2002 are from nonroad categories.

Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

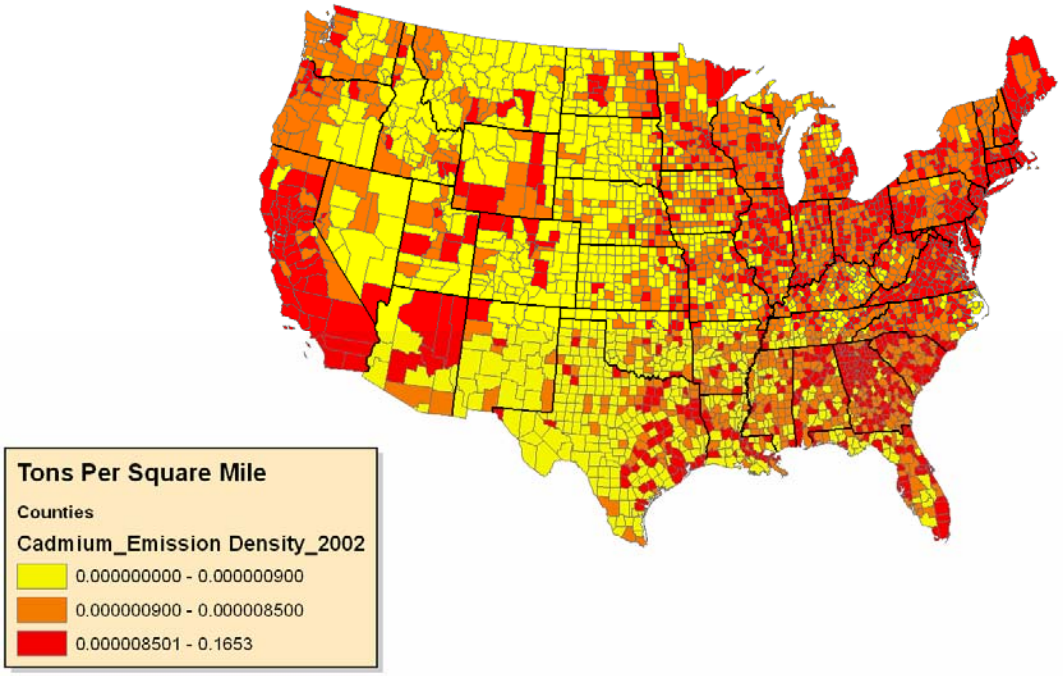
Cadmium Compounds (cont.)





- The "Other" Category shown in the Major Source Categorization pie chart includes open burning, landfills, and incineration categories.

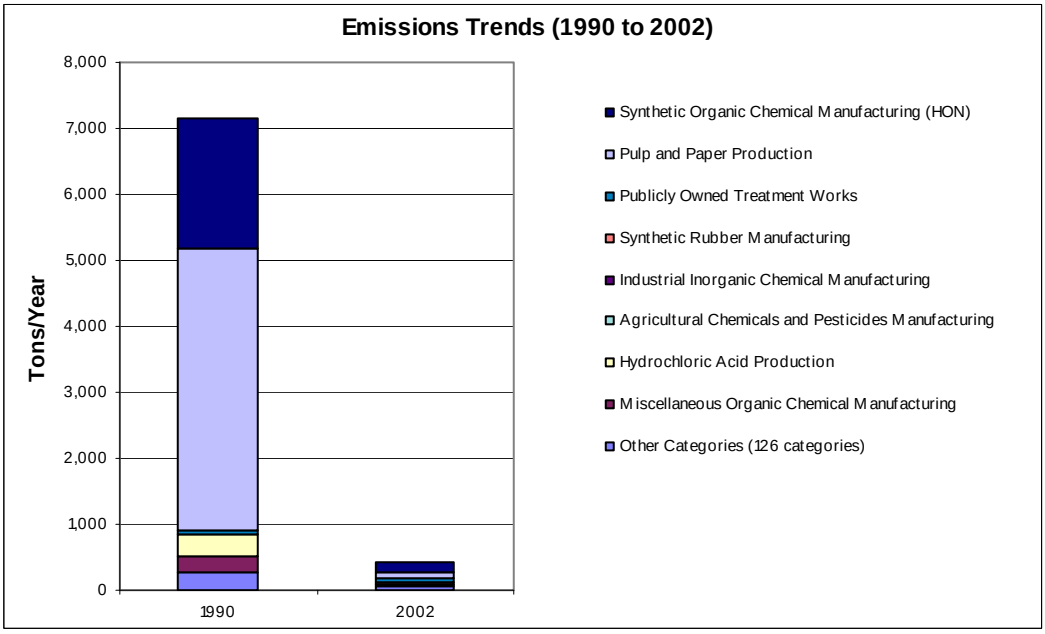
2002 Emissions Density Map



- The emissions density map shows that cadmium compounds are emitted in higher concentrations in areas with greater population. Counties in Montana and Idaho with high emission densities are due to agricultural field burning.

Carbon Tetrachloride

- HAP Category Name: Carbon Tetrachloride
- CAS Number: 56-23-5
- Chemical Formula: CCl_4 Molecular Weight: 153.82
- Toxicity: Potential Cancer Risks and NonCancer Effects
- 124 Source Categories (2002)
- 2002 Total Emissions: 433 tons



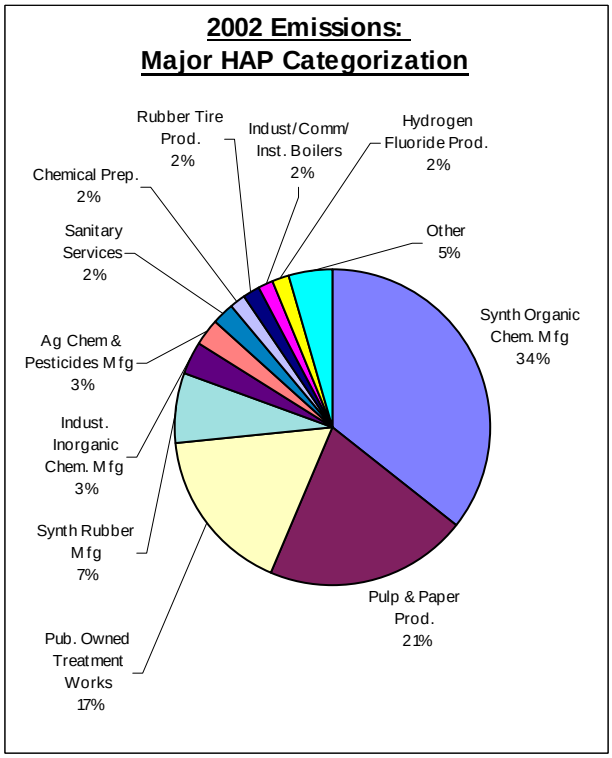
Emissions (Tons) 11/20/06

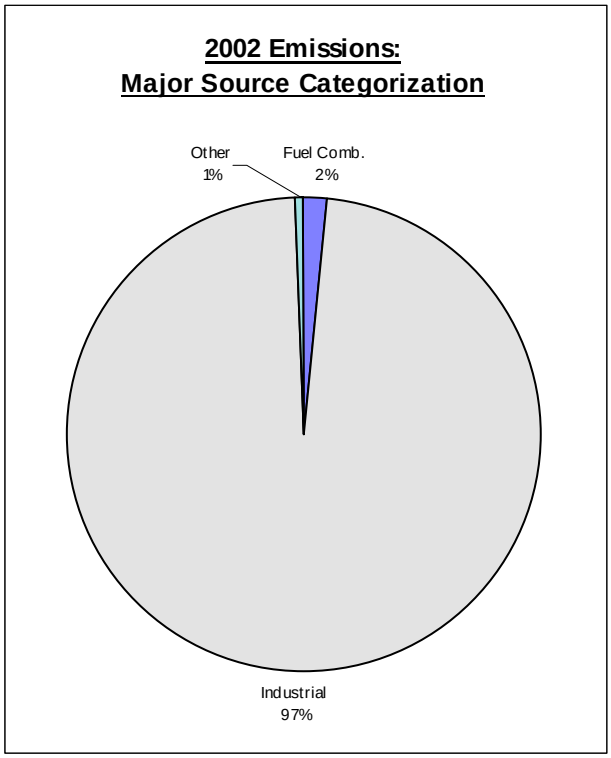
	1990	2002	Pct Change
Synthetic Organic Chemical Manufacturing (HON)	1962.92	153.49	-92%
Pulp and Paper Production	4270.68	91.25	-98%
Publicly Owned Treatment Works	63.95	72.75	14%
Synthetic Rubber Manufacturing		32.05	
Industrial Inorganic Chemical Manufacturing	1.18	13.53	1047%
Agricultural Chemicals and Pesticides Manufacturing	15.26	12.53	-18%
Hydrochloric Acid Production	339.61	1.39	-100%
Miscellaneous Organic Chemical Manufacturing	243.81	0.44	-100%
Other Categories (126 categories)	259.45	55.92	-78%
TOTAL	**7,157**	**433**	**-94%**

- Stationary source regulations have reduced carbon tetrachloride emissions by approximately 94 % since 1990. Carbon tetrachloride is not emitted from mobile sources.
- Significant stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the Pulp and Paper Production, HON, Hydrochloric Acid Production, and Miscellaneous Organic Chemical Manufacturing sources.

Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

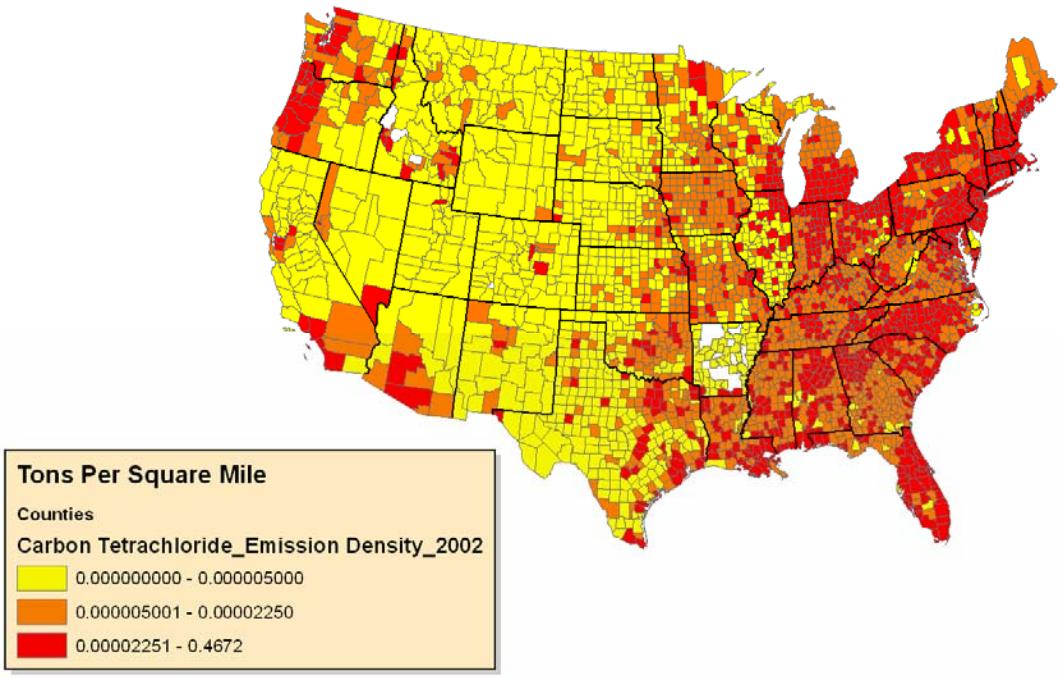
Carbon Tetrachloride (cont.)





- The "Other" Category shown in the Major Source Categorization pie chart includes landfills and incineration.

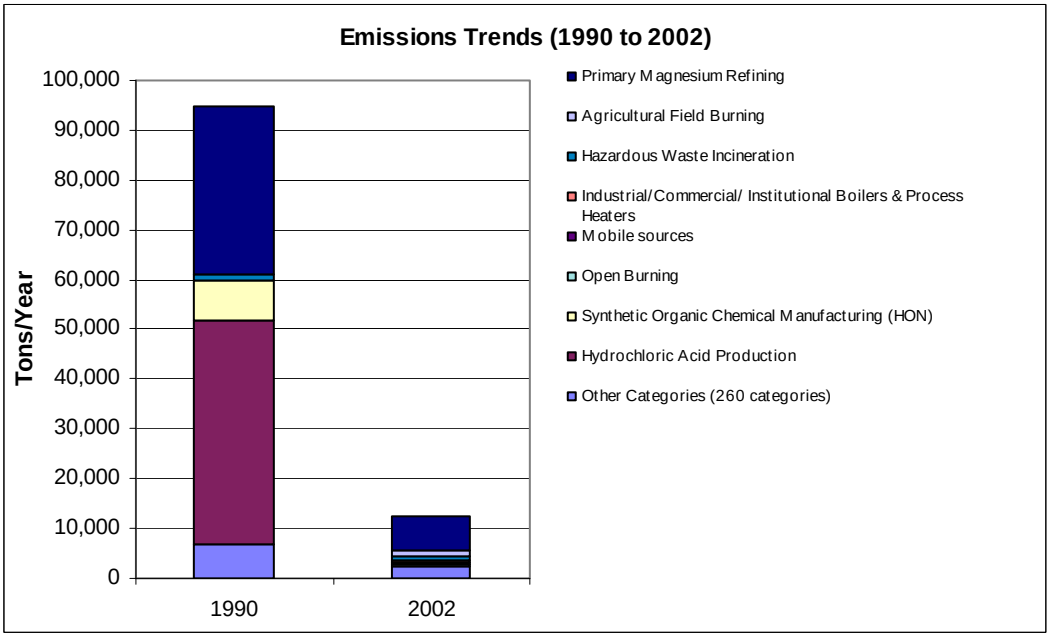
2002 Emissions Density Map



- The County Density map shows that carbon tetrachloride is emitted in 3112 counties of the 3141 counties in the 50 states. Landfills and POTWs are not present in all counties. Lowest range extends below 10^{-9} tons/sq. mi. White areas identify counties with actual zero emissions.

Chlorine

- HAP Category Name: Chlorine
- CAS Number: 7782-50-5
- Chemical Formula: Cl_2 Molecular Weight: 70.91
- Toxicity: Potential NonCancer Effects
- 216 Source Categories (2002)
- 2002 Total Emissions: 12,530 tons



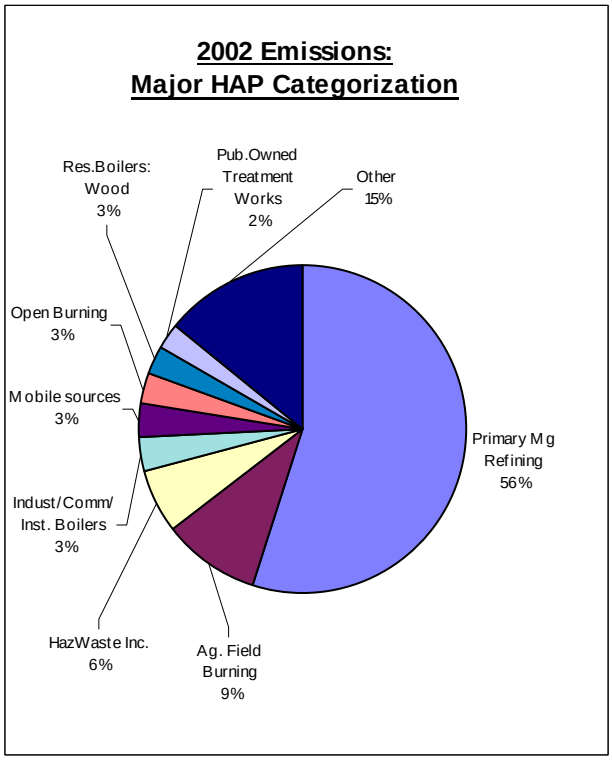
Emissions (Tons) 11/20/06

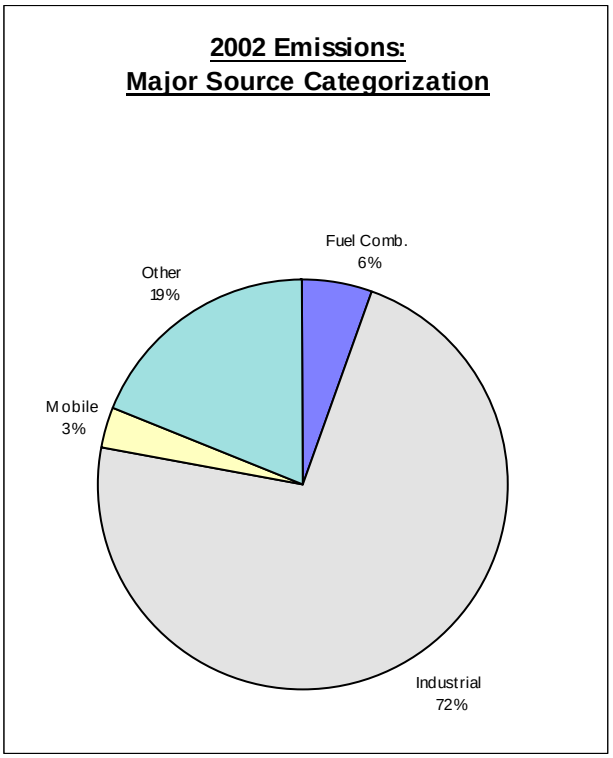
	1990	2002	Pct Change
Primary Magnesium Refining	33,717.90	6,908.64	-80%
Agricultural Field Burning		1,159.93	
Hazardous Waste Incineration	1,059.26	791.32	-25%
Industrial/Commercial/ Institutional Boilers & Process Heaters	61.52	421.27	585%
Mobile sources		416.03	
Open Burning	0.01	399.57	3995600%
Synthetic Organic Chemical Manufacturing (HON)	8,074.51	186.04	-98%
Hydrochloric Acid Production	44,935.24	13.03	-100%
Other Categories (260 categories)	6,822.87	2,233.98	-67%
TOTAL	**94,671**	**12,530**	**-87%**

- Significant stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the Hydrochloric Acid Production, Primary Magnesium Refining, HON, and Pulp and Paper Production sources.
- Categories such as Agricultural Field Burning and Open Burning of Yard Waste are reported in 2002 NEI but were not reported in the 1990 NEI.
- Categories such as POTWs, Portland Cement Manufacturing, Utility Boilers, Industrial/Institutional/Commercial Boilers, and Residential Wood Combustion are not well characterized in the 1990 NEI.

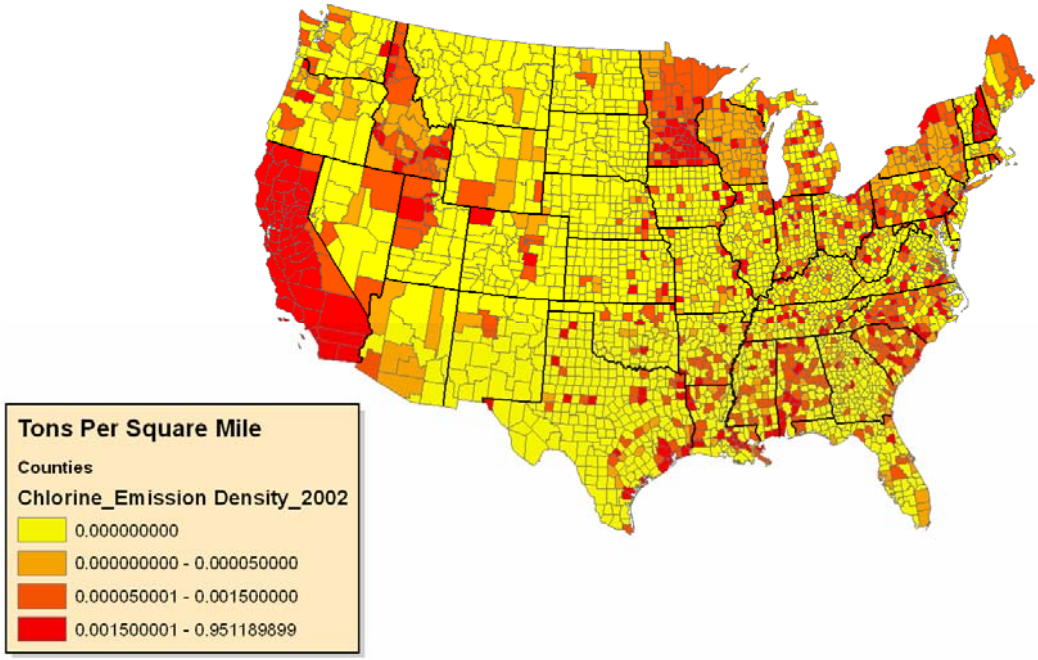
Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

Chlorine (cont.)





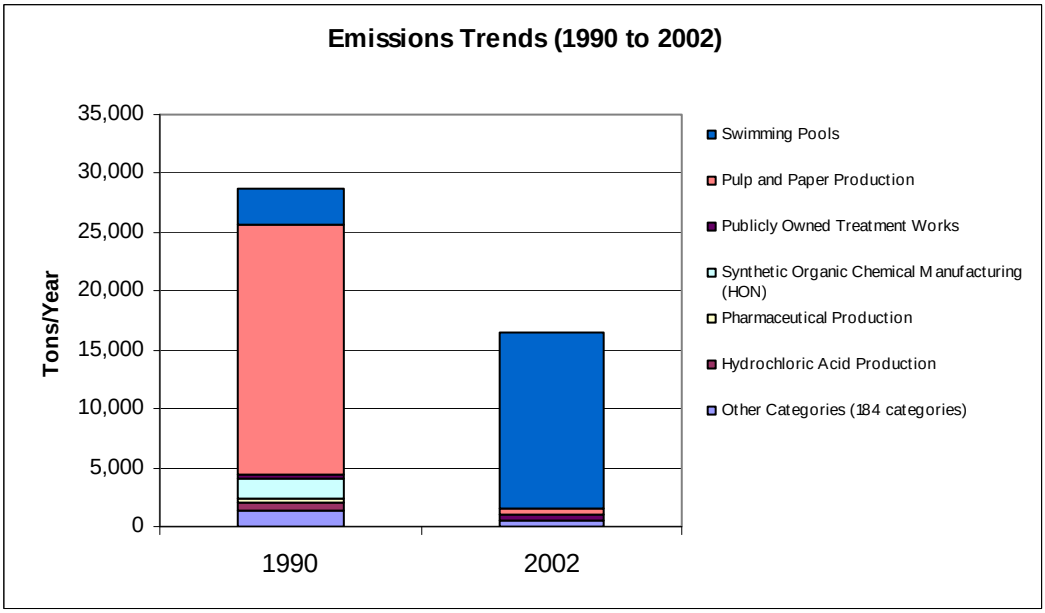
2002 Emissions Density Map



- The County Density map shows that chlorine is emitted in 1057 counties of the 3141 counties in the 50 states. The largest source in the US is a Primary Magnesium Refining located in Utah. Approximately 50% of total 2002 chlorine emissions are associated with this facility. This facility has been evaluated since the 1996 NEI and the emission trends are consistent with from year to year. The emissions have been verified by the state of UT.

Chloroform

- HAP Category Name: Chloroform
- CAS Number: 67-66-3
- Chemical Formula: $CHCl_3$ Molecular Weight: 119.38
- Toxicity: Potential NonCancer Effects
- 217 Source Categories (2002)
- 2002 Total Emissions: 16,513 tons



Emissions (Tons)

	1990	2002	Pct Change
Swimming Pools	3,031.5	14,924.2	392.3%
Pulp and Paper Production	21,222.2	639.6	-97.0%
Publicly Owned Treatment Works	353.3	447.9	26.8%
Synthetic Organic Chemical Manufactu	1,619.1	60.2	-96.3%
Pharmaceutical Production	407.2	14.3	-96.5%
Hydrochloric Acid Production	634.3	0.1	-100.0%
Other Categories (184 categories)	1,392.8	426.3	-69.4%
TOTAL	28,660.4	16,512.6	-42.4%

- Chloroform is emitted from stationary sources. Significant stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the Pulp and Paper Production, HON, Hydrochloric Acid Production, Pharmaceutical Production, and Miscellaneous Organic Chemical Manufacturing sources.
- Categories such as Swimming Pools and POTWs are not well characterized in the 1990 NEI.

Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

Chloroform (cont.)

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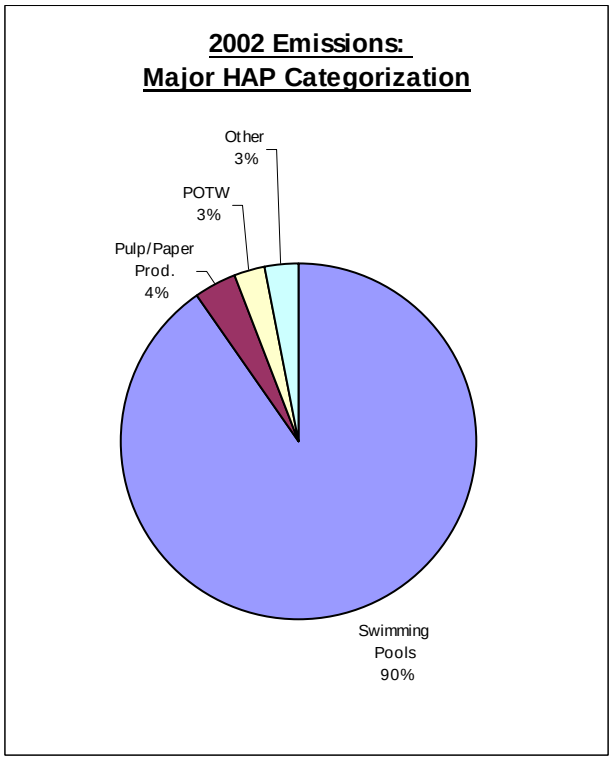
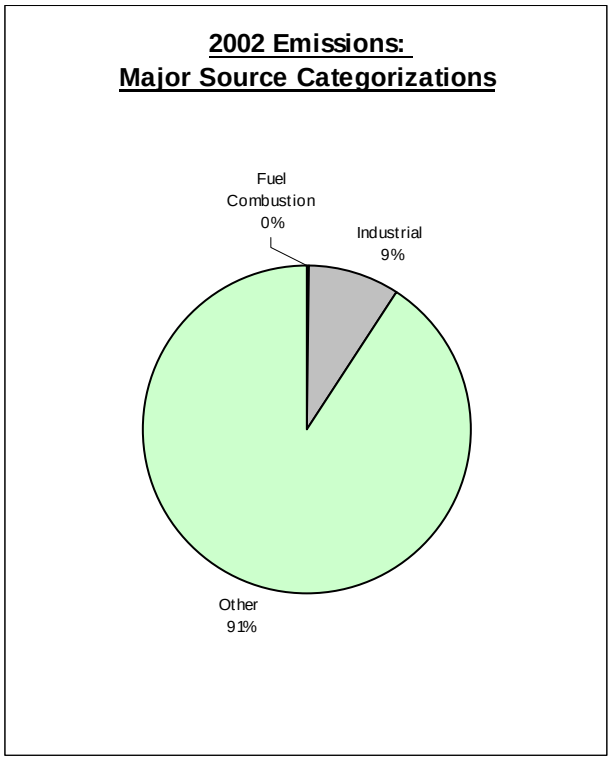
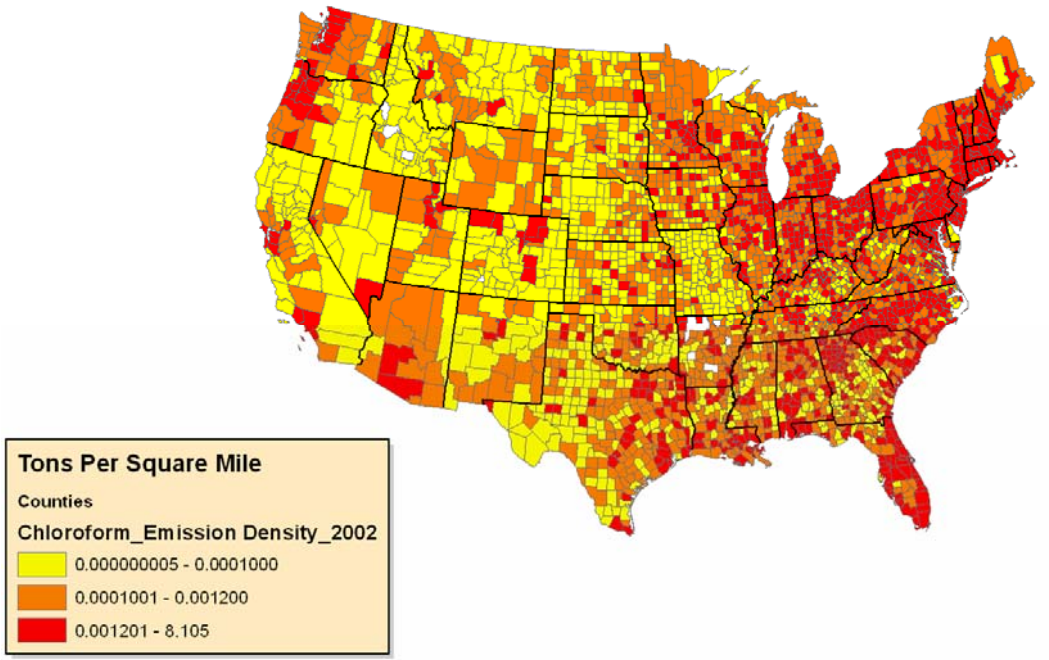




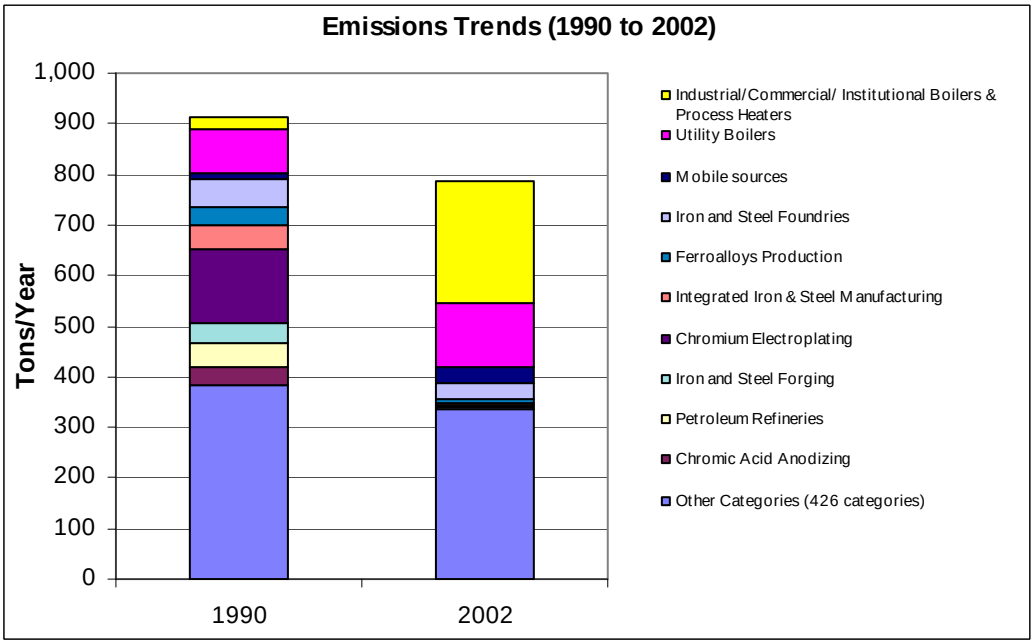
2002 Emissions Density Map



- The County Density map shows that chloroform is emitted in 3124 counties of the 3141 counties in the 50 states.
- White areas identify counties with actual zero emissions.

Chromium Compounds

- HAP Category Name: Chromium Compounds
- Includes 35 compounds in the NEI
- Toxicity: Potential Cancer Risks and NonCancer Effects for Hexavalent Chromium
- 414 Source Categories (2002)
- 2002 Total Emissions: 787 tons



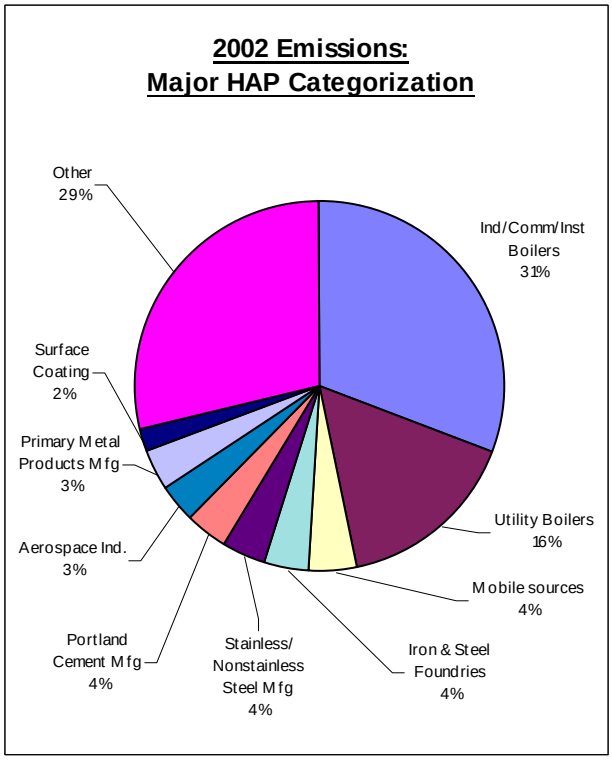
Emissions (Tons) 11/20/06

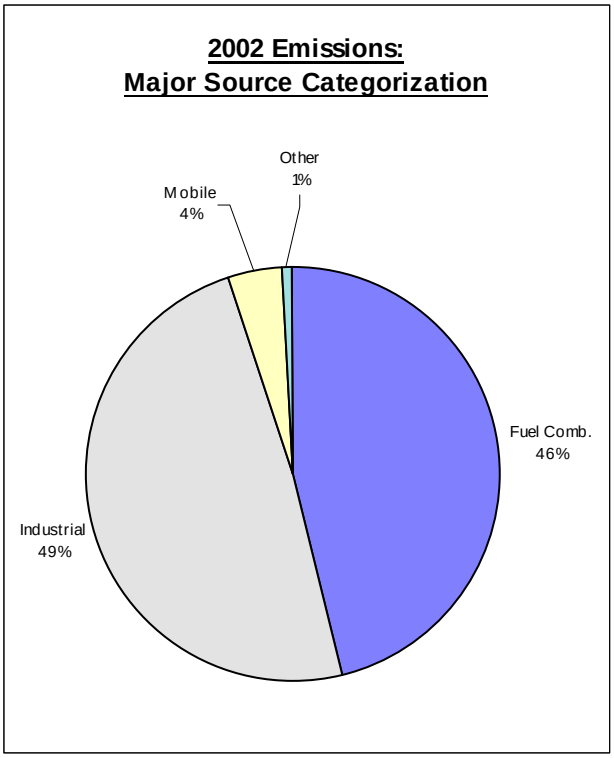
	1990	2002	Pct Change
Industrial/Commercial/ Institutional Boilers & Process Heaters	24.67	242.65	884%
Utility Boilers	87.42	125.78	44%
Mobile sources	11.88	31.75	167%
Iron and Steel Foundries	53.92	31.53	-42%
Ferroalloys Production	38.74	7.56	-80%
Integrated Iron & Steel Manufacturing	45.24	4.87	-89%
Chromium Electroplating	147.19	4.56	-97%
Iron and Steel Forging	40.05	1	-98%
Petroleum Refineries	47.29	0.92	-98%
Chromic Acid Anodizing	36.55	0.01	-100%
Other Categories (426 categories)	382.06	336.71	-12%
TOTAL	**915**	**787**	**-14%**

- Stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the Chromium Electroplating, Iron and Steel Foundries, Integrated Iron & Steel Manufacturing, Petroleum Refineries, and Ferroalloys Production sources.
- Categories such as industrial/institutional/commercial boilers and utility boilers burning oil are underestimated in the 1990 NEI.
- Emission data are shown for Chromium Compounds, not Hexavalent Chromium.

Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

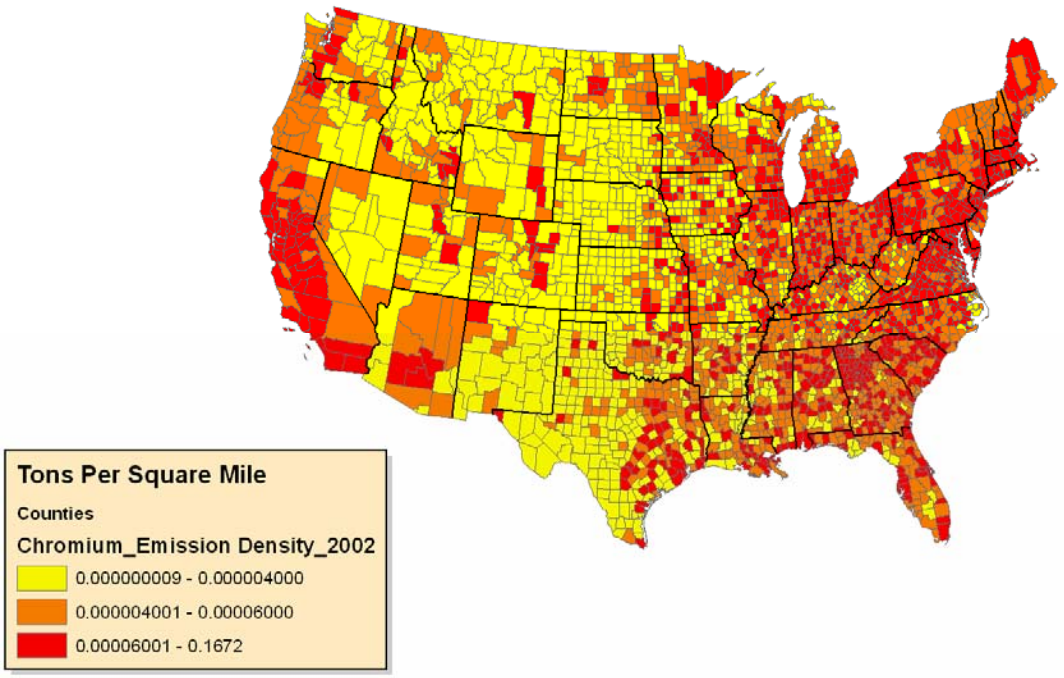
Chromium Compounds (cont.)





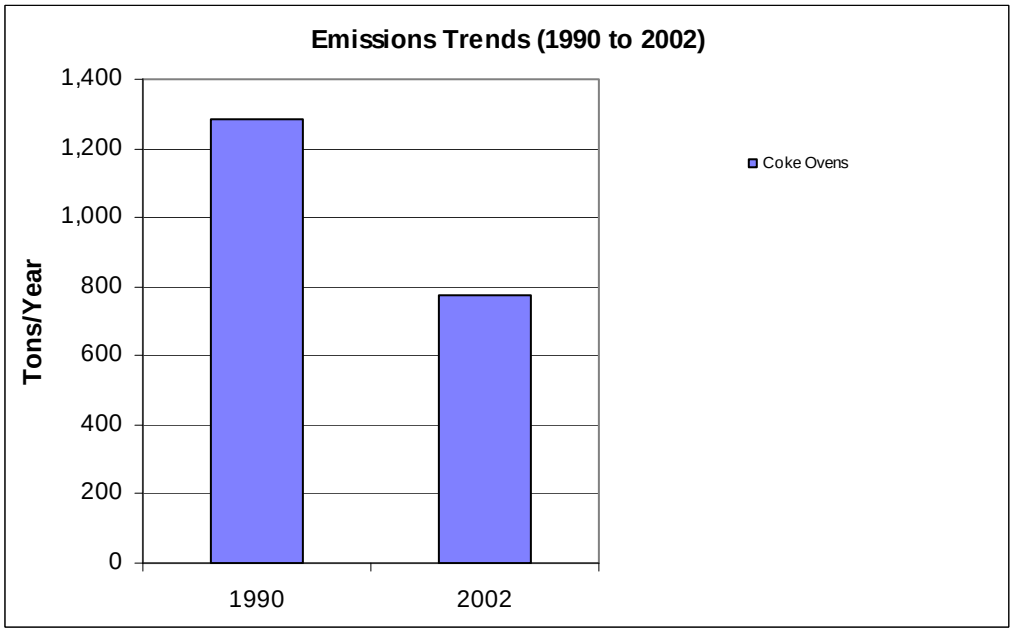
- The "Other" Category shown in the Major Source Categorization pie chart includes incineration categories.

2002 Emissions Density Map



Coke Oven Emissions

- HAP Category Name: Coke Oven Emissions
- CAS Number: 8007-45-2
- Comprised of: Benzene Soluble Organics (BSO) and Methylene Chloride Soluble Organics (MCSO)
- Toxicity: Potential Cancer Risks
- 2 Source Categories (2002)
- 2002 Total Emissions: 775 tons



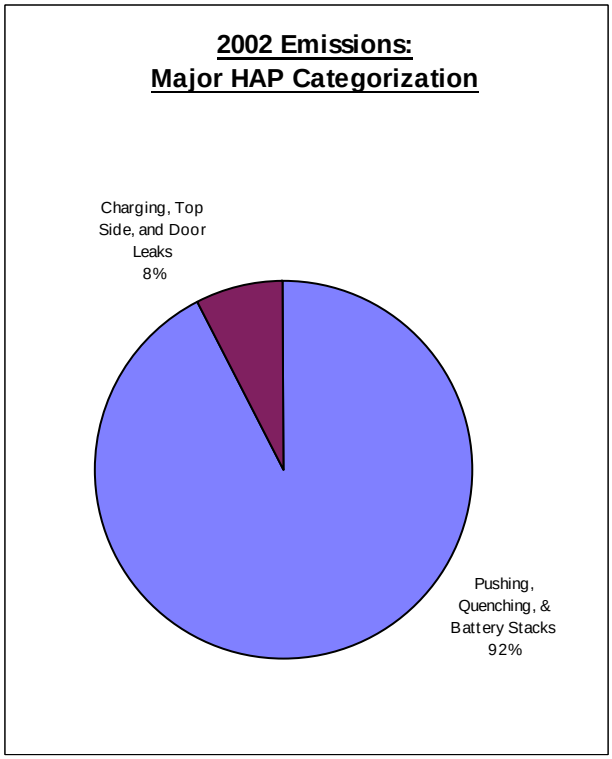
Emissions (Tons) 11/20/06

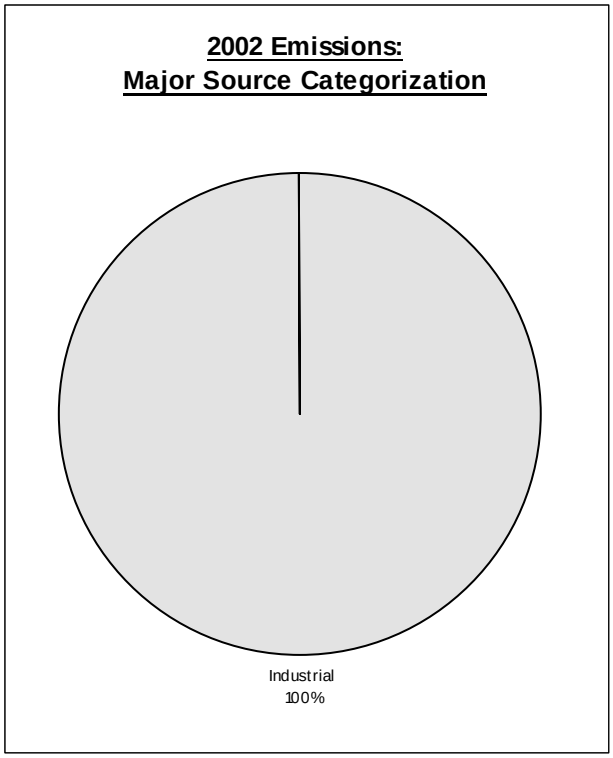
	1990	2002	Pct Change
Coke Ovens	1281.68	775.12	-40%
TOTAL	**1,282**	**775**	**-40%**

- Coke Oven Emissions data are of high quality. 2002 NEI data are based on data from the Coke oven Residual Risk Standard development. Coke ovens estimates include 2 categories: Pushing, Quenching, & Battery Stacks; and Charging, Top Side, and Door Leaks.
- Significant reductions have occurred due to implementation of Maximum Achievable Control Technology (MACT) standards. Further reductions are expected from implementation of Residual Risk standards.

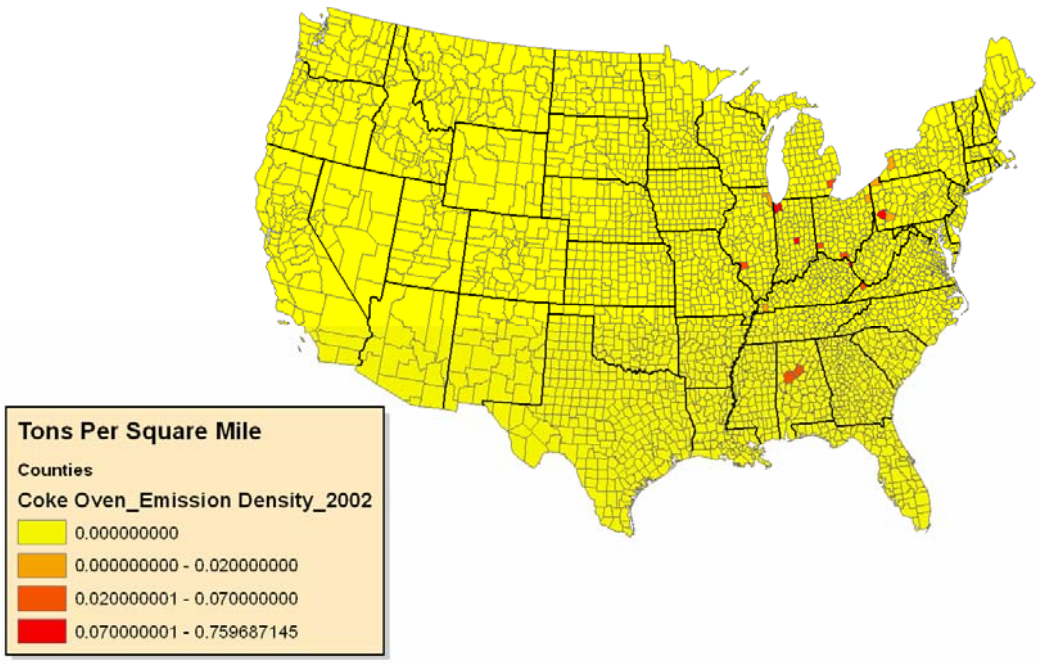
Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

Coke Oven Emissions (cont.)





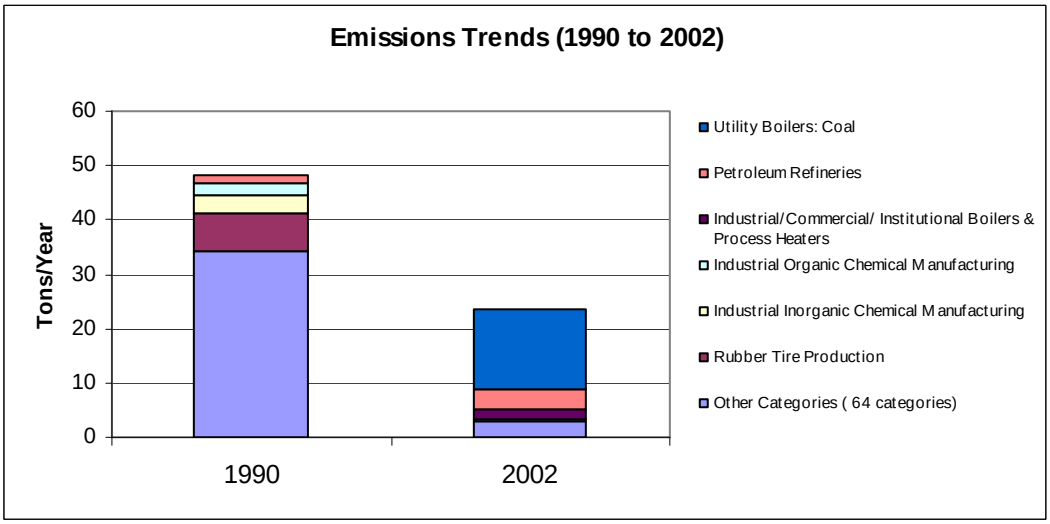
2002 Emissions Density Map



- The County Density map shows that coke oven emissions are emitted in 19 counties of the 3141 counties in the 50 states.

Ethylene dibromide

- HAP Category Name: Ethylene dibromide
- CAS Number: 106-93-4 Chemical Synonym: Dibromoethane
- Chemical Formula: $C_2H_4Br_2$ Molecular Weight: 187.86
- Toxicity: Potential Cancer Risks and NonCancer Effects
- 97 Source Categories (2002)
- 2002 Total Emissions: 24 tons



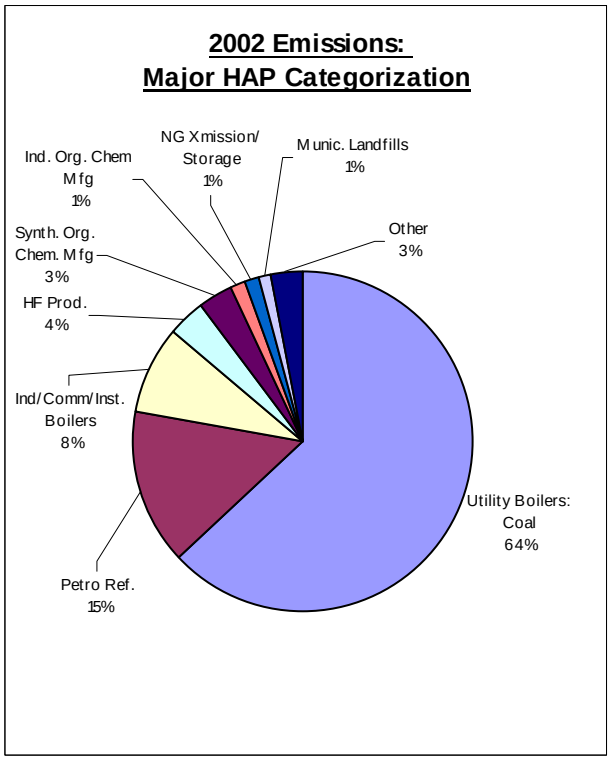
Emissions (Tons)

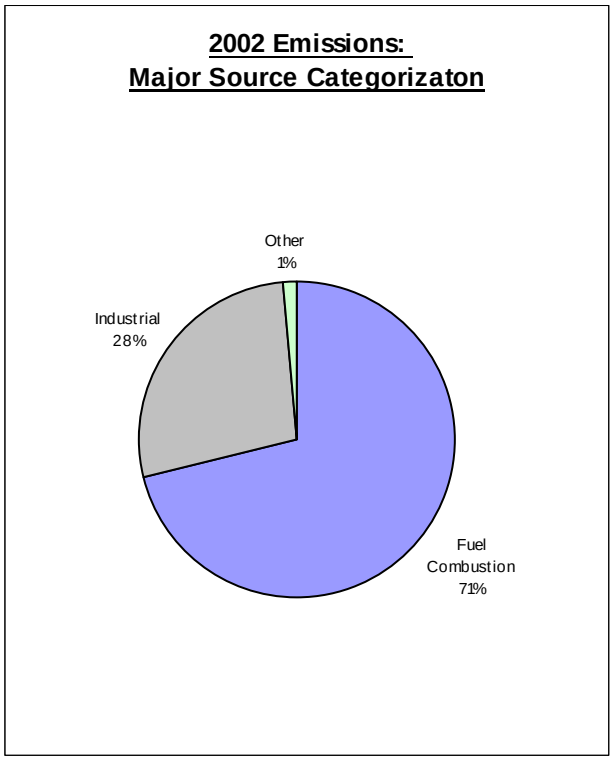
	1990	2002	Pct Change
Other Categories (64 categories)	34.31	2.94	-91.4%
Polymers and Resins 1 2	3.65		
Off-Site Waste and Recovery Operation	3.42		
Motor Vehicle Parts and Accessories	4.97		
Miscellaneous Organic Chemical Manu	8.41		
Hydrochloric Acid Production	10.16		
Rubber Tire Production	6.85	0.004	-99.9%
Industrial Inorganic Chemical Manufact	3.45	0.02	-99.4%
Industrial Organic Chemical Manufactu	2.31	0.33	-85.7%
Industrial/Commercial/ Institutional Boile	0.01	1.92	19100.0%
Petroleum Refineries	1.39	3.5	151.8%
Utility Boilers: Coal		14.87	
TOTAL	**48.32**	**23.584**	**-51.2%**

- Ethylene Dibromide is only emitted from stationary sources. Source categories are not consistent in the 1990 NEI and the 2002 NEI. The largest categories in the 2002 NEI are not present in the 1990 NEI.
- Ethylene Dibromide is on the list of HAPs under the Section 112c3/112k Urban Area Source Program (FR 1999), but is not on the list of 1999 NATA risk drivers.

Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

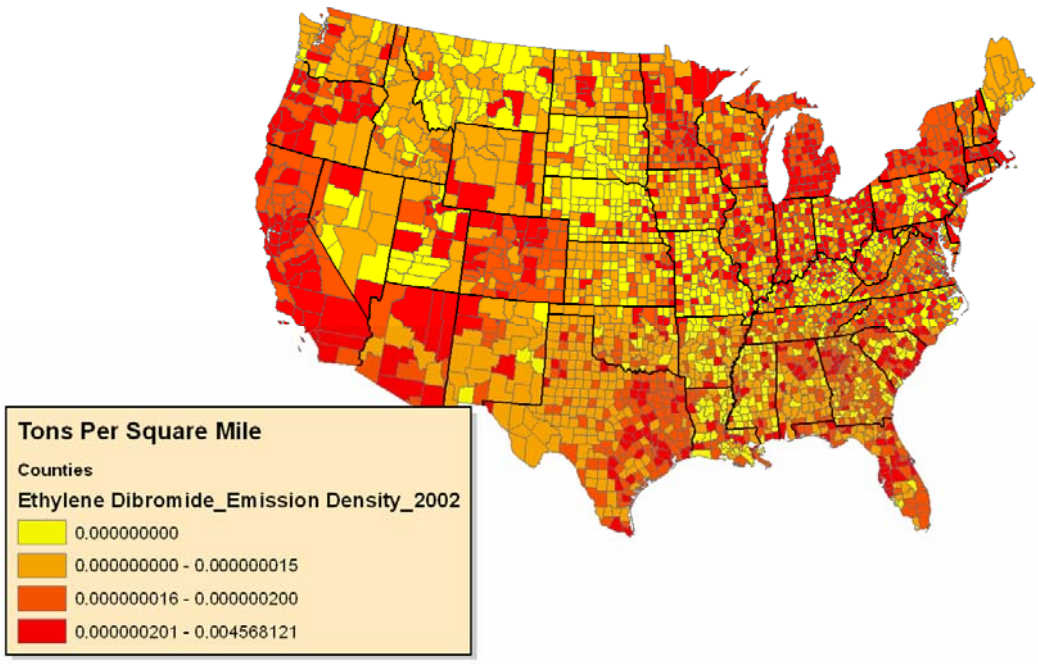
Ethylene dibromide (cont.)





- The "Other" Category shown in the Major Source Categorization pie chart includes incinerators and landfills.

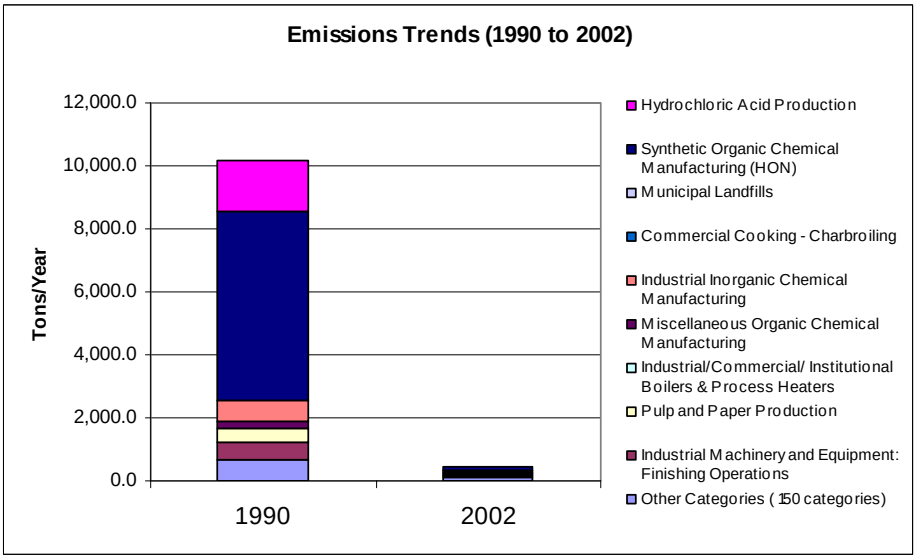
2002 Emissions Density Map



- The County Density map shows that ethylene dibromide is emitted in 2393 counties of the 3141 counties in the 50 states.

Ethylene dichloride

- HAP Category Name: Ethylene dichloride
- CAS Number: 107-06-2
- Chemical Synonym: 1,2-Dichloroethane
- Chemical Formula: $C_2H_4Cl_2$ Molecular Weight: 98.96
- Toxicity: Potential Cancer Risks and NonCancer Effects
- 189 Source Categories (2002)
- 2002 Total Emissions: 456 tons



Emissions (Tons)

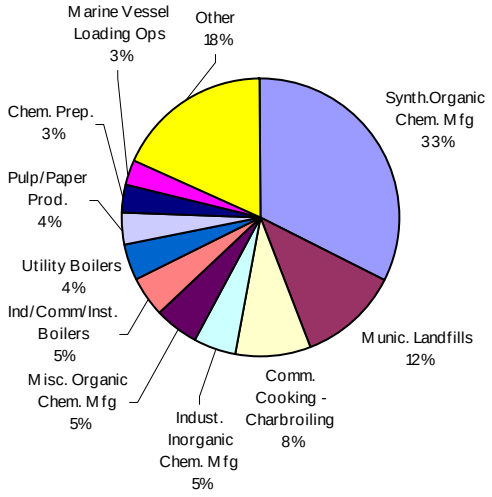
	1990	2002	Pct Change
Synthetic Organic Chemical Manufacturing (HON)	5,985.3	148.6	-97.5%
Municipal Landfills	1.6	53.1	3239.6%
Commercial Cooking - Charbroiling		38.7	
Industrial Inorganic Chemical Manufacturing	680.8	22.9	-96.6%
Miscellaneous Organic Chemical Manufacturing	217.1	22.5	-89.6%
Industrial/Commercial/ Institutional Boilers & Process Heaters	0.8	22.2	2611.0%
Pulp and Paper Production	458.1	18.0	-96.1%
Industrial Machinery and Equipment: Finishing Operations	553.3	0.0	-100.0%
Hydrochloric Acid Production	1,633.7		
Other Categories (150 categories)	663.8	130.1	-80.4%
TOTAL:	**10,194.4**	**456.1**	**-95.5%**

- Ethylene Dichloride is only emitted from stationary sources. Stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the HON, Hydrochloric Acid Production, Pharmaceutical Production and Miscellaneous Organic Chemical Manufacturing.
- Categories such as Charbroiling, Utility Boilers and Industrial/Institutional/Commercial boilers are reported in 2002 NEI but were not reported in the 1990 NEI. Other categories such as Landfills are not well characterized in the 1990 NEI.

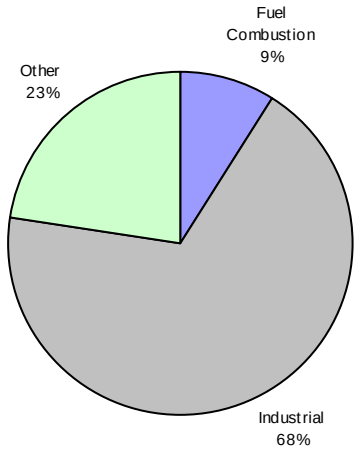
Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

Ethylene dichloride (cont.)

2002 Emissions: Major HAP Categorization

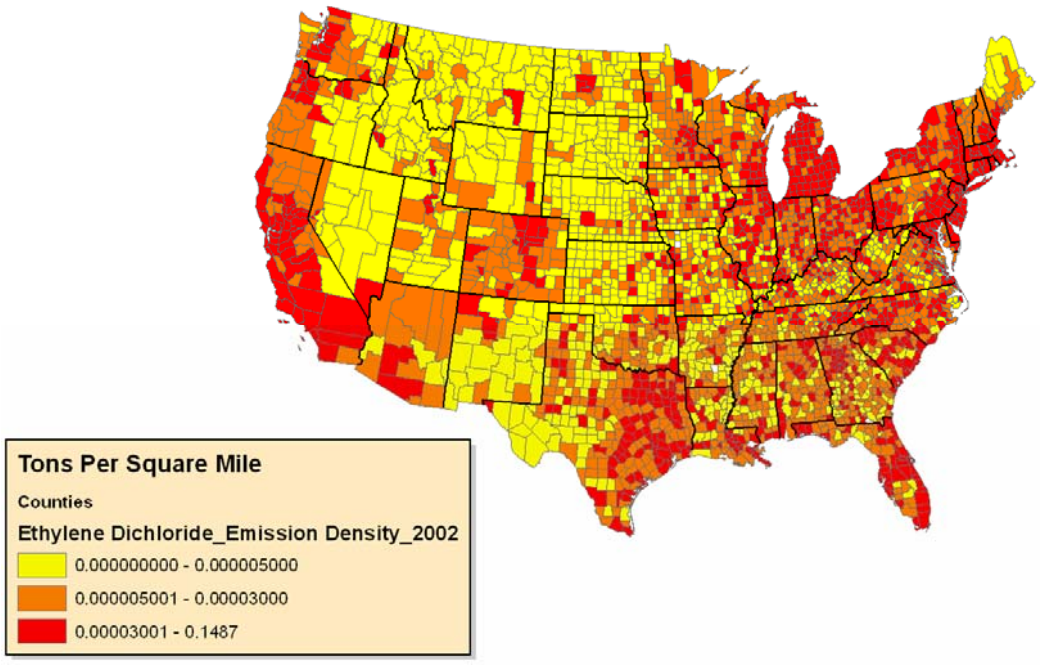


2002 Emissions: Major Source Categorization



- The "Other" Category shown in the Major Source Categorization pie chart includes landfills, charbroiling and incineration categories.

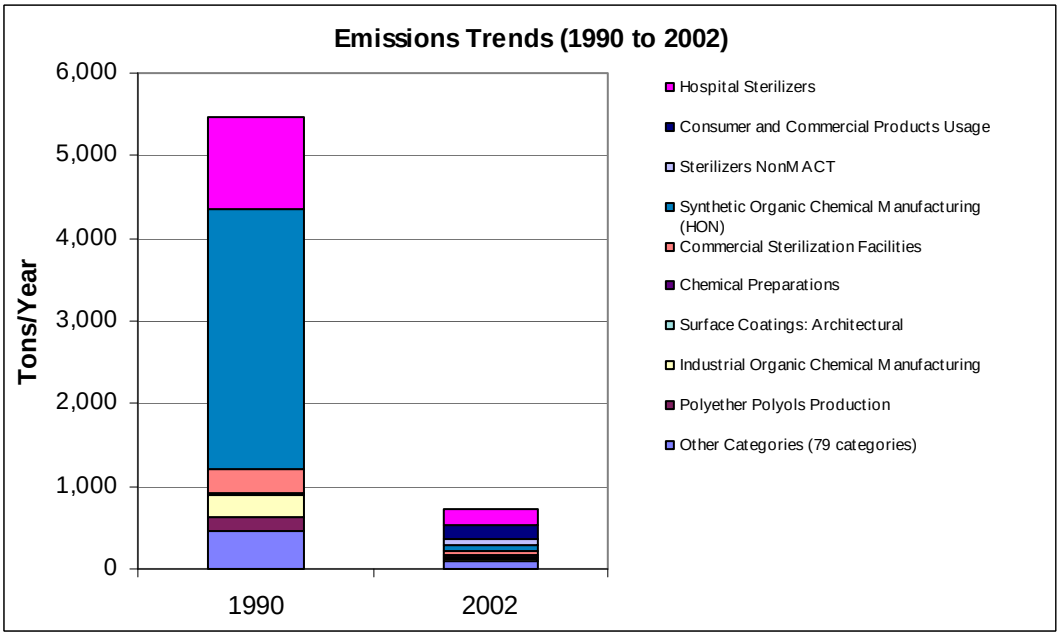
2002 Emissions Density Map



- Lowest range extends below 10^{-9} tons/sq. mi. White areas identify counties with actual zero emissions.

Ethylene Oxide

- HAP Category Name: Ethylene Oxide
- CAS Number: 75-21-8
- Chemical Formula: $C_2H_6O_2$ Molecular Weight: 62.07
- Toxicity: Potential Cancer Risks and NonCancer Effects
- 82 Source Categories (2002)
- 2002 Total Emissions: 715 tons



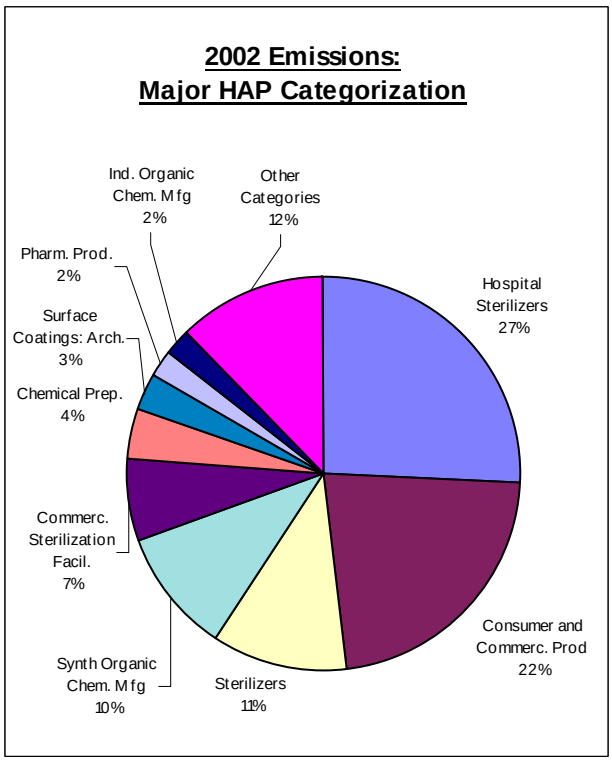
Emissions (Tons) 11/20/06

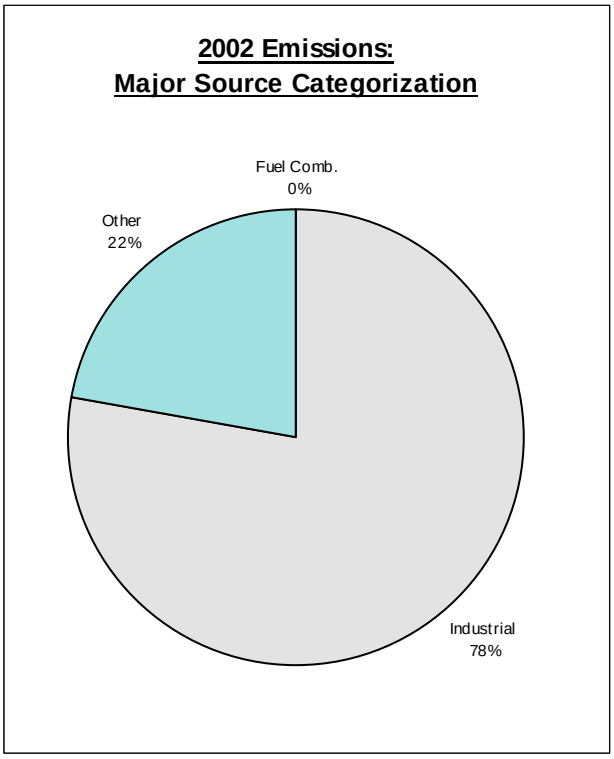
	1990	2002	Pct Change
Hospital Sterilizers	1105.46	185.42	-83%
Consumer and Commercial Products Usage		158.16	
Sterilizers NonMACT	21.3	79.76	274%
Synthetic Organic Chemical Manufacturing (HON)	3124.88	73.67	-98%
Commercial Sterilization Facilities	308.34	47.63	-85%
Chemical Preparations	12.07	28.77	138%
Surface Coatings: Architectural		21.59	
Industrial Organic Chemical Manufacturing	260.23	15.8	-94%
Polyether Polyols Production	176.15	0.04	-100%
Other Categories (79 categories)	462.44	103.77	-78%
TOTAL	**5,471**	**715**	**-87%**

- Ethylene Oxide is only emitted from stationary sources. Significant stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the HON, Hospital Sterilizers, Commercial Sterilization Facilities, Polyether Polyols Production, and Miscellaneous Organic Chemical Manufacturing.
- Consumer and Commercial Products Usage emissions of ethylene oxide are reported in 2002 NEI but were not reported in the 1990 NEI.

Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

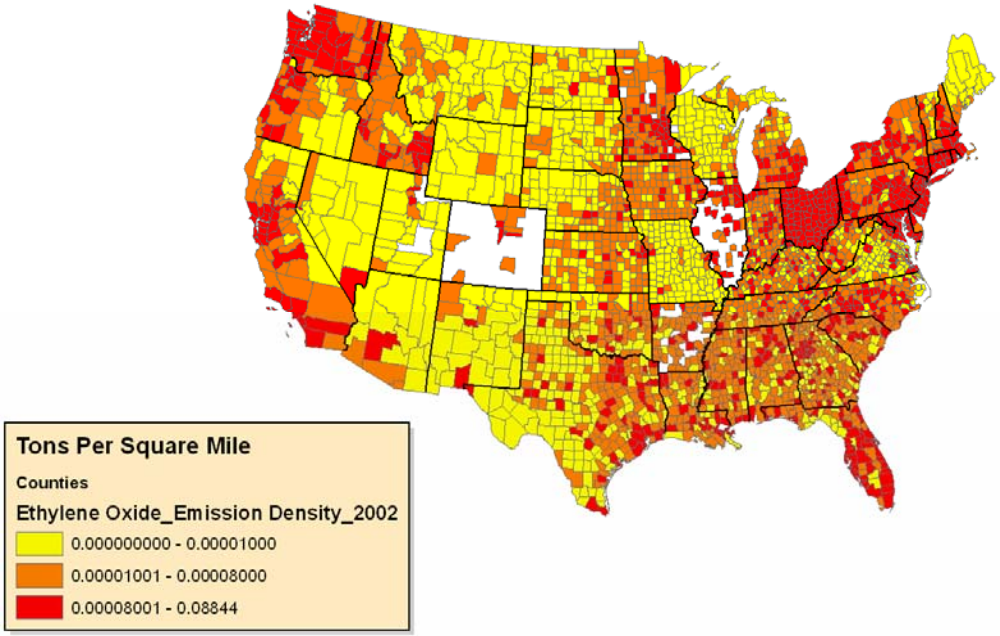
Ethylene Oxide (cont.)





- The "Other" Category shown in the Major Source Categorization pie chart includes Consumer and Commercial Products Usage categories.

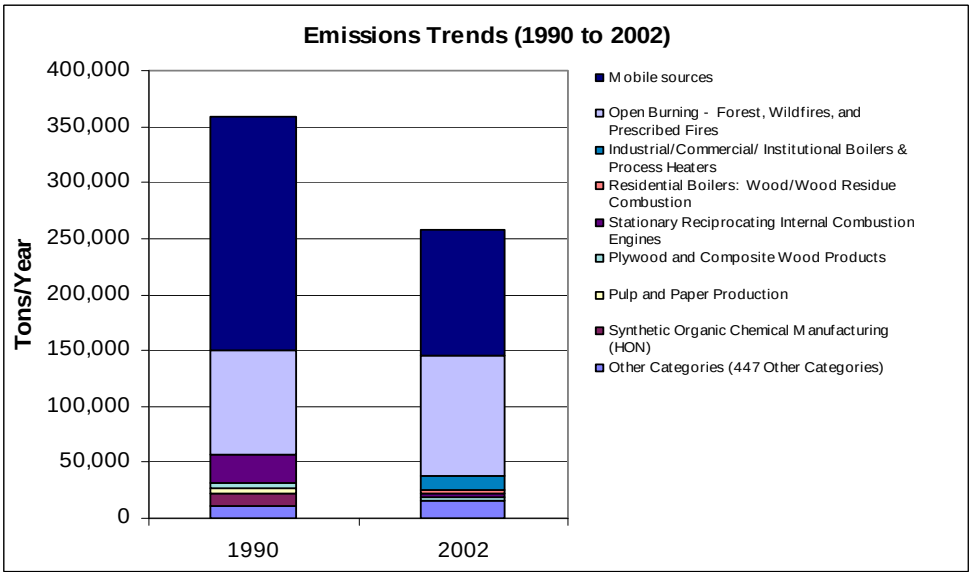
2002 Emissions Density Map



- The County Density map shows that ethylene oxide is emitted in 2987 counties of the 3141 counties in the 50 states.
- Lowest range extends below 10^{-9} tons/sq. mi. White areas identify counties with actual zero emissions.

Formaldehyde

- HAP Category Name: Formaldehyde
- CAS Number: 50-00-0
- Chemical Formula: CH_2O Molecular Weight: 30.03
- Toxicity: Potential Cancer Risks and NonCancer Effects
- 452 Source Categories (2002)
- 2002 Total Emissions: 258,009 tons



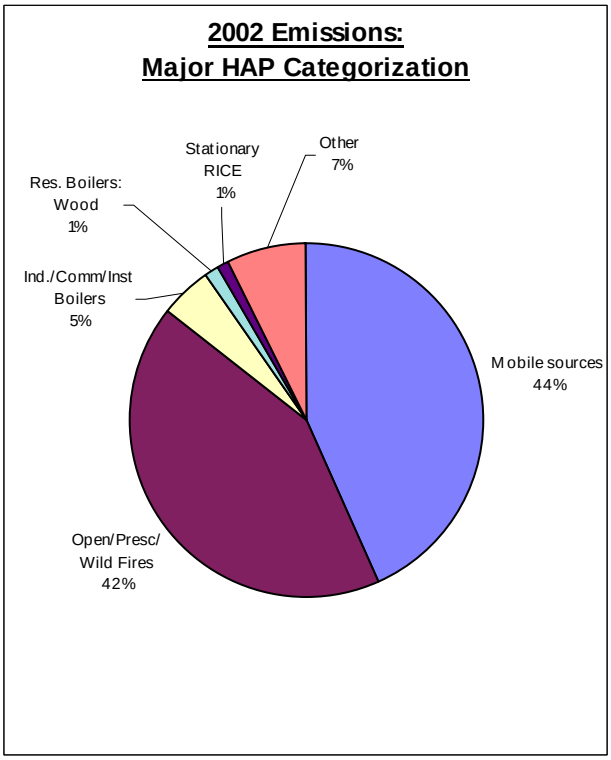
Emissions (Tons) 11/20/06

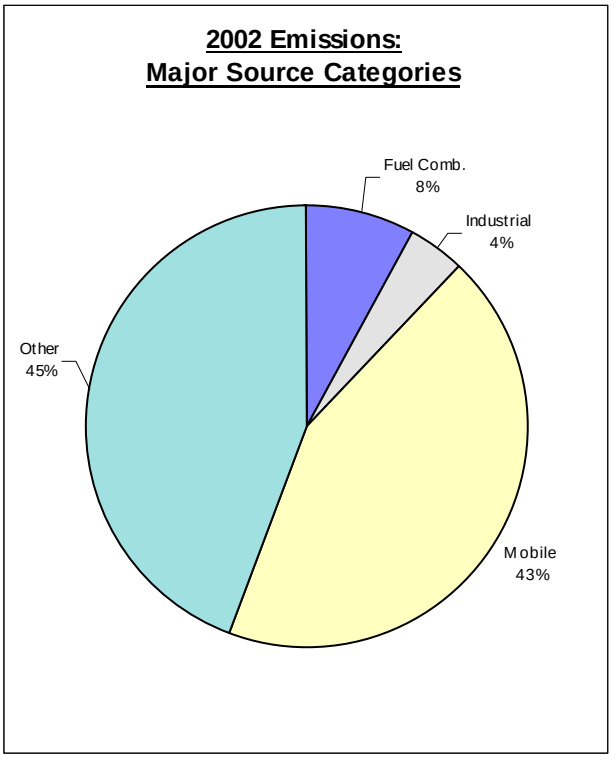
	1990	2002	Pct Change
Mobile sources	209,311.3	111,934.8	-47%
Open Burning - Forest, Wildfires, and Prescribed Fires	93,254.4	108,492.0	16%
Industrial/Commercial/ Institutional Boilers & Process Heaters	687.3	12,194.2	1674%
Residential Boilers: Wood/Wood Residue Combustion	0.2	3,661.1	1525354%
Stationary Reciprocating Internal Combustion Engines	25,240.9	3,326.5	-87%
Plywood and Composite Wood Products	3,773.5	2,190.3	-42%
Pulp and Paper Production	4,340.9	789.4	-82%
Synthetic Organic Chemical Manufacturing (HON)	12,554.2	217.1	-98%
Other Categories (447 Other Categories)	10,333.0	15,203.5	47%
TOTAL	**359,495.7**	**258,008.9**	**-28%**

- Stationary source and mobile source regulations have reduced formaldehyde emissions by approximately 28 % since 1990. Significant stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for Stationary Reciprocating Internal Combustion Engines, HON, Pulp & Paper Production, Plywood and Composite Wood Products, Wool Fiberglass Manufacturing, Miscellaneous Organic Chemical Manufacturing, and Petroleum Refineries sources. Many other MACT categories have also reduced emissions of formaldehyde.
- Emission estimation methodologies are different in 1990 and 2002 for the categories of: Open Burning: Forest and Wildfires and Prescribed Burns.
- Categories such as Agricultural Field Burning, Residential Wood Combustion, Burning of Logging Debris and Charbroiling are reported in 2002 NEI but were not reported in the 1990 NEI. Other categories such as utility and industrial/institutional/commercial boilers are underestimated in the 1990 NEI.

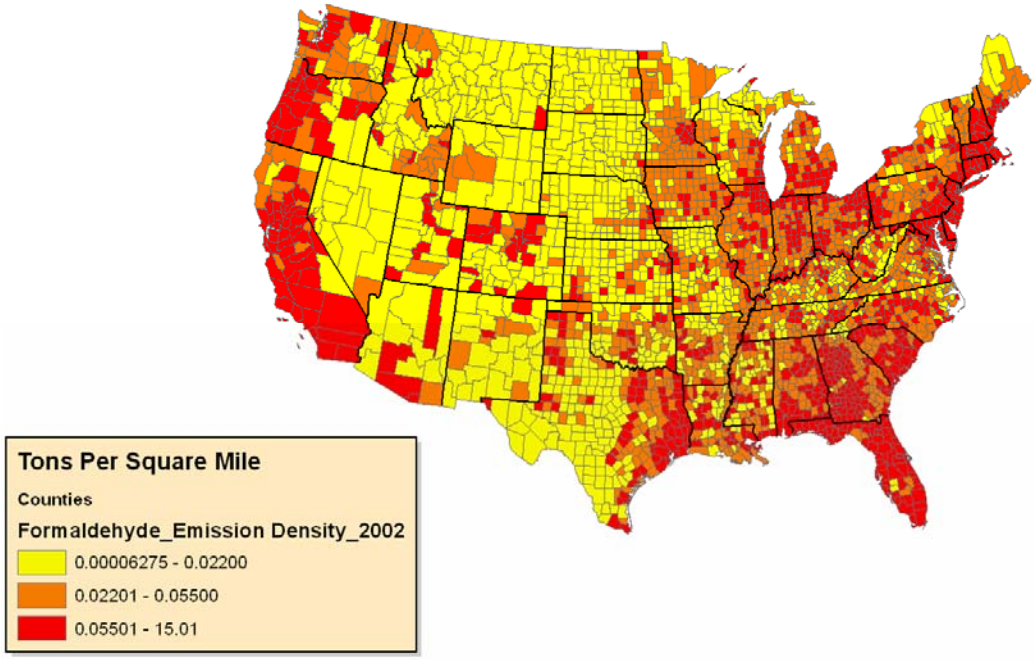
Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

Formaldehyde (cont.)





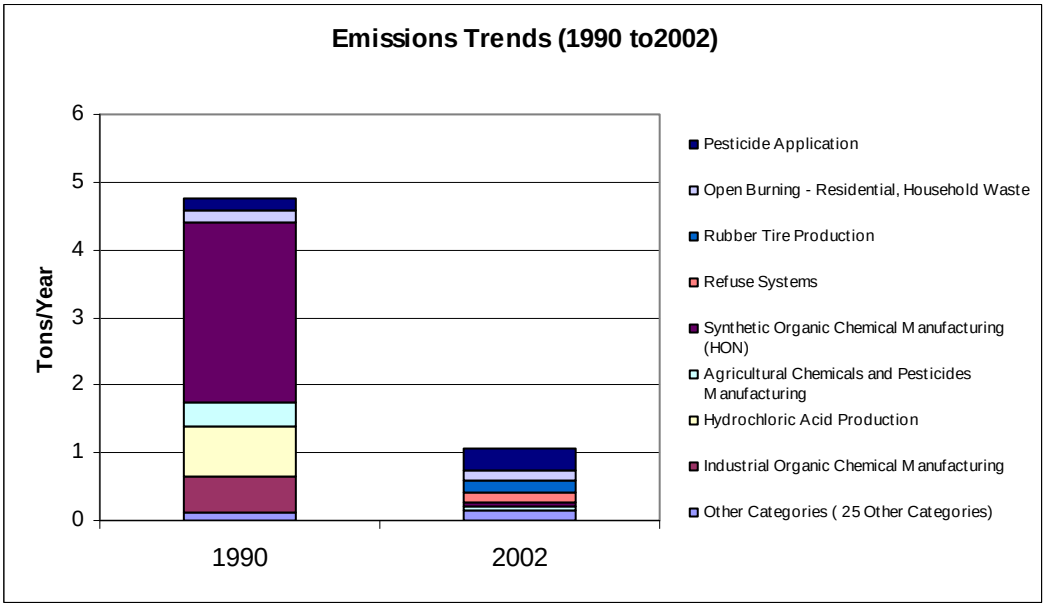
2002 Emissions Density Map



- The emissions density map shows that formaldehyde is emitted in higher concentrations in areas with greater population. The primary source of formaldehyde emissions in 2002 is mobile sources, which can be correlated to population. The counties in Montana and Idaho with high emission densities are due to agricultural field burning.

Hexachlorobenzene

- HAP Category Name: Hexachlorobenzene
- CAS Number: 118-74-1
- Chemical Formula: C_6Cl_6 Molecular Weight: 284.78
- Toxicity: Potential Cancer Risks and NonCancer Effects
- 39 Source Categories
- 2002 Total Emissions: 1.05 tons

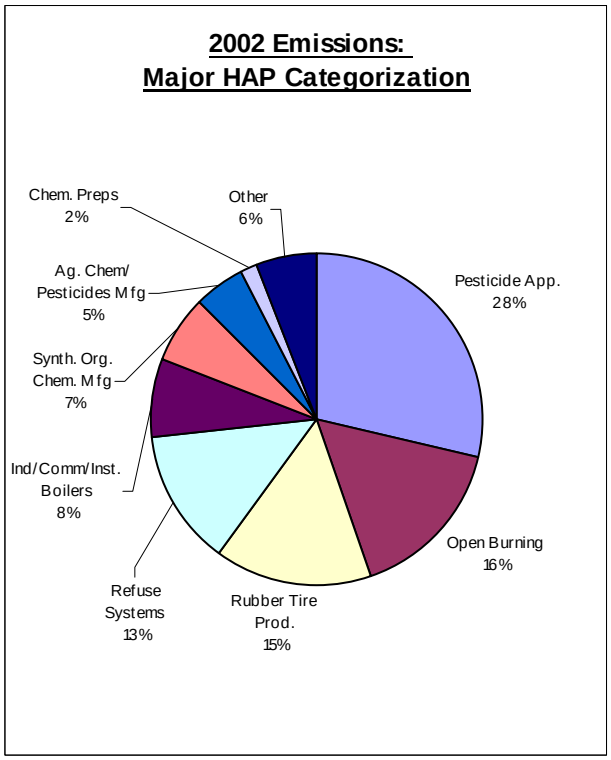


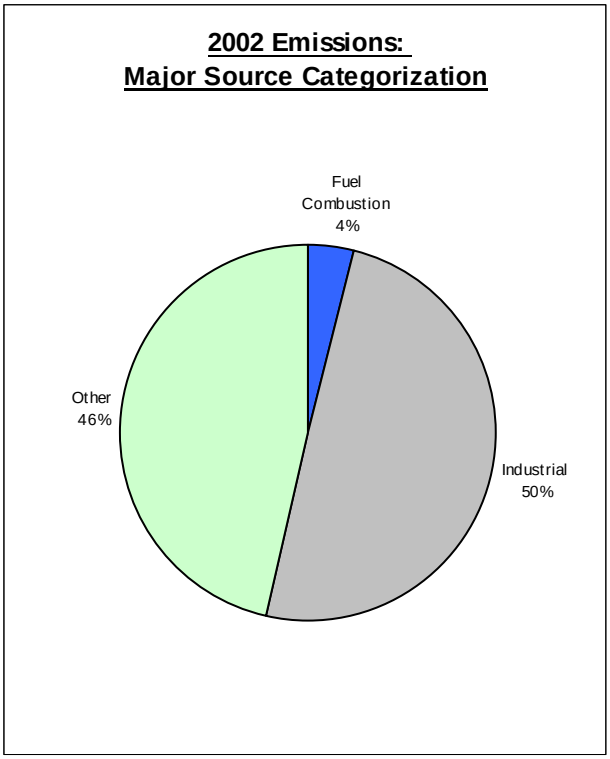
Emissions (Tons)

	1990	2002	Pct Change
Pesticide Application	0.2	0.30	50.0%
Open Burning - Residential, Household Waste	0.16	0.17	6.3%
Rubber Tire Production		0.16	
Refuse Systems		0.14	
Synthetic Organic Chemical Manufacturing (HON)	2.66	0.07	-97.4%
Agricultural Chemicals and Pesticides Manufacturing	0.37	0.05	-86.5%
Hydrochloric Acid Production	0.73		
Industrial Organic Chemical Manufacturing	0.52		
Other Categories (25 Other Categories)	0.13	0.16	23.1%
TOTAL	**4.77**	**1.05**	**-78.0%**

- Hexachlorobenzene is only emitted from stationary sources. Significant stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the HON, Hydrochloric Acid Production, and Agricultural Chemicals and Pesticides Manufacturing.
- Utility and industrial/institutional/commercial boilers, pesticide application, and landfills emissions are reported in 2002 NEI but were not reported in the 1990 NEI.

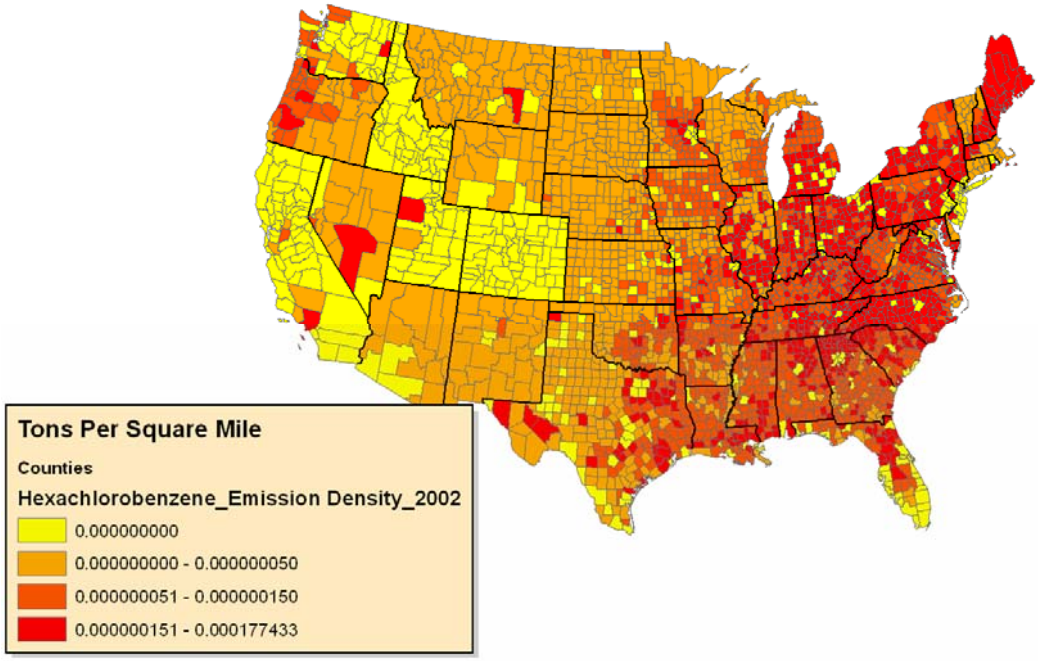
Hexachlorobenzene (cont.)





- The "Other" Category shown in the Major Source Categorization pie chart includes pesticide application and incineration categories.

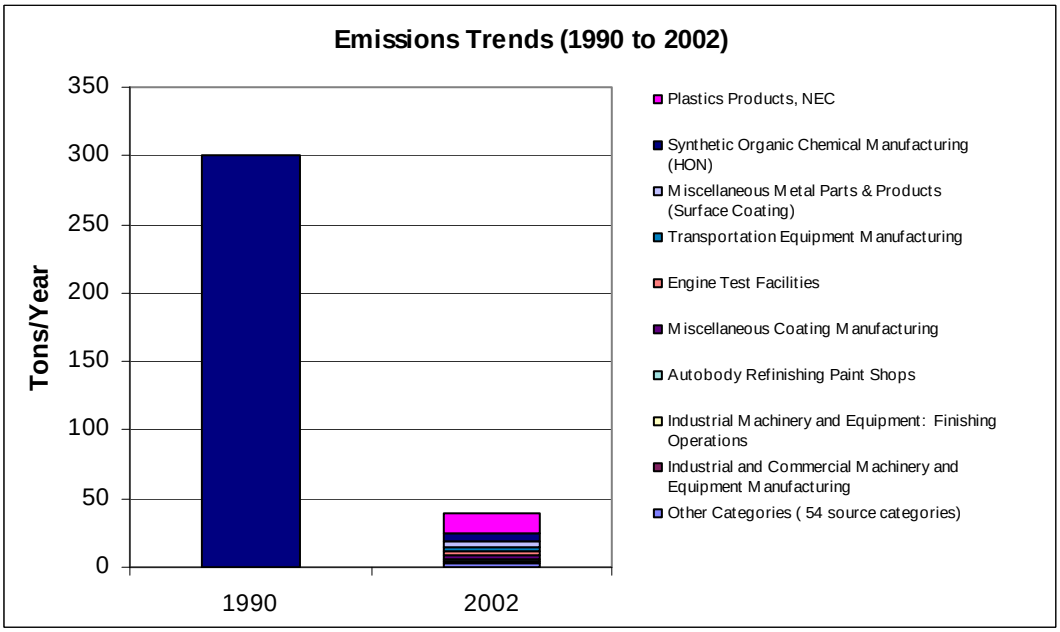
2002 Emissions Density Map



- The County Density map shows that hexachlorobenzene is emitted in 2649 counties of the 3141 counties in the 50 states.

Hexamethylene 1,6-diisocyanate

- HAP Category Name: Hexamethylene Diisocyanate
- CAS Number: 822-06-0
- Chemical Formula: $C_8H_{12}N_2O_2$ Molecular Weight: 168.2
- Toxicity: Potential NonCancer Effects
- 80 Source Categories (2002)
- 2002 Total Emissions: 40 tons



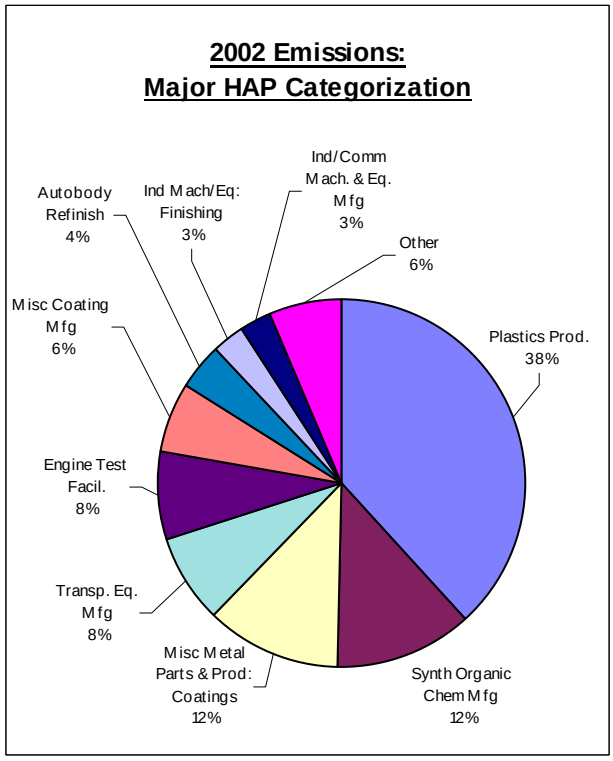
Emissions (Tons) 11/20/06

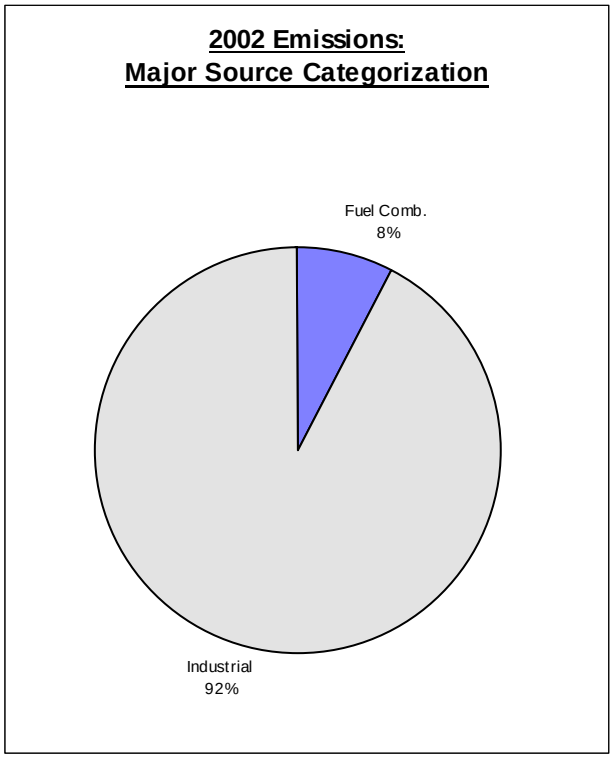
	1990	2002	Pct Change
Plastics Products, NEC		15.14	
Synthetic Organic Chemical Manufacturing (HON)	300.42	4.77	-98%
Miscellaneous Metal Parts & Products (Surface Coating)		4.69	
Transportation Equipment Manufacturing		3.11	
Engine Test Facilities		3.06	
Miscellaneous Coating Manufacturing		2.49	
Autobody Refinishing Paint Shops	0.14	1.65	1079%
Industrial Machinery and Equipment: Finishing Operations		1.09	
Industrial and Commercial Machinery and Equipment Manufacturing		1.08	
Other Categories (54 source categories)	0.1	2.51	2410%
TOTAL	**301**	**40**	**-87%**

- Hexamethylene Diisocyanate is only emitted from stationary sources. Significant stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the HON.
- A number of solvent and surface coating categories are reported in 2002 NEI but were not reported in the 1990 NEI.

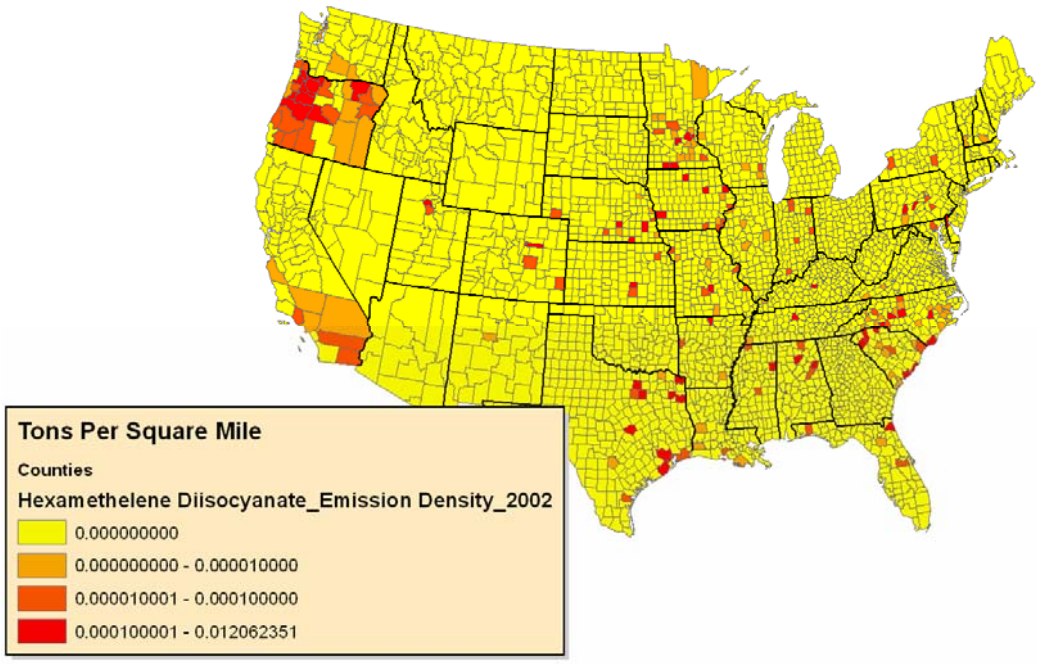
Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

Hexamethylene 1,6-diisocyanate (cont.)





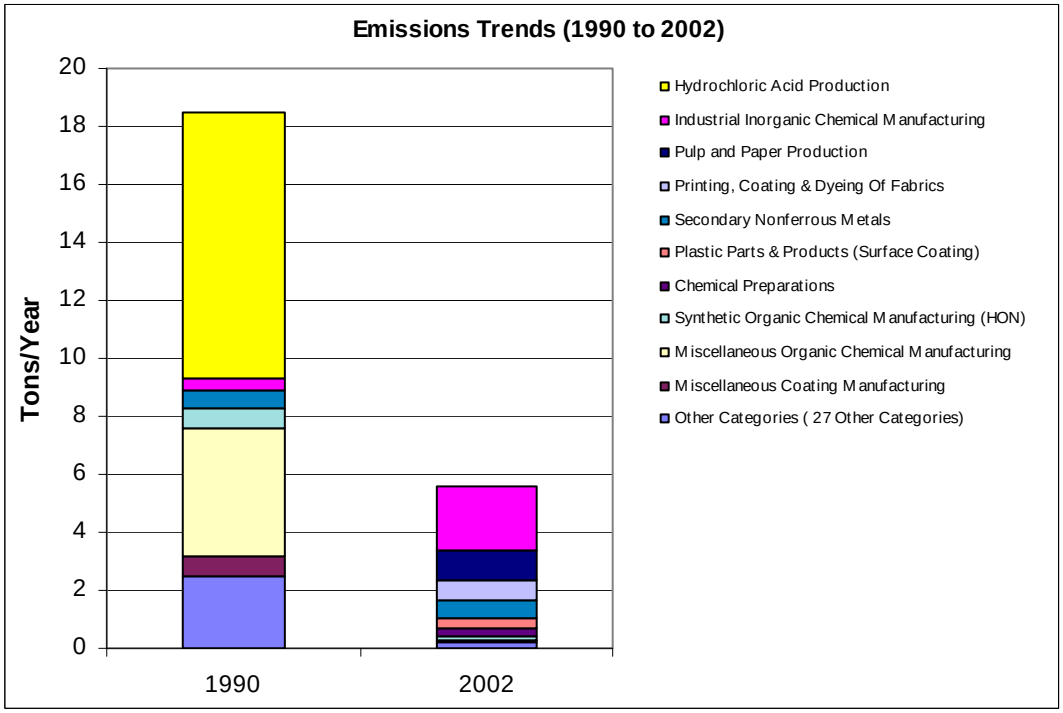
2002 Emissions Density Map



- The County Density map shows that hexamethylene diisocyanate is emitted in 198 counties of the 3141 counties in the 50 states.

Hydrazine

- HAP Category Name: Hydrazine
- CAS Number: 302-01-2
- Chemical Formula: H_4N_2 Molecular Weight: 32.05
- Toxicity: Potential Cancer Risks and NonCancer Effects
- 30 Source Categories (2002)
- 2002 Total Emissions: 5.6 tons



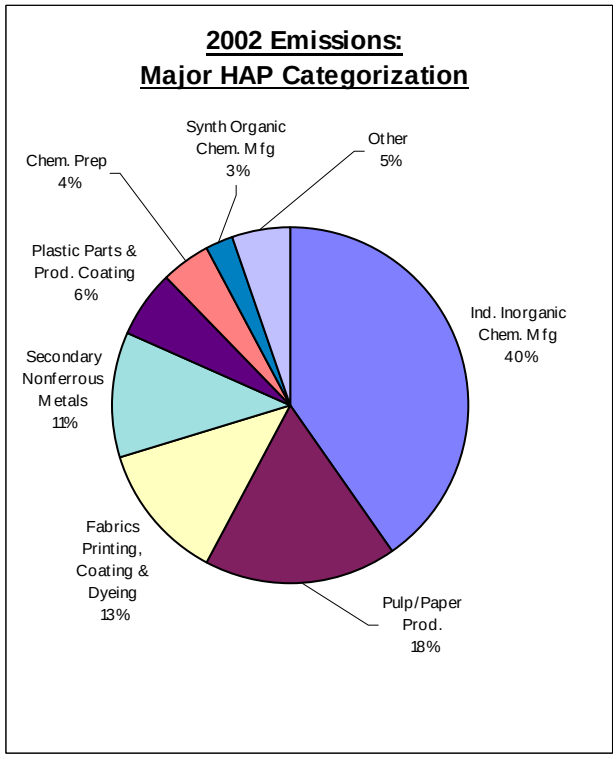
Elmissions (Tons) 11/20/06

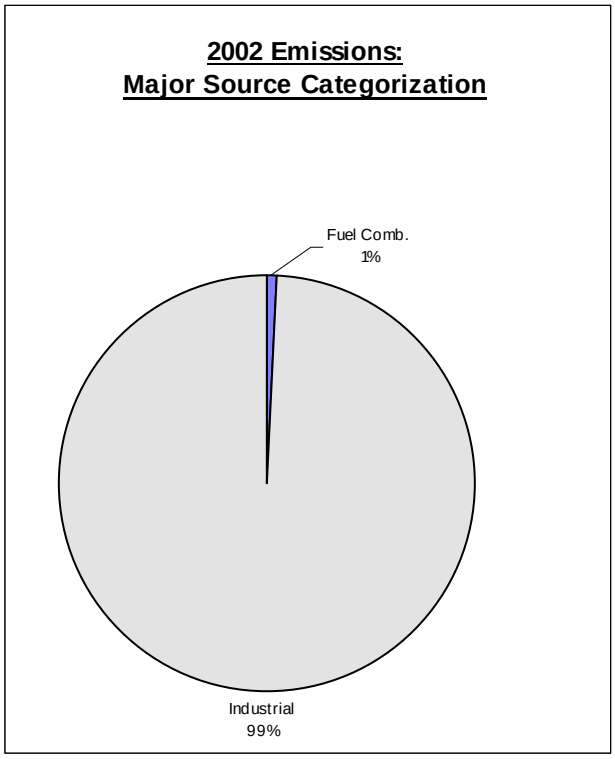
	1990	2002	Pct Change
Industrial Inorganic Chemical Manufacturing	0.42	2.25	436%
Pulp and Paper Production		0.99	
Printing, Coating & Dyeing Of Fabrics		0.7	
Secondary Nonferrous Metals	0.63	0.63	0%
Plastic Parts & Products (Surface Coating)		0.34	
Chemical Preparations	0.01	0.25	2400%
Synthetic Organic Chemical Manufacturing (HON)	0.64	0.14	-78%
Miscellaneous Organic Chemical Manufacturing	4.44	0.06	-99%
Miscellaneous Coating Manufacturing	0.69	0.0005	-100%
Hydrochloric Acid Production	9.15		-100%
Other Categories (27 Other Categories)	2.49	0.24	-90%
TOTAL	**18.5**	**5.6**	**-70%**

- Hydrazine is only emitted from stationary sources. Stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for Miscellaneous Organic Chemical Manufacturing, Miscellaneous Coating Manufacturing, and the HON.
- A number of categories reported in the 2002 NEI were not reported in the 1990 NEI.

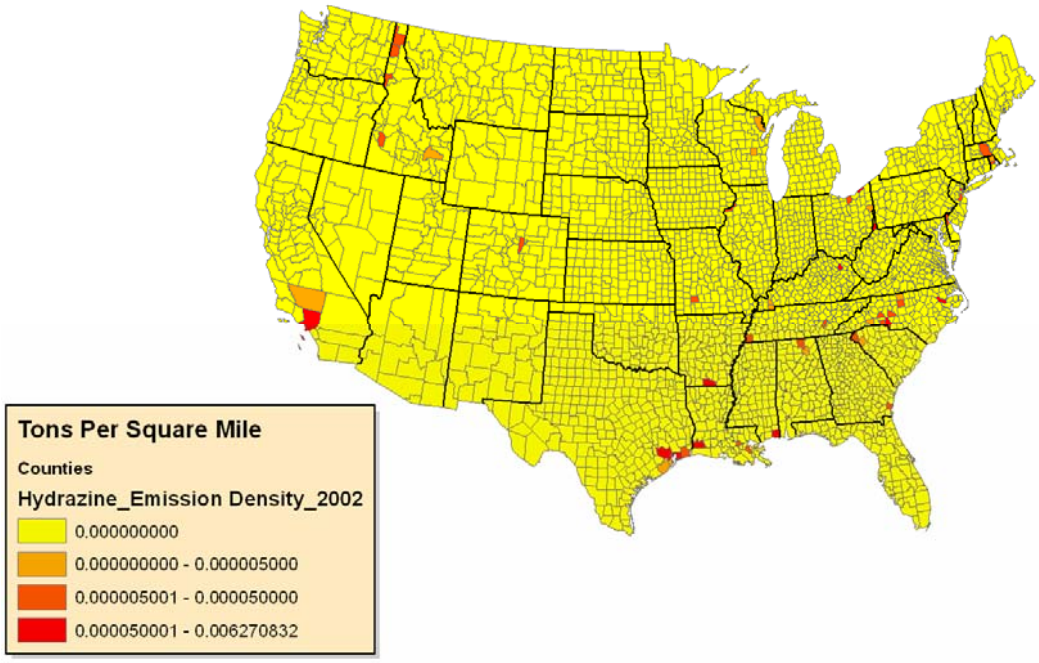
Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

Hydrazine (cont.)





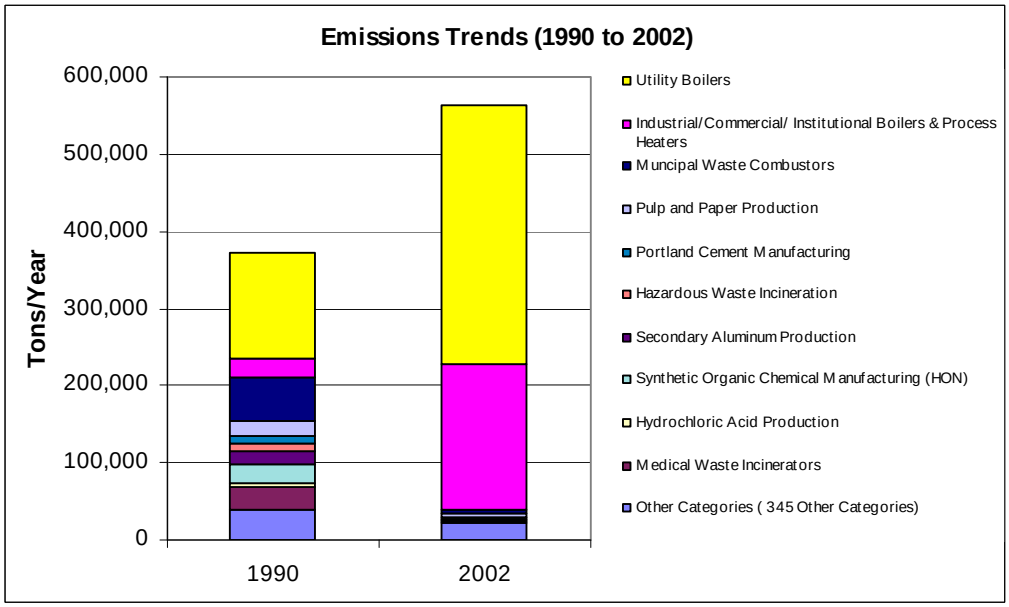
2002 Emissions Density Map



- The County Density map shows that hydrazine is emitted in 52 counties of the 3141 counties in the 50 states.

Hydrochloric Acid

- HAP Category Name: Hydrochloric Acid
- CAS Number: 7647-01-0
- Chemical Synonym: Hydrogen Chloride [Gas Only]
- Chemical Formula HCl Molecular Weight: 36.46
- Toxicity: Potential NonCancer Effects
- 316 Source Categories (2002)
- 2002 Total Emissions: 562,349 tons



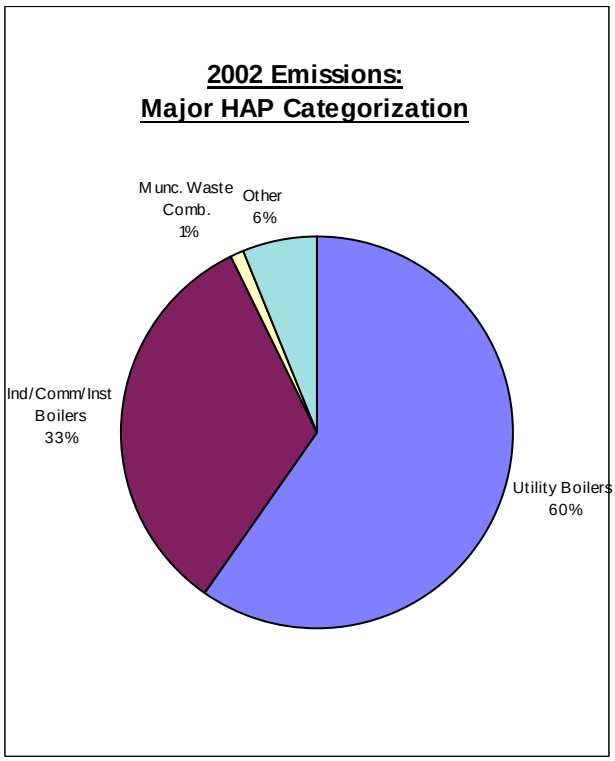
Emissions (Tons) 11/20/06

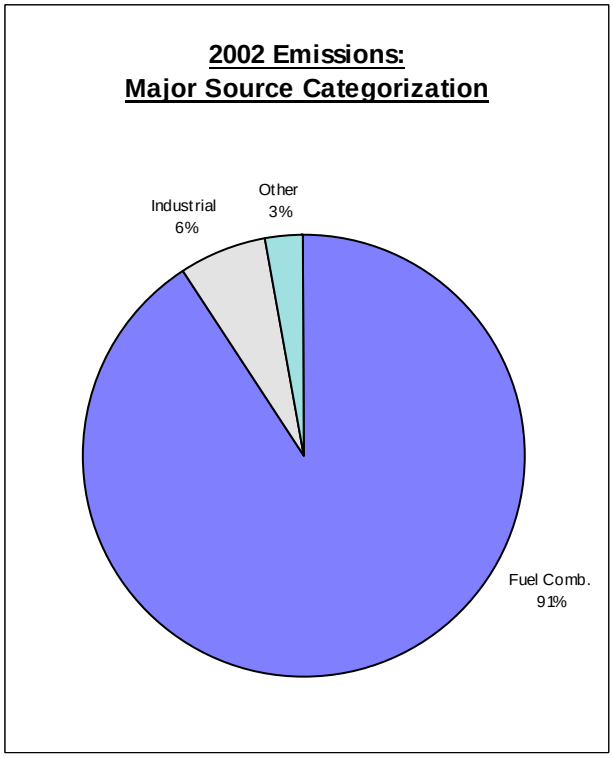
	1990	2002	Pct Change
Utility Boilers	137,907	335,550	143%
Industrial/Commercial/ Institutional Boilers & Process Heaters	23,278	186,871	703%
Muncipal Waste Combustors	57,397	6,125	-89%
Pulp and Paper Production	20,224	3,851	-81%
Portland Cement Manufacturing	9,579	3,168	-67%
Hazardous Waste Incineration	9,415	2,690	-71%
Secondary Aluminum Production	17,262	1,452	-92%
Synthetic Organic Chemical Manufacturing (HON)	23,100	539	-98%
Hydrochloric Acid Production	6,080	254	-96%
Medical Waste Incinerators	29,258	150	-99%
Other Categories (345 Other Categories)	39,143	21,701	-45%
TOTAL	**372,645**	**562,349**	**51%**

- Hydrochloric Acid is only emitted from stationary sources.
- Significant stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the Muncipal Waste Combustors, Medical Waste Incinerators, HON, Secondary Aluminum Production, Pulp and Paper Production, Portland Cement Manufacturing, Hydrochloric Acid Production, Hazardous Waste Incineration, Primary Magnesium Refining, and Steel Pickling - HCL Process.
- Categories such as utility and industrial/institutional/commercial boilers are underestimated in the current 1990 NEI, which causes the trend in emissions to appear to be increasing by 50%.

Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

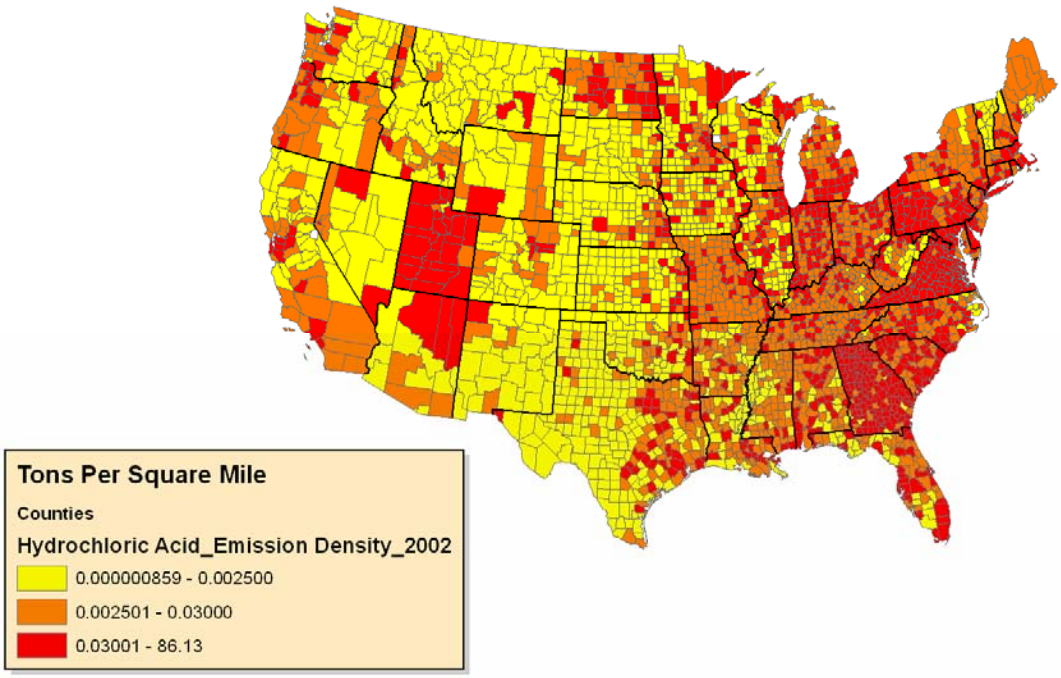
Hydrochloric Acid (cont.)





- The "Other" Category shown in the Major Source Categorization pie chart includes open burning and incineration categories.

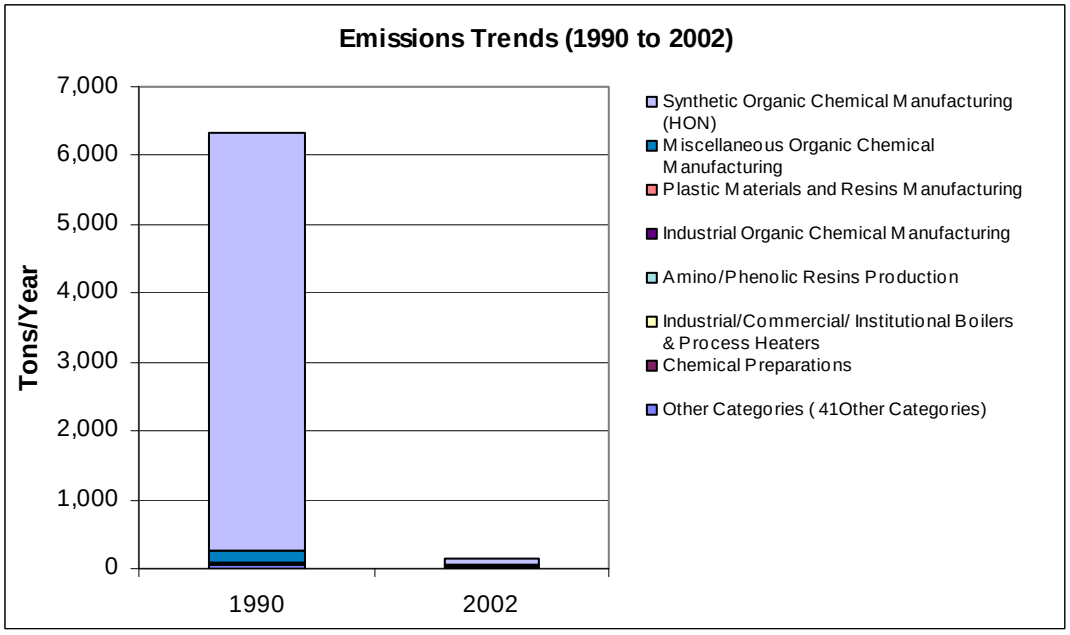
2002 Emissions Density Map



- The emissions density map shows that hydrochloric acid is emitted in higher concentrations in UT. This is due to state reported industrial boiler data.

Maleic Anhydride

- HAP Category Name: Maleic Anhydride
- CAS Number: 108-31-6
- Chemical Formula: $C_4H_2O_3$ Molecular Weight: 98.06
- Toxicity: Potential NonCancer Effects
- 40 Source Categories (2002)
- 2002 Total Emissions: 144 tons



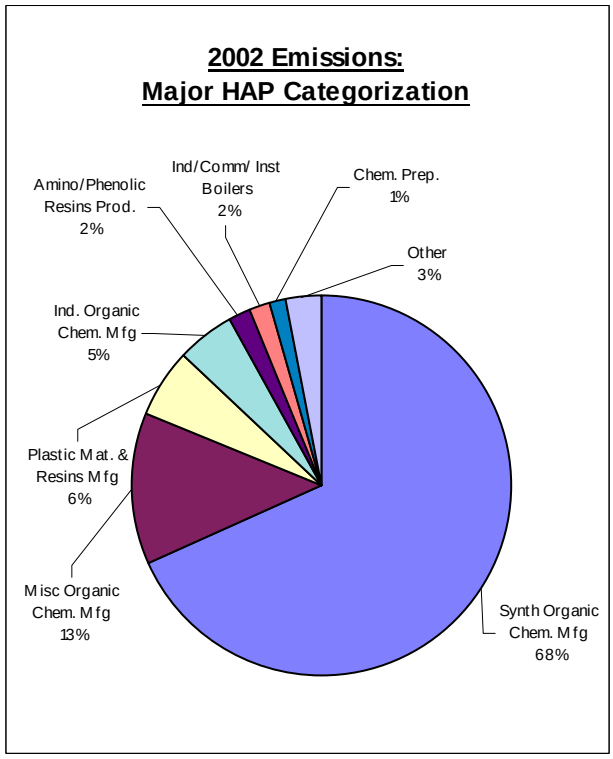
Emissions (Tons) 11/20/06

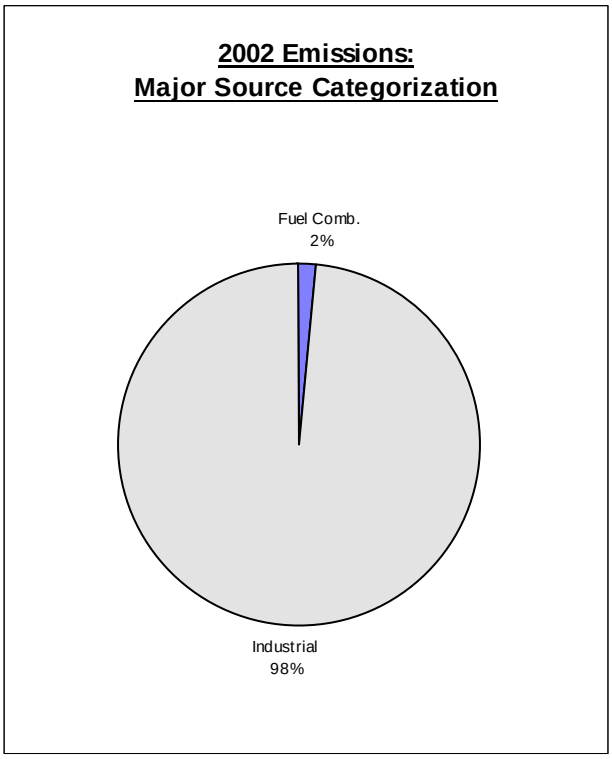
	1990	2002	Pct Change
Synthetic Organic Chemical Manufacturing (HON)	6,096.6	98.6	-98%
Miscellaneous Organic Chemical Manufacturing	146.3	18.3	-87%
Plastic Materials and Resins Manufacturing	2.1	8.4	308%
Industrial Organic Chemical Manufacturing	28.5	7.2	-75%
Amino/Phenolic Resins Production		2.8	
Industrial/Commercial/ Institutional Boilers & Process Heaters	0.1	2.5	1714%
Chemical Preparations	0.9	2.0	113%
Other Categories (41 Other Categories)	69.4	4.4	-94%
TOTAL	**6,343.9**	**144.3**	**-98%**

- Maleic anhydride is only emitted from stationary sources.
- Significant stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the HON, Miscellaneous Organic Chemical Manufacturing, and Miscellaneous Coating Manufacturing sources.
- Some sources present in 2002 NEI are not present in the 1990 NEI.

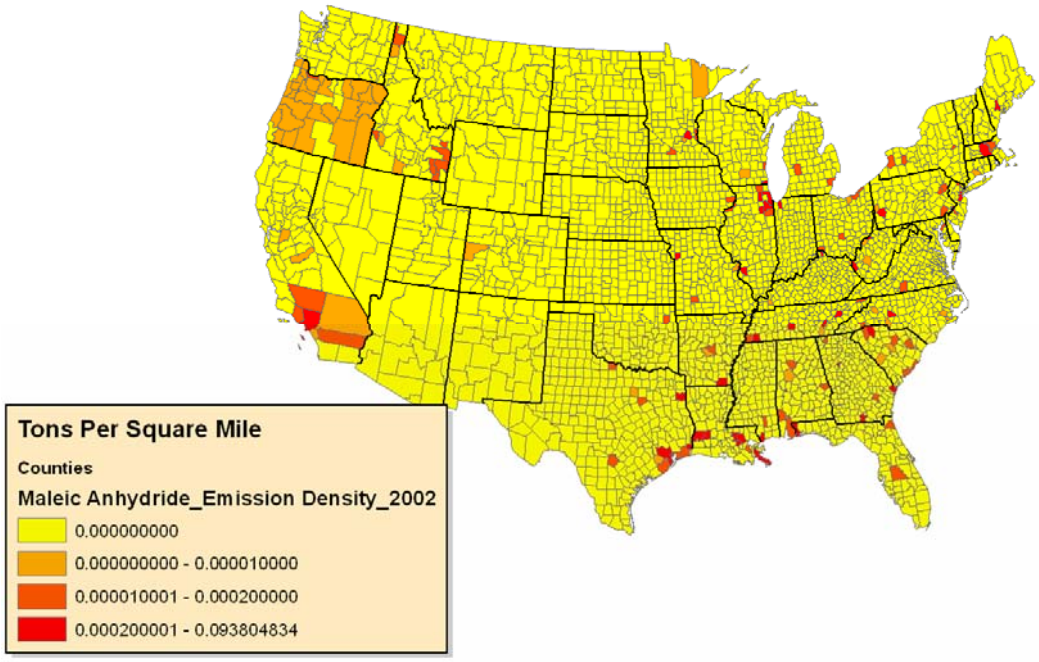
Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

Maleic Anhydride (cont.)





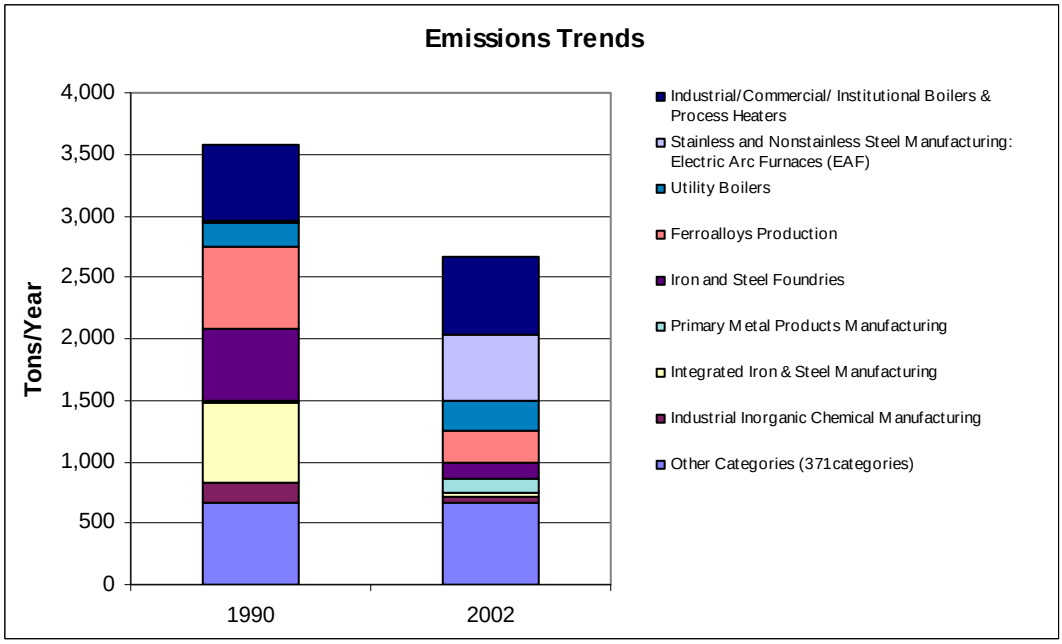
2002 Emissions Density Map



- The County Density map shows that maleic anhydride is emitted in 160 counties of the 3141 counties in the 50 states.

Manganese Compounds

- HAP Category Name: Manganese Compounds
- Includes 13 compounds in the NEI
- Toxicity: Potential NonCancer Effects
- 364 Source Categories (2002)
- 2002 Total Emissions: 2,664 tons



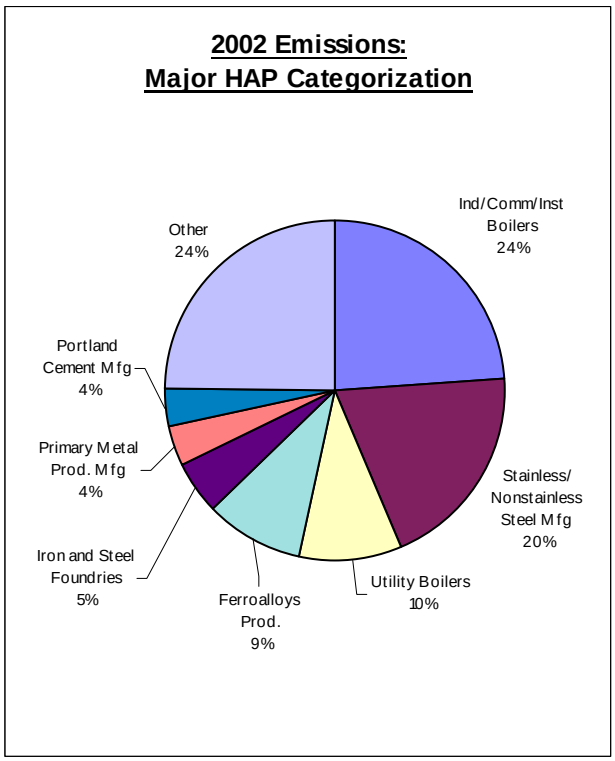
Emissions (Tons) 11/20/06

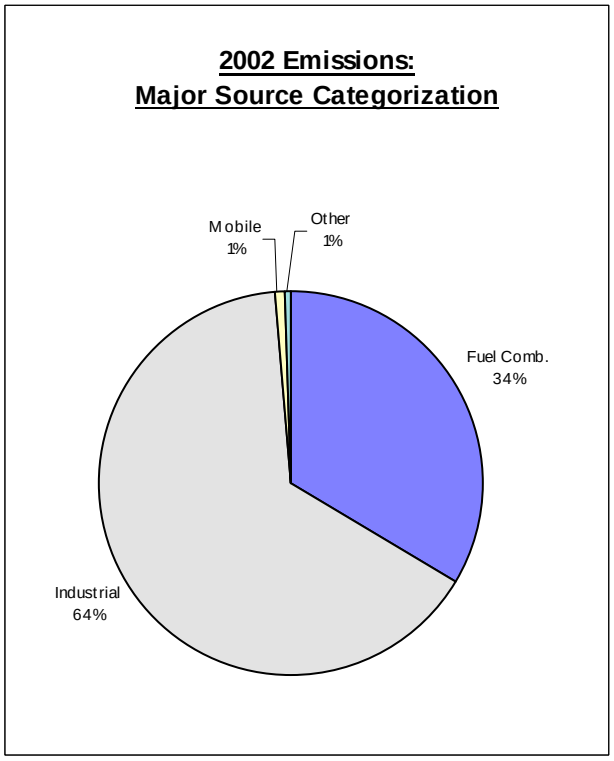
	1990	2002	Pct Change
Industrial/Commercial/ Institutional Boilers & Process Heaters	626	635	1%
Stainless and Nonstainless Steel Manufacturing: Electric Arc Furnaces (EAF)	13	527	3896%
Utility Boilers	195	257	32%
Ferroalloys Production	667	251	-62%
Iron and Steel Foundries	588	134	-77%
Primary Metal Products Manufacturing	15	105	589%
Integrated Iron & Steel Manufacturing	646	46	-93%
Industrial Inorganic Chemical Manufacturing	163	45	-72%
Other Categories (371 categories)	664	663	0%
TOTAL	**3,578**	**2,664**	**-26%**

- Stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the Ferroalloys Production, Integrated Iron & Steel Manufacturing, and Iron and Steel Foundries sources.
- Categories such as utility and industrial/commercial/institutional boilers and electric arc furnaces are underestimated in the 1990 NEI.

Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

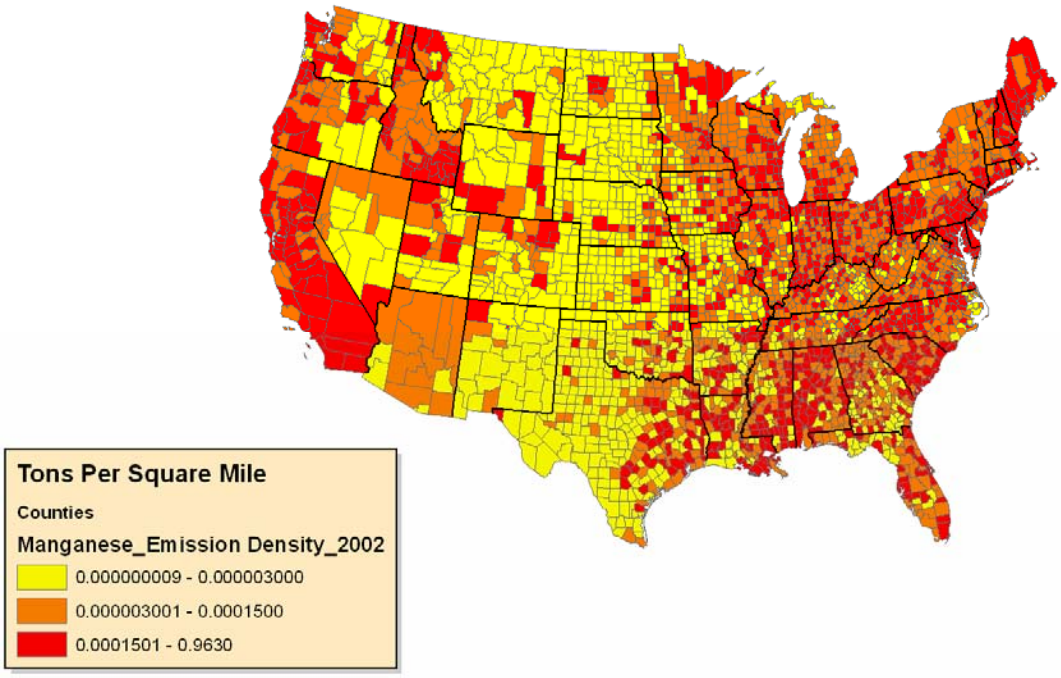
Manganese Compounds (cont.)





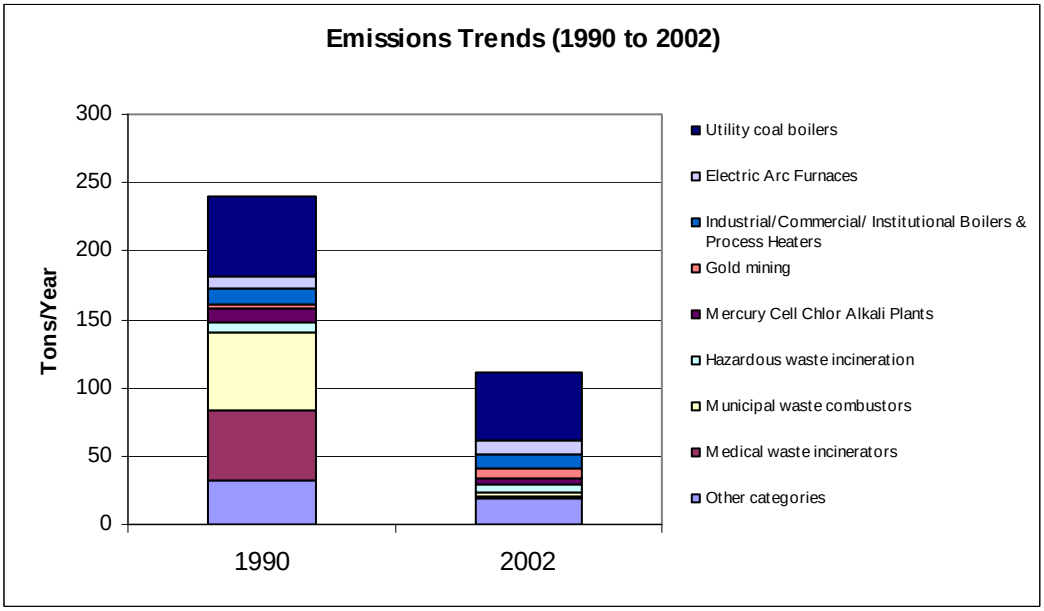
- The "Other" Category shown in the Major Source Categorization pie chart includes open burning, landfills, and incineration categories.

2002 Emissions Density Map



Mercury Compounds

- HAP Category Name: Mercury Compounds
- Includes: 9 compounds in the NEI
- Toxicity: Potential NonCancer Effects
- 213 Source Categories (2002)
- 2002 Total Emissions: 111.6 tons



Emissions (Tons)

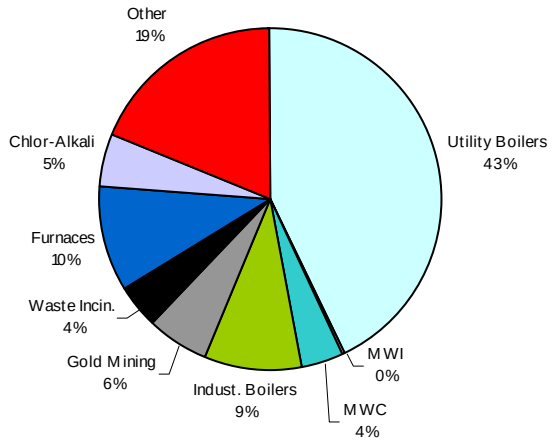
	1990	2002	Pct Change
Utility coal boilers	58.9	50.3	-14.6%
Electric Arc Furnaces	7.5	10.7	42.7%
Industrial/Commercial/ Institutional Boile	12	10	-16.7%
Gold mining	3.3	6.5	97.0%
Mercury Cell Chlor Alkali Plants	10.6	5.4	-49.1%
Hazardous waste incineration	6.6	4.6	-30.3%
Municipal waste combustors	57.3	4.2	-92.7%
Medical waste incinerators	51	0.2	-99.6%
Other categories	32.6	19.7	-39.6%
TOTAL	**239.8**	**111.6**	**-53.5%**

- Significant stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the Municipal Waste Combustors, Medical Waste Incinerators, Mercury Cell Chlor-Alkali Plants, and Hazardous Waste Incineration sources.
- The mercury inventory data are some of the best in the NEI. The largest sources of mercury in the NEI are based on source test data.
- Mobile source estimates will be added in version 3.0 2002 NEI later this year. Mobile sources are currently not present in the NEI.

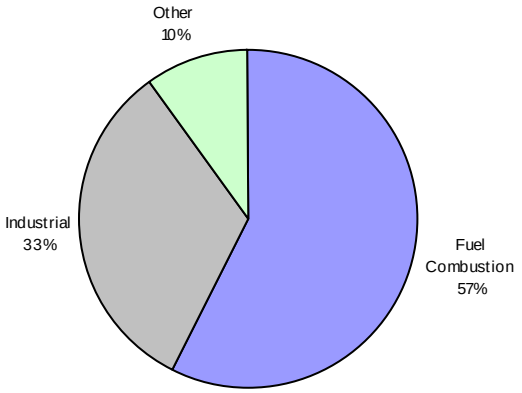
Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

Mercury Compounds (cont.)

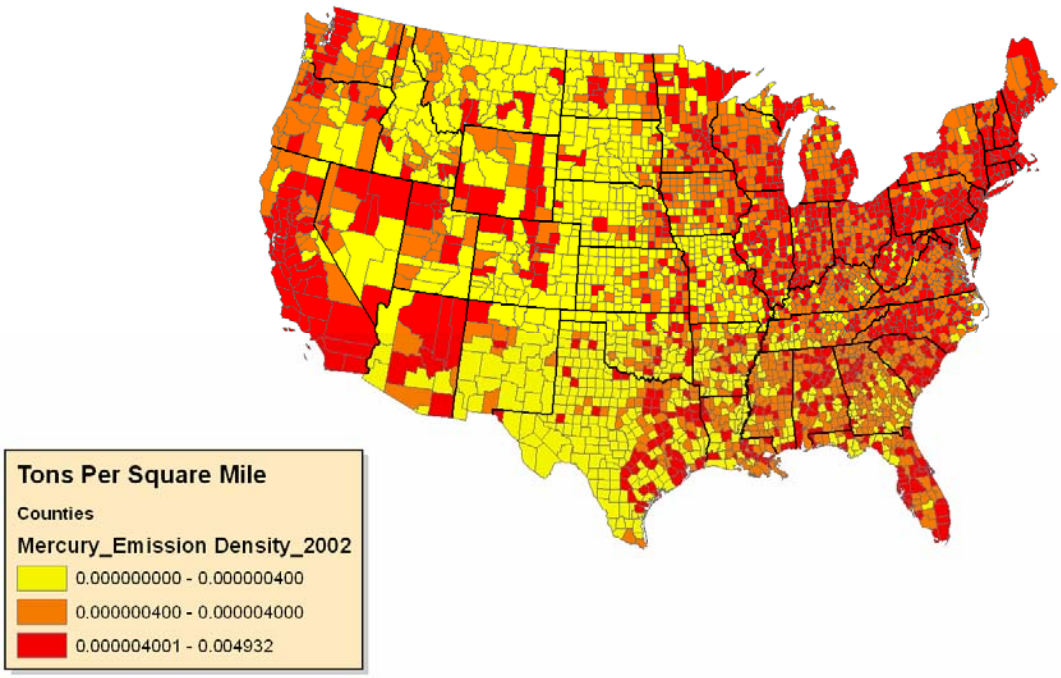
2002 Emissions:
Major HAP Categorization



2002 Emissions:
Major Source Categorization

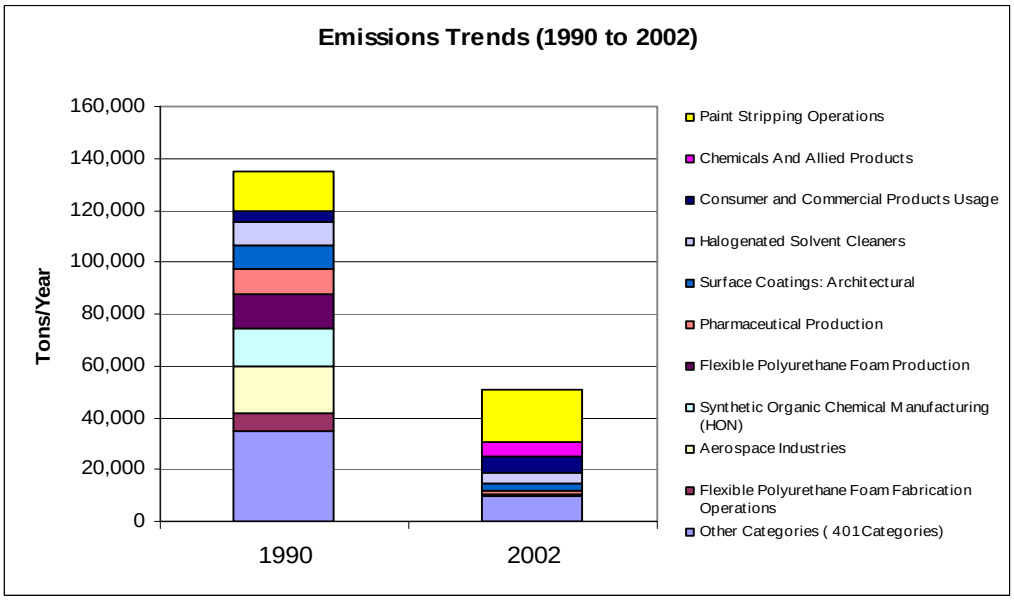


2002 Emissions Density Map



Methylene Chloride

- HAP Category: Methylene Chloride
- CAS Number: 75-09-2 Chemical Synonym: Dichloromethane
- Chemical Formula: CH_2Cl_2 Molecular Weight: 84.93
- Toxicity: Potential Cancer Risks and NonCancer Effects
- 445 Source Categories (2002)
- 2002 Total Emissions: 51,013 tons



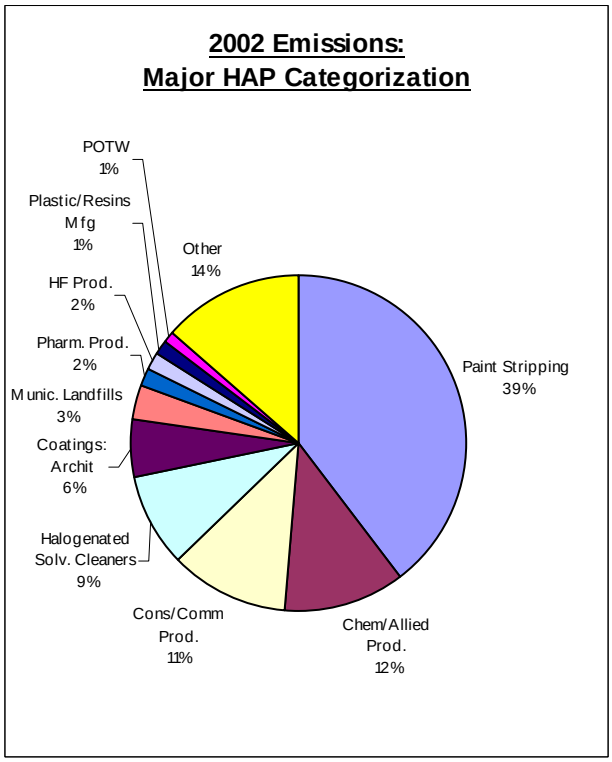
Emissions (Tons)

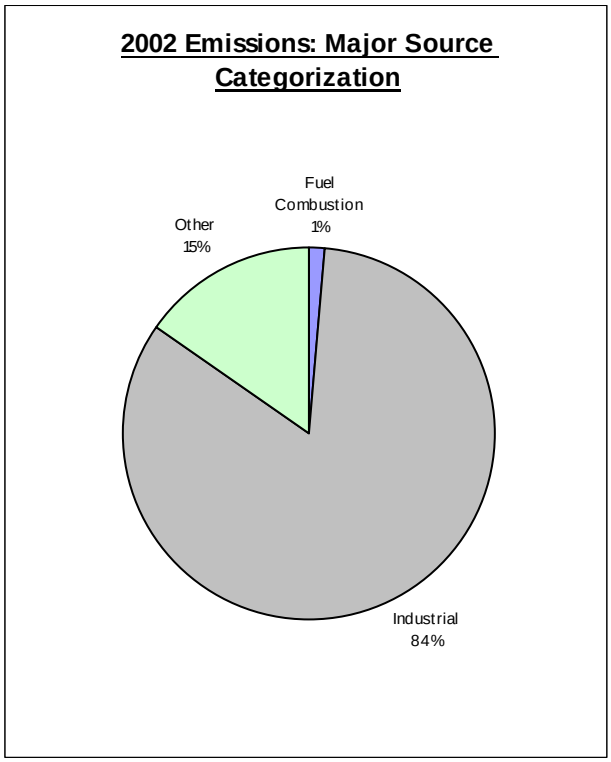
	1990	2002	Pct Change
Paint Stripping Operations	15,101.21	20,310.42	34.5%
Chemicals And Allied Products		5,960.46	
Consumer and Commercial Products Usage	4,031.17	5,780.16	43.4%
Halogenated Solvent Cleaners	9,469.98	4,440.82	-53.1%
Surface Coatings: Architectural	8,681.58	2,948.56	-66.0%
Pharmaceutical Production	10,044.66	927.84	-90.8%
Flexible Polyurethane Foam Production	13,241.72	372.18	-97.2%
Synthetic Organic Chemical Manufacturing (HON)	14,582.37	272.05	-98.1%
Aerospace Industries	17,752.34	102.55	-99.4%
Flexible Polyurethane Foam Fabrication Operations	7,164.11	0.24	-100.0%
Other Categories (401 Categories)	34,621.53	9,897.91	-71.4%
TOTAL	**134,690.67**	**51,013.19**	**-62.1%**

- Methylene chloride is only emitted from stationary sources. Significant stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for Aerospace Industries, HON, Flexible Polyurethane Foam Production, Pharmaceutical Production, Halogenated Solvent Cleaners, Flexible Polyurethane Foam Fabrication Operations, and Surface coating categories.
- Fuel Combustion categories are underestimated in the 1990 NEI.

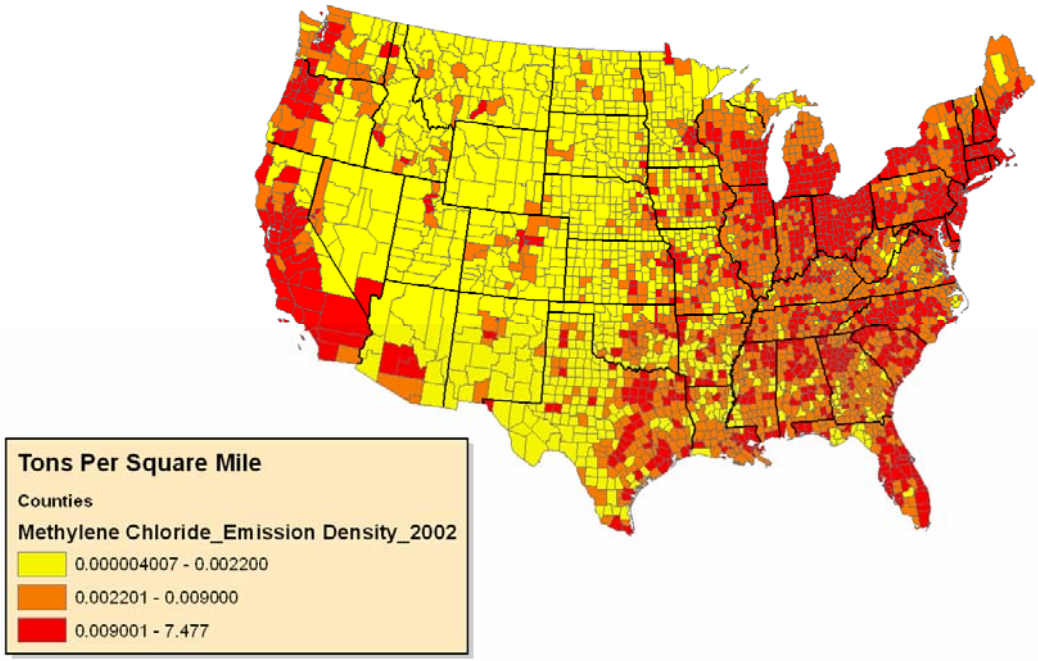
Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

Methylene Chloride (cont.)





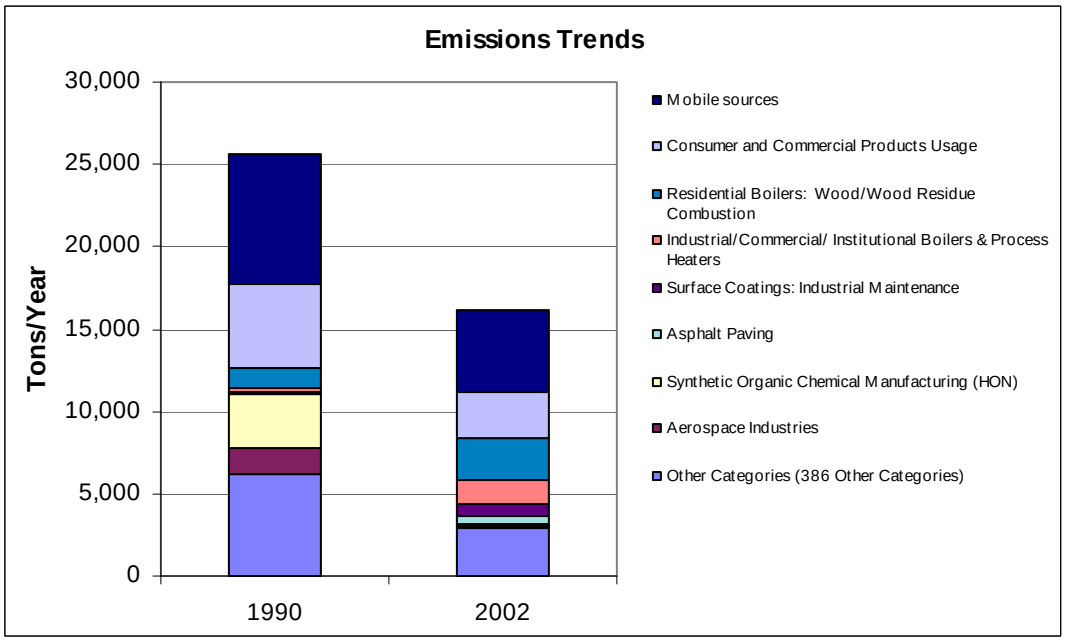
2002 Emissions Density Map



- The emissions density map shows that methylene chloride is emitted in higher concentrations in areas with greater population. The primary source of methylene chloride emissions in 2002 is solvent use, which can be correlated to population.

Naphthalene

- HAP Category Name: Naphthalene
- CAS Number: 91-20-3
- Chemical Formula: $C_{10}H_8$ Molecular Weight: 128.16
- Toxicity: Potential Cancer Risks and NonCancer Effects
- 174 Source Categories (2002)
- 2002 Total Emissions: 16,110 tons



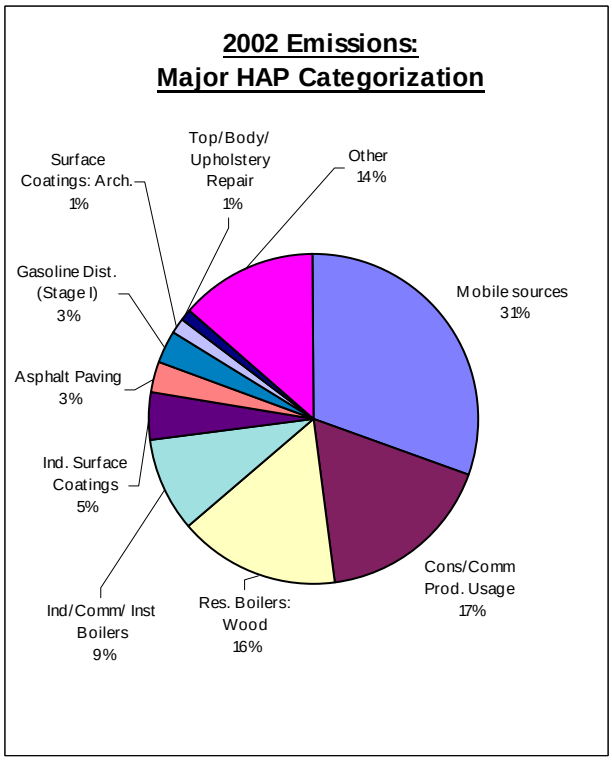
Emissions (Tons) 11/20/06

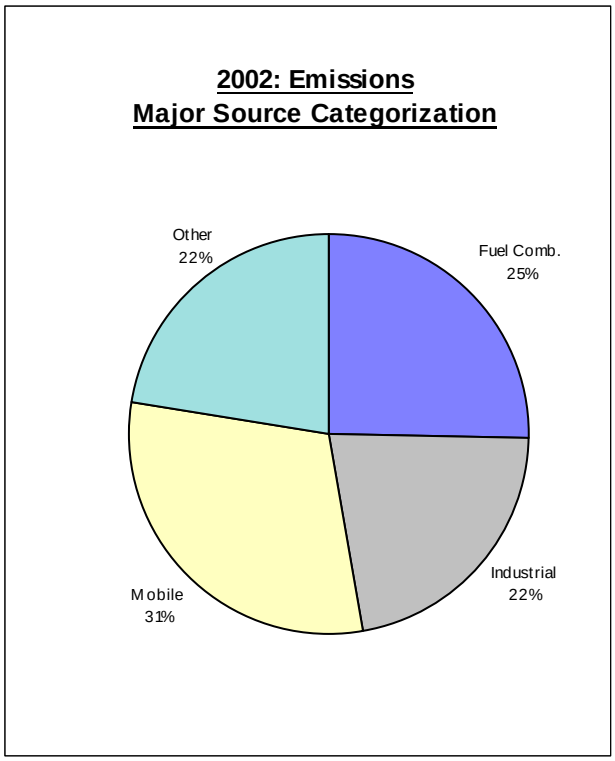
	1990	2002	Pct Change
Mobile sources	7,849.6	4,910.3	-37%
Consumer and Commercial Products Usage	5,105.1	2,774.2	-46%
Residential Boilers: Wood/Wood Residue Combustion	1,257.1	2,546.1	103%
Industrial/Commercial/ Institutional Boilers & Process Heaters	156.8	1,503.7	859%
Surface Coatings: Industrial Maintenance	136.0	754.0	454%
Asphalt Paving		510.7	
Synthetic Organic Chemical Manufacturing (HON)	3,330.4	125.8	-96%
Aerospace Industries	1,620.3	22.3	-99%
Other Categories (386 Other Categories)	6,147.3	2,962.6	-52%
TOTAL	**25,602.5**	**16,109.6**	**-37%**

- Stationary source and mobile source regulations have reduced naphthalene emissions by approximately 37% since 1990. Significant stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for HON, Aerospace Industries, Petroleum Refineries, Pulp and Paper Production, and Miscellaneous Organic Chemical Manufacturing sources.
- Emission estimation methodologies are different in 1990 and 2002 for Gasoline Distribution (Stage I).
- Categories such as Asphalt Paving, Architectural Surface Coatings and Charbroiling are reported in 2002 NEI but were not reported in the 1990 NEI. Other categories such as residential wood combustion and industrial/institutional/commercial boilers are underestimated in the 1990 NEI.

Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

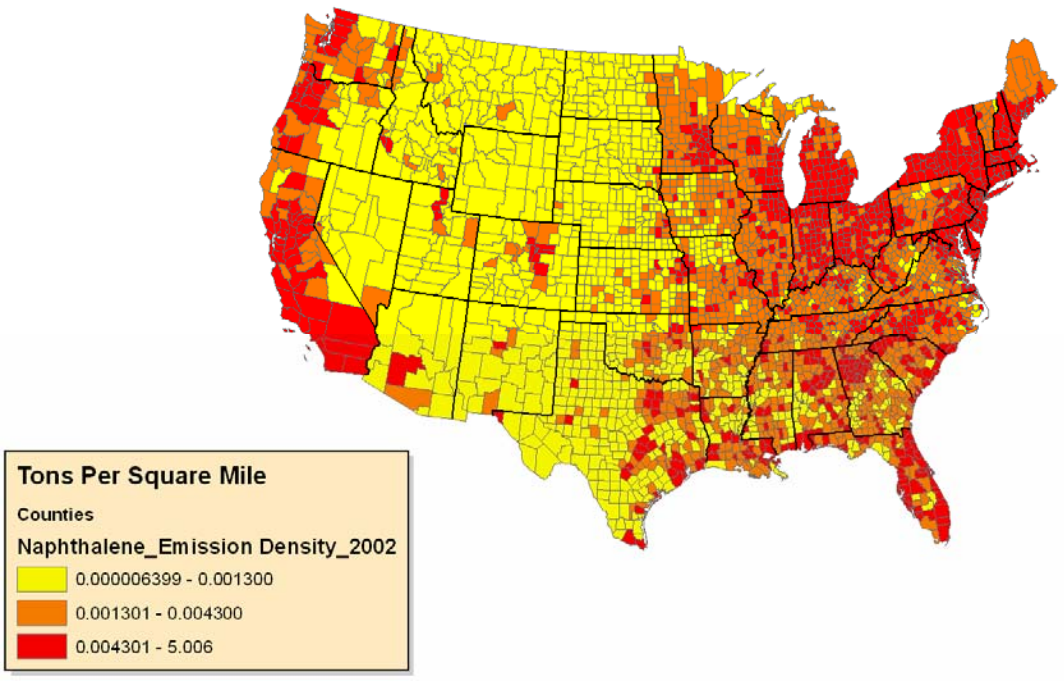
Naphthalene (cont.)





The "Other" Category shown in the Major Source Categorization pie chart includes asphalt paving, consumer/commercial solvent usage, open burning, incineration and charbroiling categories.

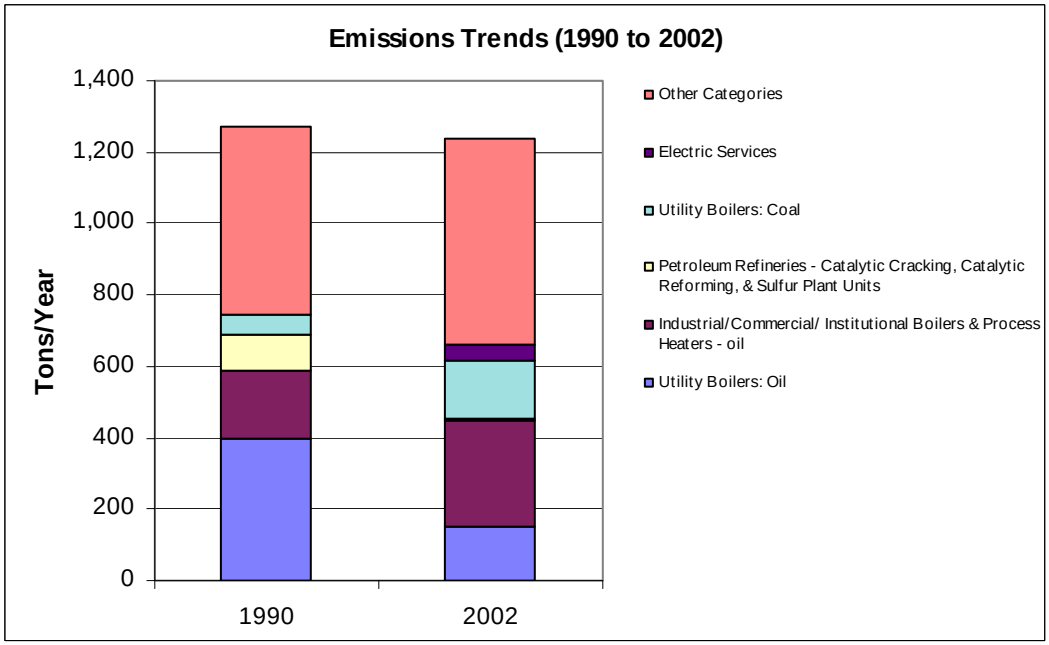
2002 Emissions Density Map



- The emissions density map shows that naphthalene is emitted in higher concentrations in areas with greater population.

Nickel Compounds

- HAP Category Name: Nickel Compounds
- Includes 20 compounds in the NEI
- Toxicity: Potential Cancer Risks and NonCancer Effects
- 174 Source Categories (2002)
- 2002 Total Emissions: 1,235 tons



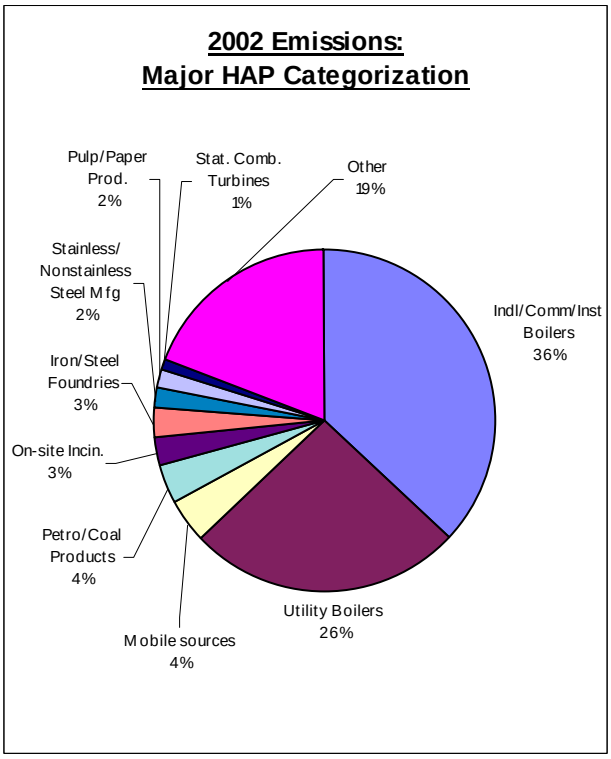
Emissions (Tons)

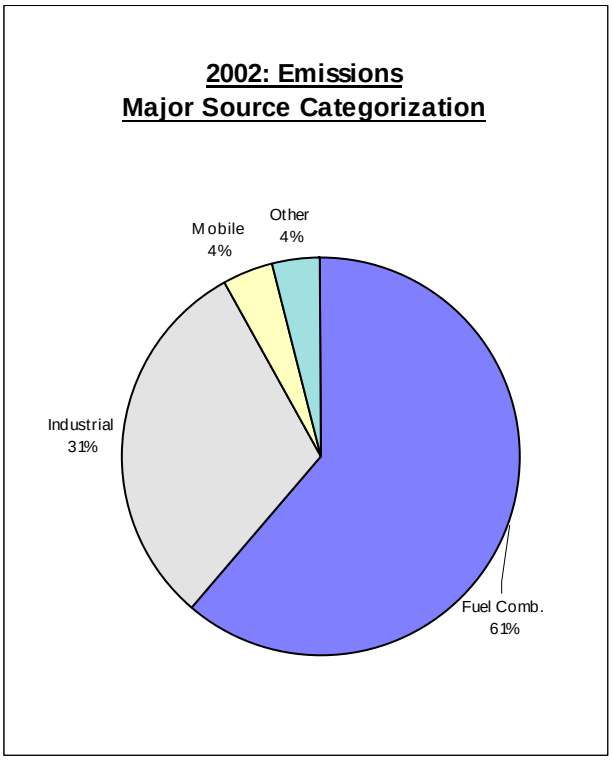
	1990	2002	Pct Change
Utility Boilers: Oil	395	153	-61%
Industrial/Commercial/ Institutional Boilers & Process Heaters - oil	191	293	53%
Petroleum Refineries - Catalytic Cracking, Catalytic Reforming, & Sulfur Plant Units	102	6	-94%
Utility Boilers: Coal	57	162	182%
Electric Services	N/A	49	
Other Categories	527	572	9%
TOTAL	**1,273**	**1,235**	**-3%**

- Stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the Petroleum Refineries and Integrated Iron & Steel Manufacturing sources.
- Categories such as utility and industrial/commercial/institutional boilers and electric arc furnaces are underestimated in the 1990 NEI.

Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

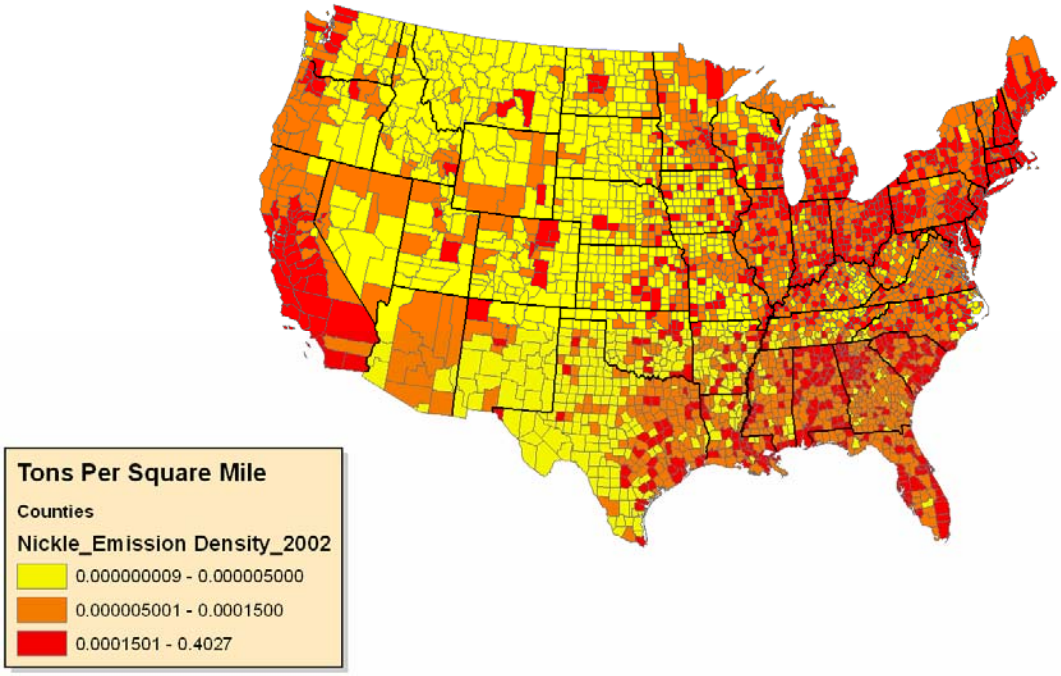
Nickel Compounds (cont.)





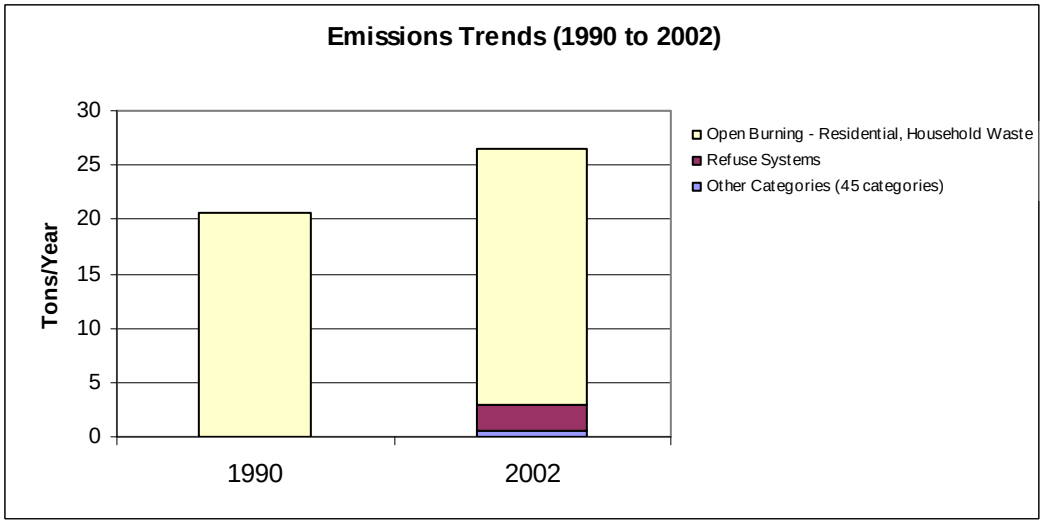
The "Other" Category shown in the Major Source Categorization pie chart includes open burning, landfills, and incineration categories.

2002 Emissions Density Map



PCBs

- HAP Category Name: Polychlorinated Biphenyls (Aroclors)
- Includes: 11 compounds in the NEI
- Toxicity: Potential Cancer Risks
- 62 Source Categories (2002)
- 2002 Total Emissions: 26.4 tons



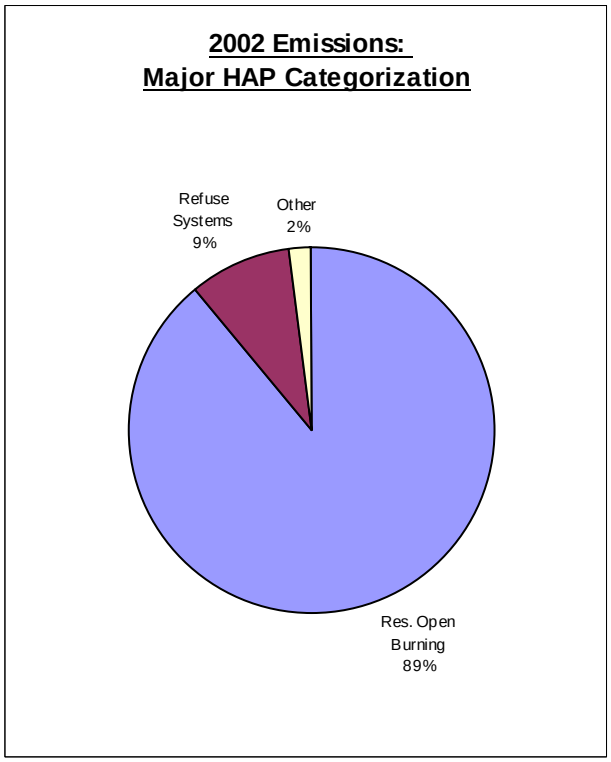
Emissions (Tons)

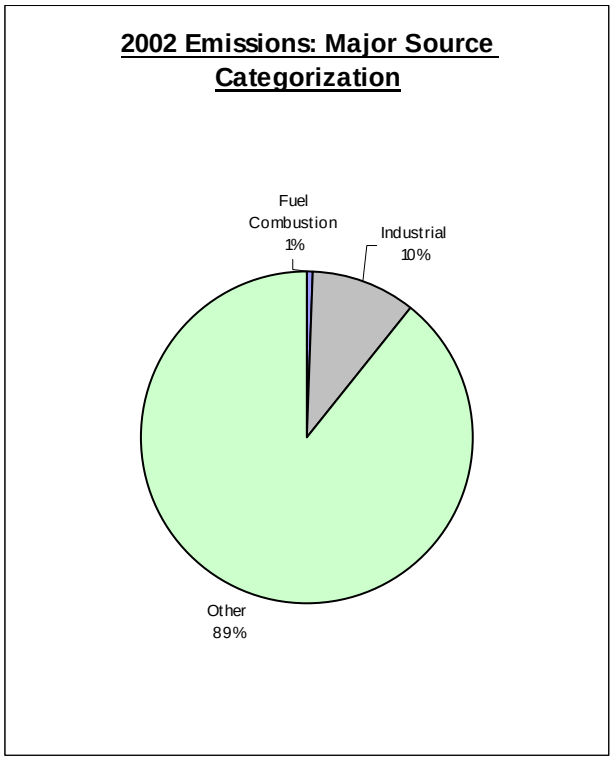
	1990	2002	Pct Change
Open Burning - Residential, Household	20.55	23.47	14.2%
Refuse Systems	6E-07	2.4	399999900%
Other Categories (45 categories)	0.04	0.55	1275%
TOTAL	**20.59**	**26.42**	**28%**

- PCBs are only emitted from stationary sources.
- The primary sources of PCB emissions in the 2002 NEI are open burning of residential waste and one incinerator located on UT near a Primary Magnesium Refining facility. Emissions from other incinerators are very small. There are 142 facilities that emit PCBs in the 2002 inventory. With the exception of the facility in UT, all facilities have emissions less than 0.1 ton. Most have emissions less than 0.001 ton.

Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

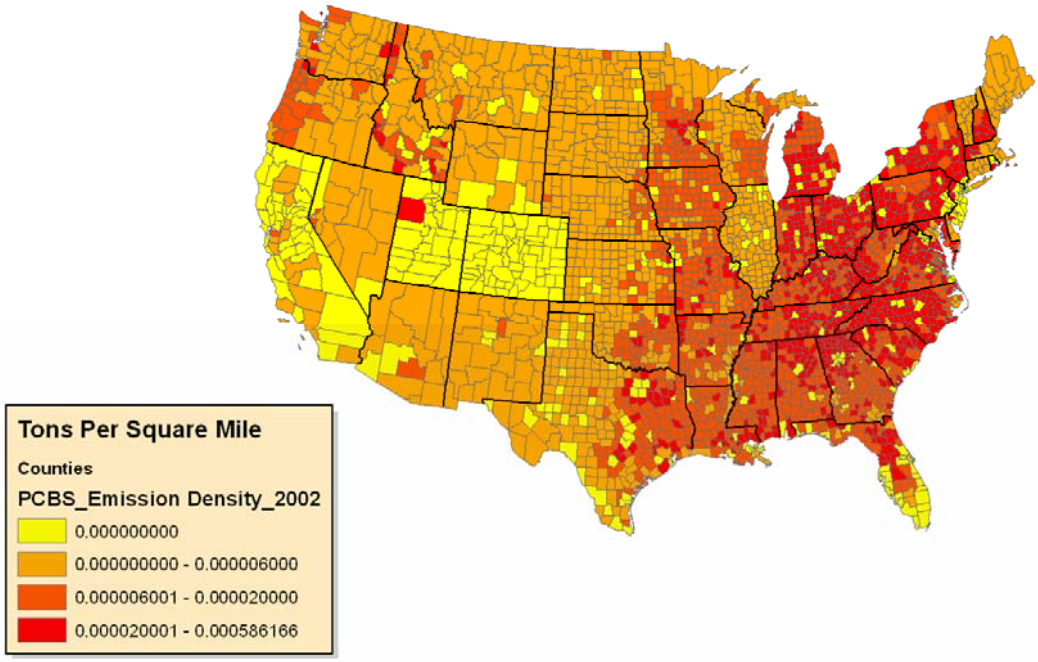
PCBs (cont.)





- The "Other" Category shown in the Major Source Categorization pie chart includes open burning categories and incineration.

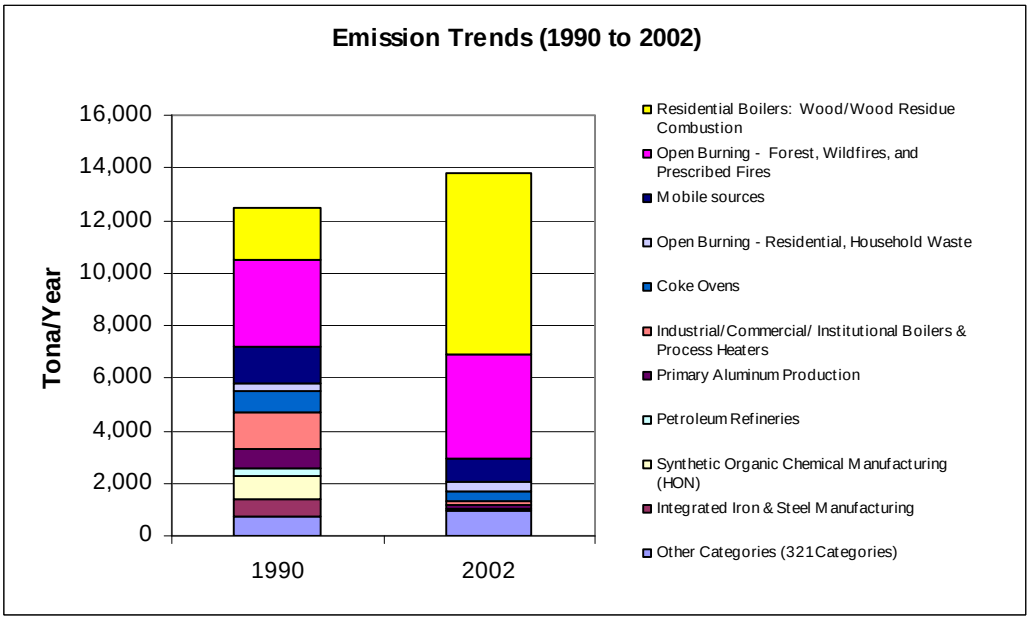
2002 Emissions Density Map



- The County Density map shows that PCBs are emitted in 2717 counties of the 3141 counties in the 50 states.

Polycyclic Organic Matter

- HAP Category Name: Polycyclic Organic Matter (POM); Total
- Includes: 55 compounds (PAHs) in the NEI
- Toxicity: Potential Cancer Risks and NonCancer Effects
- 377 Source Categories (2002)
- 2002 Total Emissions: 13,772 tons



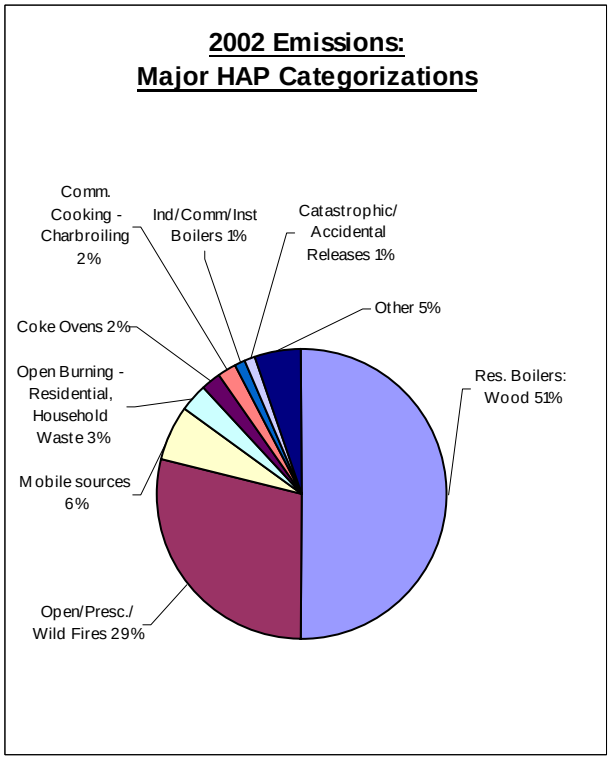
Emissions (Tons) 11/20/06

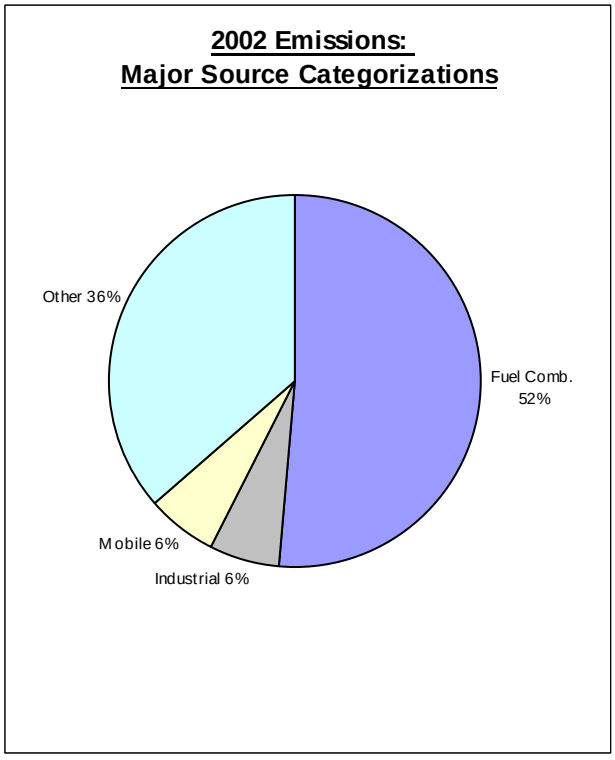
	1990	2002	Pct Change
Residential Boilers: Wood/Wood Residue Combustion	1937.56	6875.68	255%
Open Burning - Forest, Wildfires, and Prescribed Fires	3330.79	3972.53	19%
Mobile sources	1367.37	844.83	-38%
Open Burning - Residential, Household Waste	275.43	426.56	55%
Coke Ovens	841.76	324.48	-61%
Industrial/Commercial/ Institutional Boilers & Process Heaters	1410.38	160.14	-89%
Primary Aluminum Production	701.61	104.92	-85%
Petroleum Refineries	332.65	45.73	-86%
Synthetic Organic Chemical Manufacturing (HON)	857.51	17.99	-98%
Integrated Iron & Steel Manufacturing	662.85	15.69	-98%
Other Categories (321 Categories)	726.09	983.41	35%
Totals	**12,444**	**13,772**	**11%**

- Stationary source and mobile source regulations have reduced POM emissions since 1990. Stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for Primary Aluminum Production, Integrated Iron & Steel Manufacturing, and Petroleum Refineries sources.
- Emission estimation methodologies are different in 1990 and 2002 for the categories of: Open Burning: Forest and Wildfires and Prescribed Burns.
- Categories, such as Residential Wood Combustion, are underestimated in the 1990 NEI.
- In 1990, POM included naphthalene as part of the 16-PAH definition used.

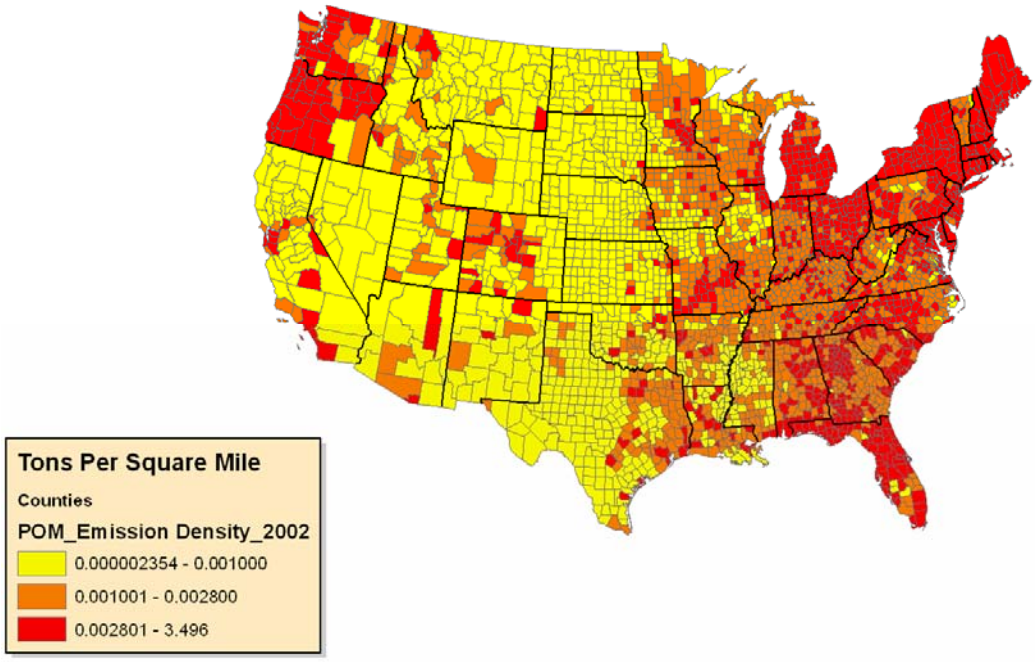
Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

Polycyclic Organic Matter (cont.)





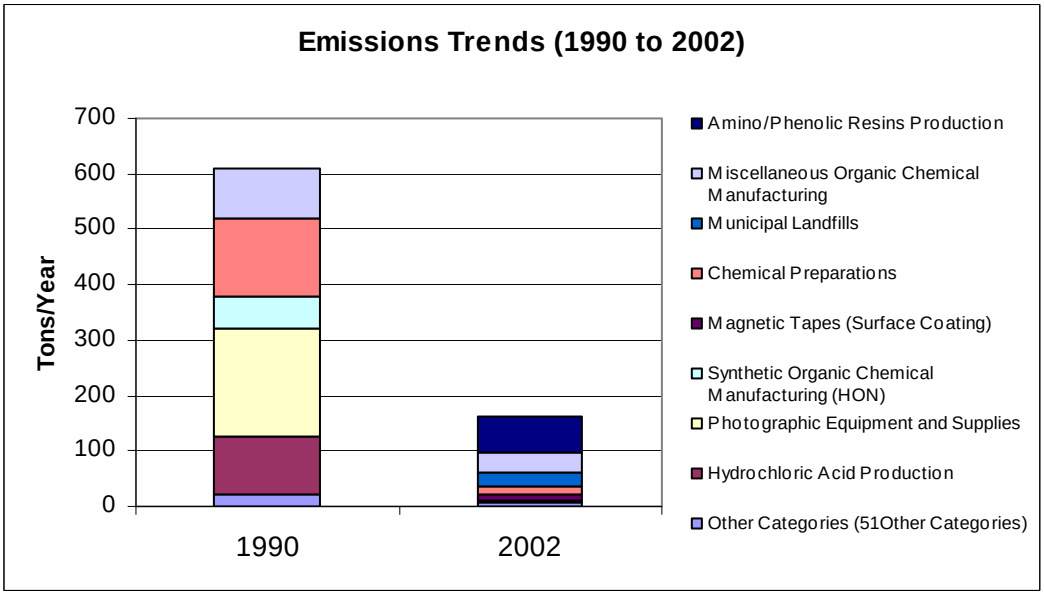
2002 Emissions Density Map



- The emissions density map shows that POM is emitted in higher concentrations in areas with greater population. The counties in Montana and Idaho with high emission densities are due to agricultural field burning.

Propylene dichloride

- HAP Category Name: Propylene dichloride
- CAS Number: 78-87-5 Chemical Synonym: 1,2-Dichloropropane
- Chemical Formula: $C_3H_6Cl_2$ Molecular Weight: 112.99
- Toxicity: Potential Cancer Risks and NonCancer Effects
- 77 Source Categories (2002)
- 2002 Total Emissions: 161 tons



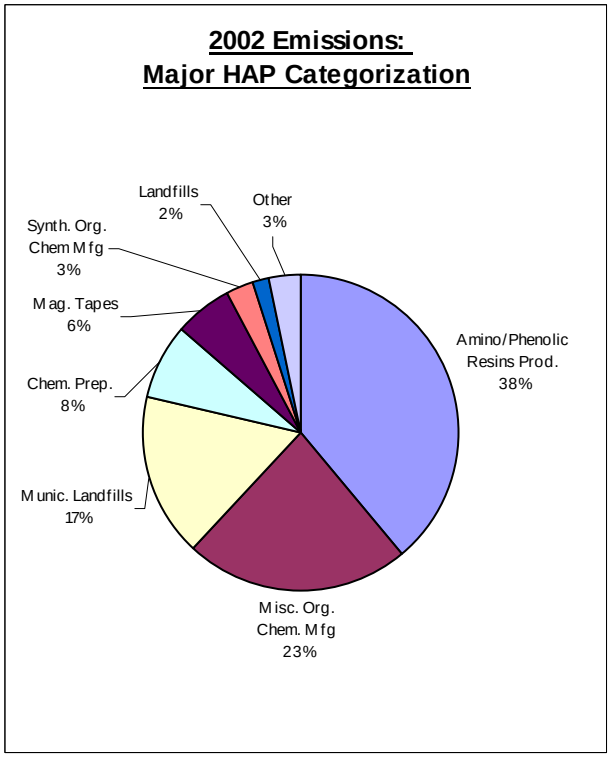
Emissions (Tons)

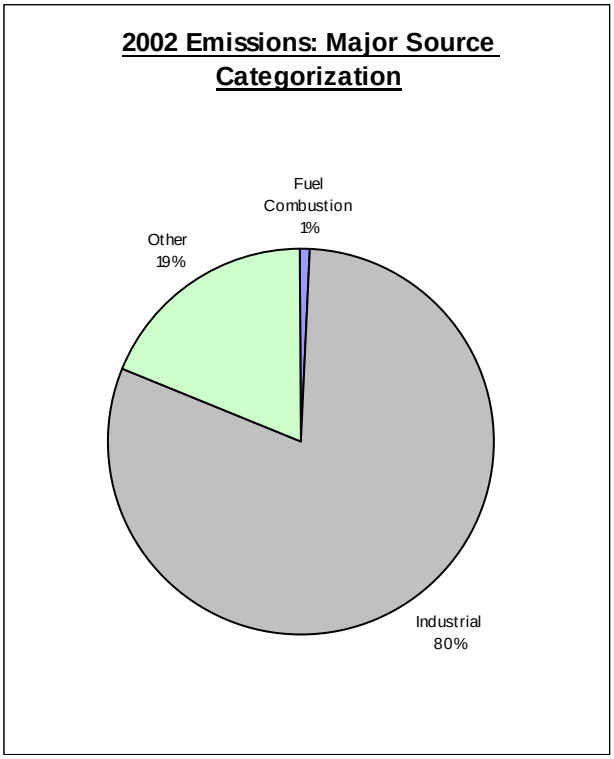
	1990	2002	Pct Change
Amino/Phenolic Resins Production		62.43	
Miscellaneous Organic Chemical Manufacturing	92.72	37.08	-60.0%
Municipal Landfills	0.28	26.64	9414.3%
Chemical Preparations	139.44	12.67	-90.9%
Magnetic Tapes (Surface Coating)		9.31	
Synthetic Organic Chemical Manufacturing (HON)	56.06	4.41	-92.1%
Photographic Equipment and Supplies	195	0.004	-100.0%
Hydrochloric Acid Production	104.7	0.004	-100.0%
Other Categories (51 Other Categories)	22.71	8.05	-64.6%
TOTAL	**610.9**	**160.6**	**-73.7%**

- Propylene dichloride is only emitted from stationary sources.
- Stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the Hydrochloric Acid Production, Miscellaneous Organic Chemical Manufacturing, and HON sources
- A number of source categories are reported in the 2002 NEI but were not reported in the 1990 NEI.

Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

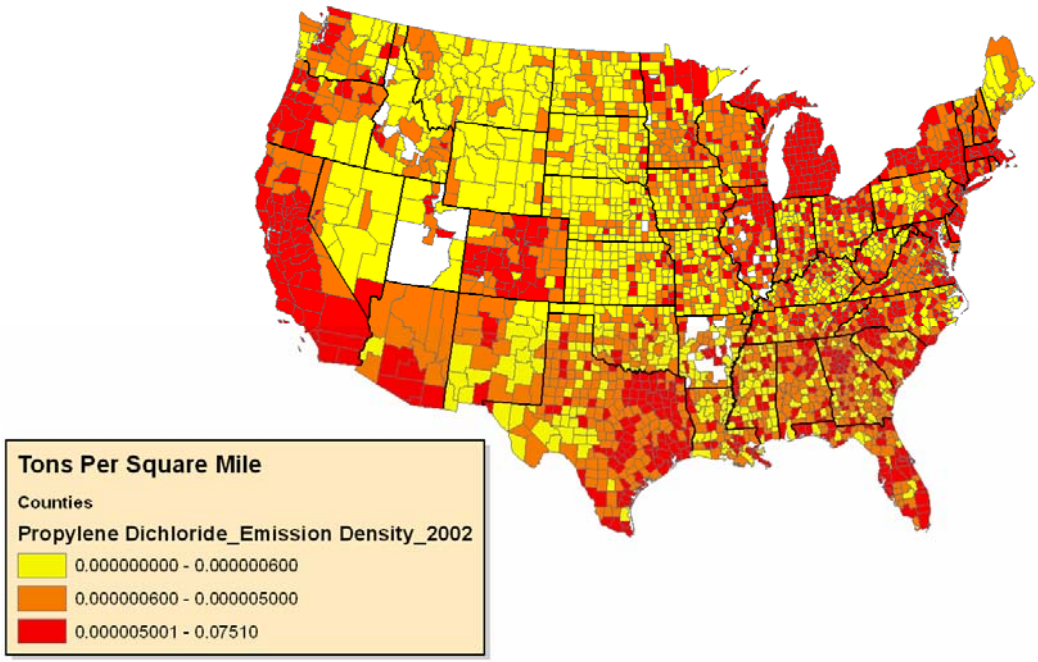
Propylene dichloride (cont.)





- The "Other" Category shown in the Major Source Categorization pie chart includes consumer and commercial products usage, incineration and landfill categories.

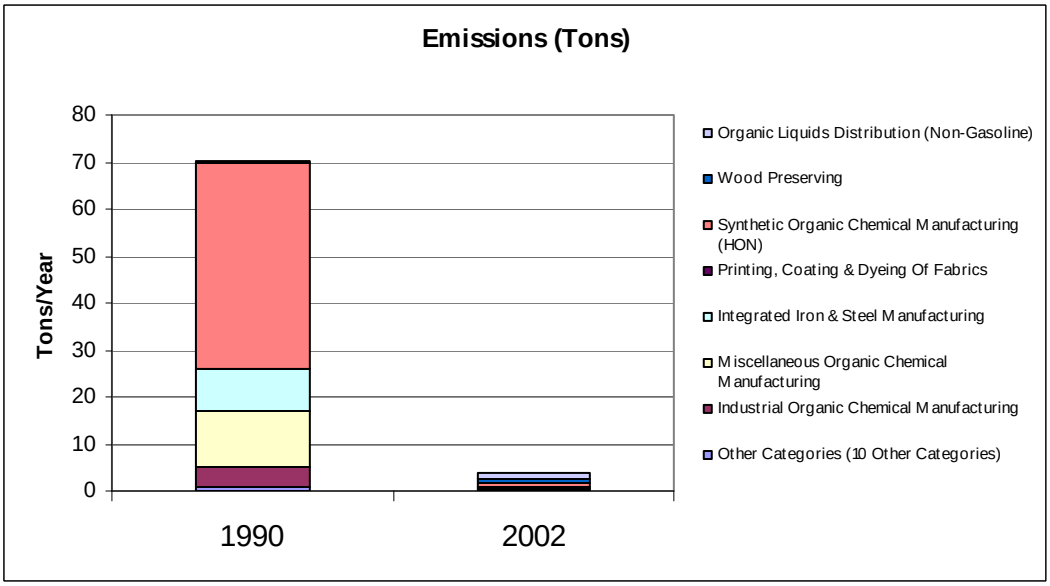
2002 Emissions Density Map



- The County Density map shows that propylene dichloride is emitted in 3065 counties of the 3141 counties in the 50 states.
- Lowest range extends below 10^{-9} tons/sq. mi. White areas identify counties with actual zero emissions.

Quinoline

- HAP Category Name: Quinoline
- CAS Number: 91-22-5
- Chemical Formula: C_9H_7N Molecular Weight: 129.16
- Toxicity: Potential Cancer Risks
- 22 Source Categories (2002)
- 2002 Total Emissions: 3.86 tons



Emissions (Tons)

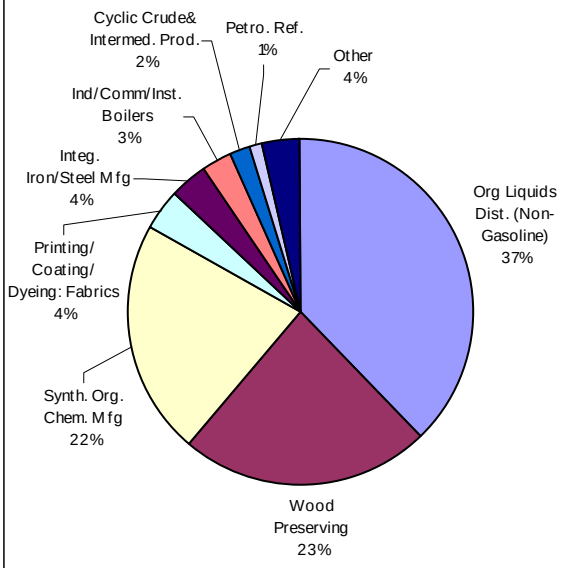
	1990	2002	Pct Change
Organic Liquids Distribution (Non-Gasoline)		1.46	
Wood Preserving	0.09	0.9	900.0%
Synthetic Organic Chemical Manufacturing (HON)	43.89	0.85	-98.1%
Printing, Coating & Dyeing Of Fabrics		0.15	
Integrated Iron & Steel Manufacturing	9.18	0.14	-98.5%
Miscellaneous Organic Chemical Manufacturing	11.72		
Industrial Organic Chemical Manufacturing	4.38		
Other Categories (10 Other Categories)	0.77	0.36	-53.2%
TOTAL	**70.03**	**3.86**	**-94.5%**

- Quinoline is only emitted from stationary sources.
- Stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the HON.
- Some sources present in 2002 NEI are not present in the 1990 NEI.

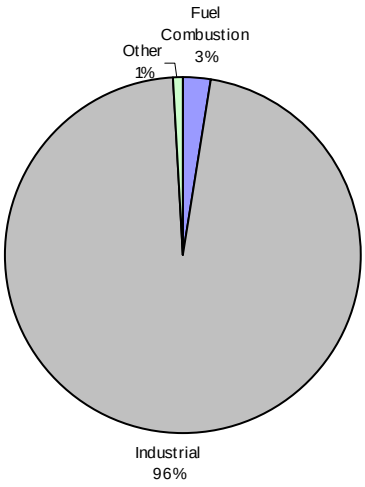
Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

Quinoline (cont.)

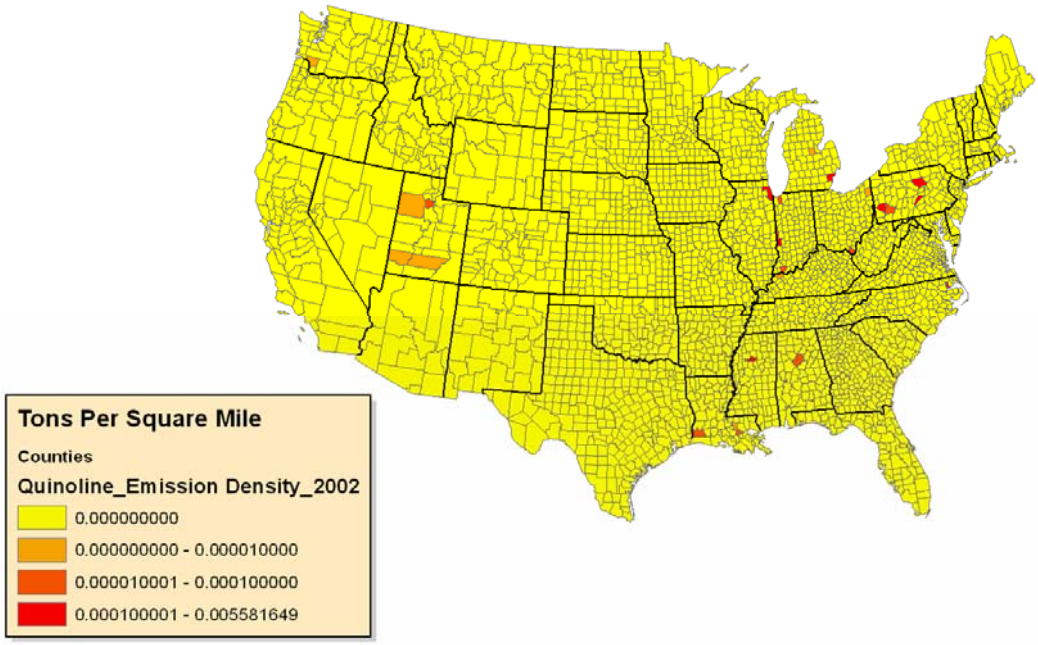
2002 Emissions: Major HAP Categorization



2002 Emissions: Major Source Categorization



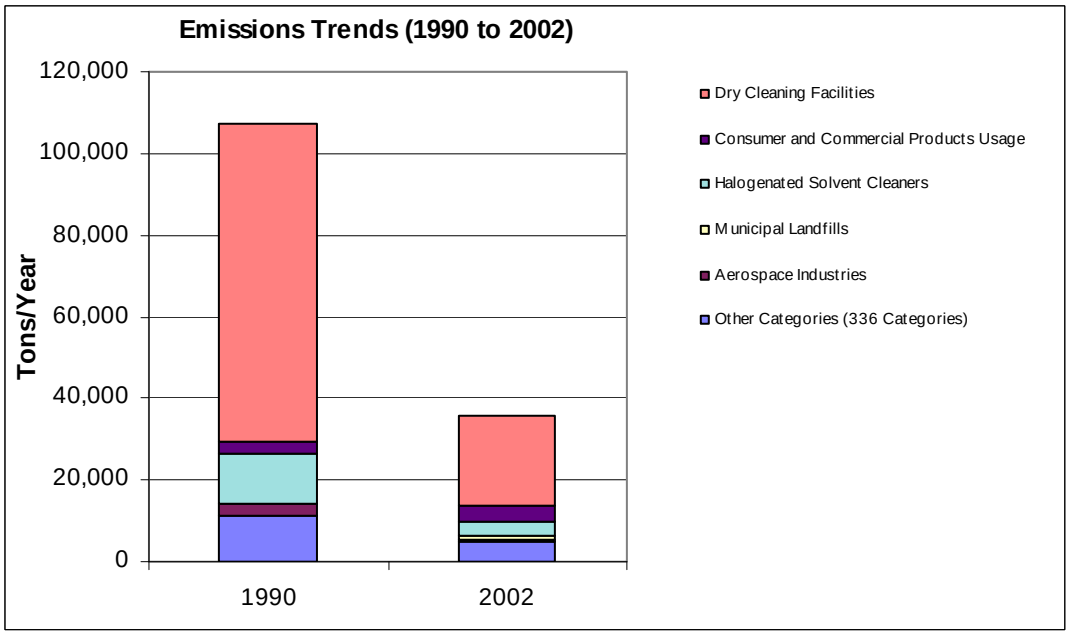
2002 Emissions Density Map



- The County Density map shows that quinoline is emitted in 26 counties of the 3141 counties in the 50 states.

Tetrachloroethylene

- HAP Category Name: Tetrachloroethylene
- CAS Number: 127-18-4 Chemical Synonym: Perchloroethylene
- Chemical Formula: C_2Cl_4 Molecular Weight: 165.83
- Toxicity: Potential Cancer Risks and NonCancer Effects
- 281 Source Categories (2002)
- 2002 Total Emissions: 35,587 tons



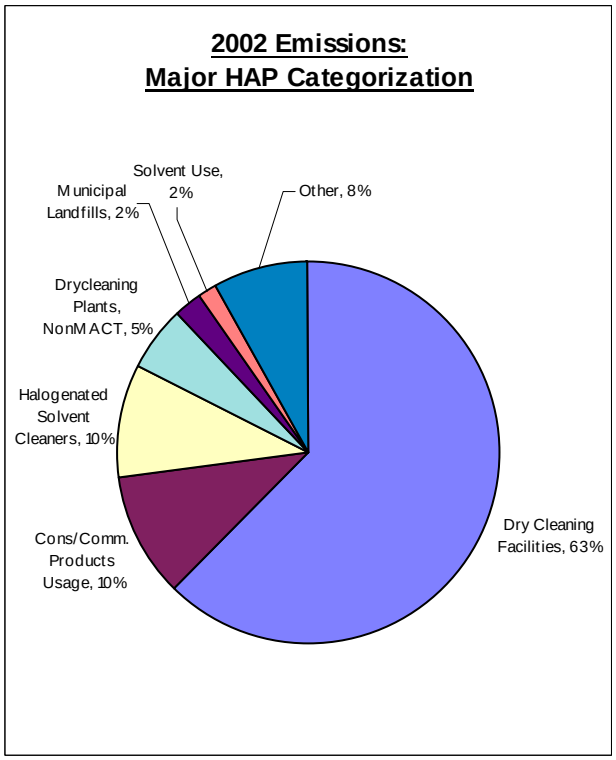
Emissions (Tons)

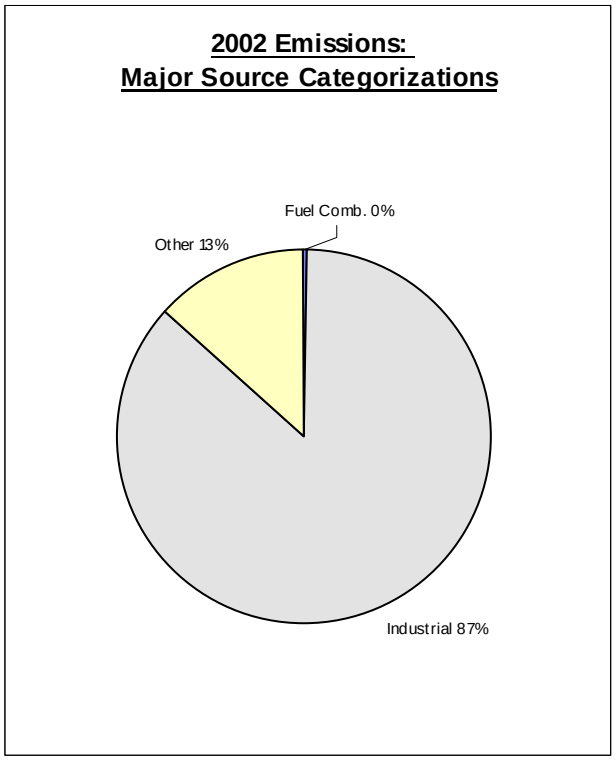
	1990	2002	Pct Change
Dry Cleaning Facilities	77,698	22,117	-72%
Consumer and Commercial Products Usage	3,126	3,733	19%
Halogenated Solvent Cleaners	12,428	3,541	-72%
Municipal Landfills	45	812	1713%
Aerospace Industries	2,488	323	-87%
Other Categories (336 Categories)	11,494	5,061	-56%
TOTAL	**107,280**	**35,587**	**-67%**

- Tetrachloroethylene is only emitted from stationary sources.
- Significant stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the Dry Cleaning, Halogenated Solvent Cleaners, Aerospace Industries and surface coating sources.
- Landfills are reported in 2002 NEI but were not reported in the 1990 NEI.

Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

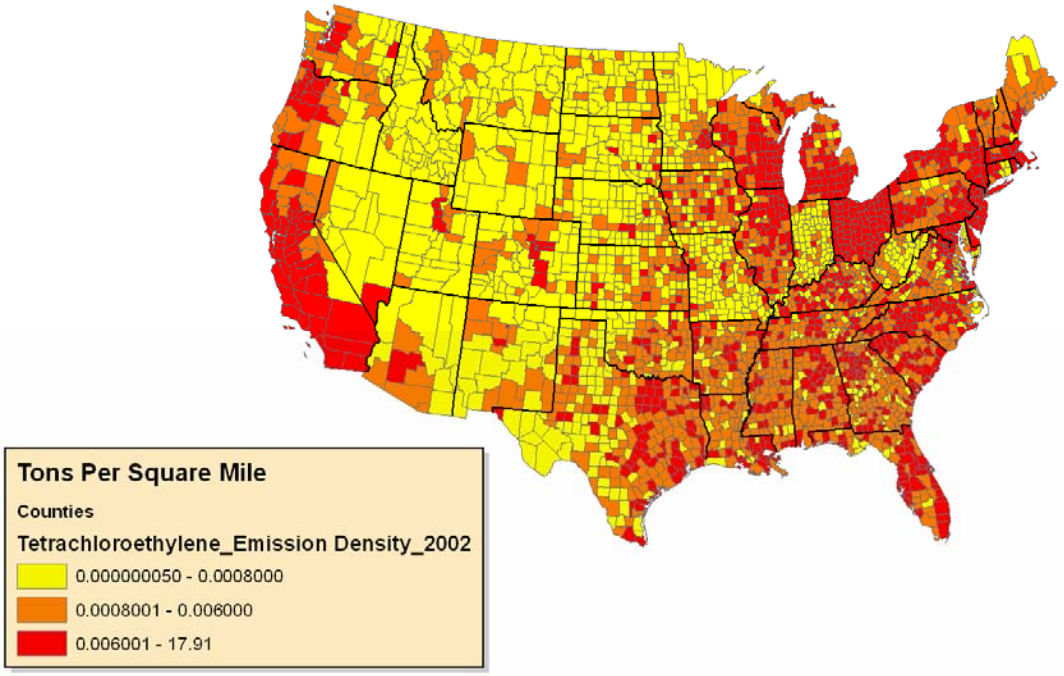
Tetrachloroethylene (cont.)





The "Other" Category shown in the Major Source Categorization pie chart includes consumer and commercial products usage, incineration and landfill categories.

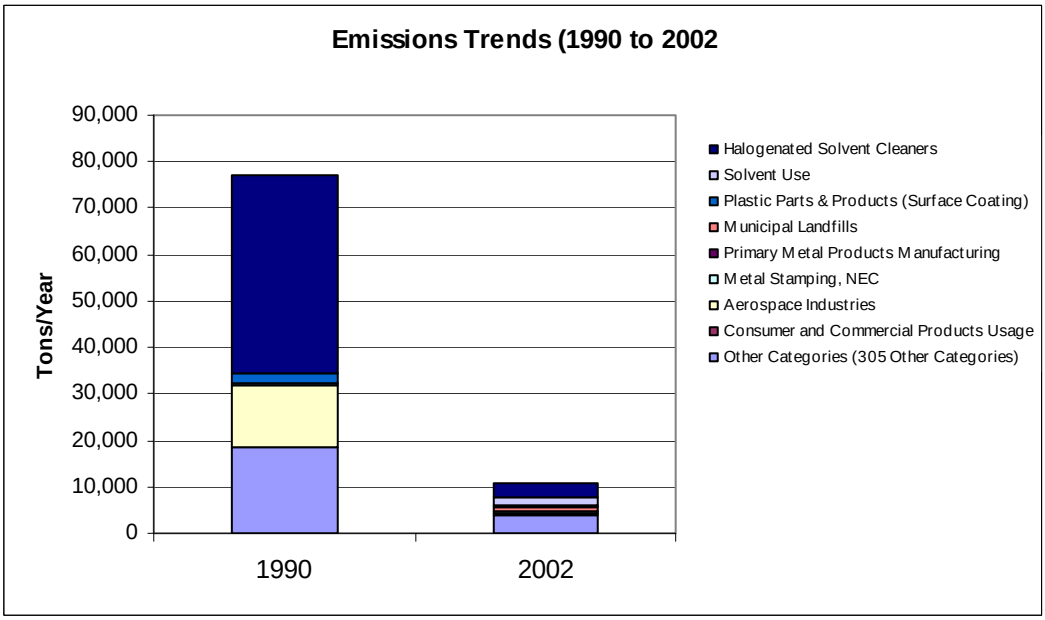
2002 Emissions Density Map



- The emissions density map shows that tetrachloroethylene is emitted in higher concentrations in areas with greater population. The primary sources of tetrachloroethylene emissions in 2002 are dry cleaners and solvent use, which can be correlated to population.

Trichloroethylene

- HAP Source Category Name: Trichloroethylene
- CAS Number: 79-01-6
- Chemical Formula: C_2HCl_3 Molecular Weight: 131.39
- Toxicity: Potential Cancer Risks and NonCancer Effects
- 344 Source Categories (2002)
- 2002 Total Emissions: 10,847 tons



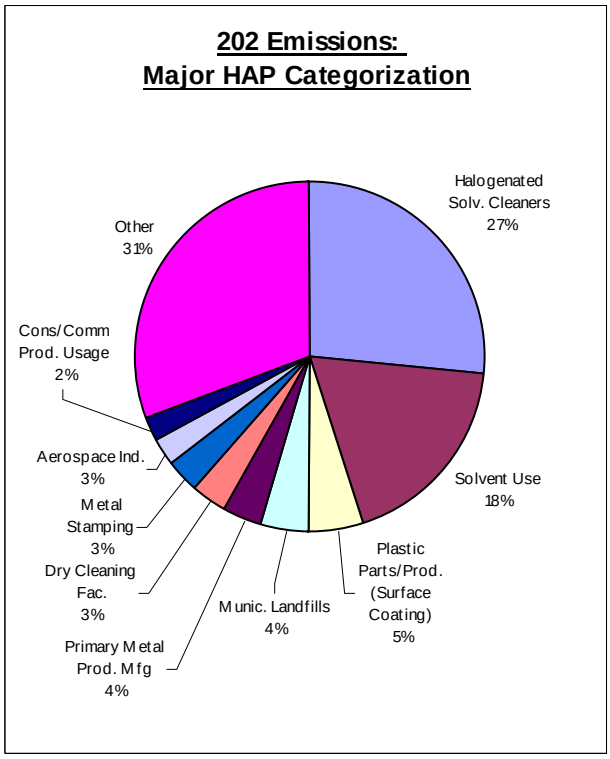
Emissions (Tons)

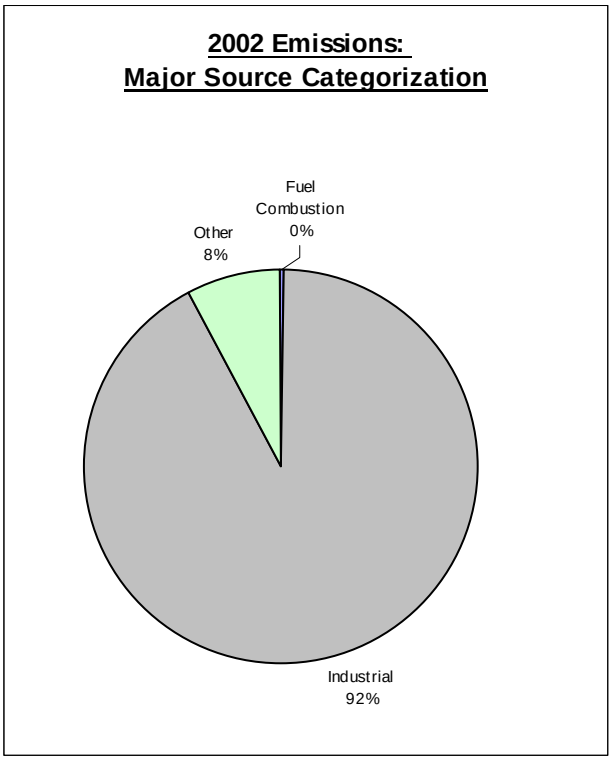
	1990	2002	Pct Change
Halogenated Solvent Cleaners	42,569.88	2,903.07	-93.2%
Solvent Use		1,973.47	
Plastic Parts & Products (Surface Coat	2,099.81	559.08	-73.4%
Municipal Landfills	11.94	482.56	3941.5%
Primary Metal Products Manufacturing	46.79	389.87	733.2%
Metal Stamping, NEC	619.60	325.44	-47.5%
Aerospace Industries	13,450.15	278.01	-97.9%
Consumer and Commercial Products U	53.84	243.99	353.2%
Other Categories (305 Other Categorie	18,319.38	3,691.08	-79.9%
TOTAL	**77,171.39**	**10,846.57**	**-85.9%**

- Trichloroethylene is only emitted from stationary sources.
- Significant stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the Halogenated Solvent Cleaners, Aerospace Industries , HON, and surface coating sources.
- Landfills are underestimated in the 1990 NEI.

Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

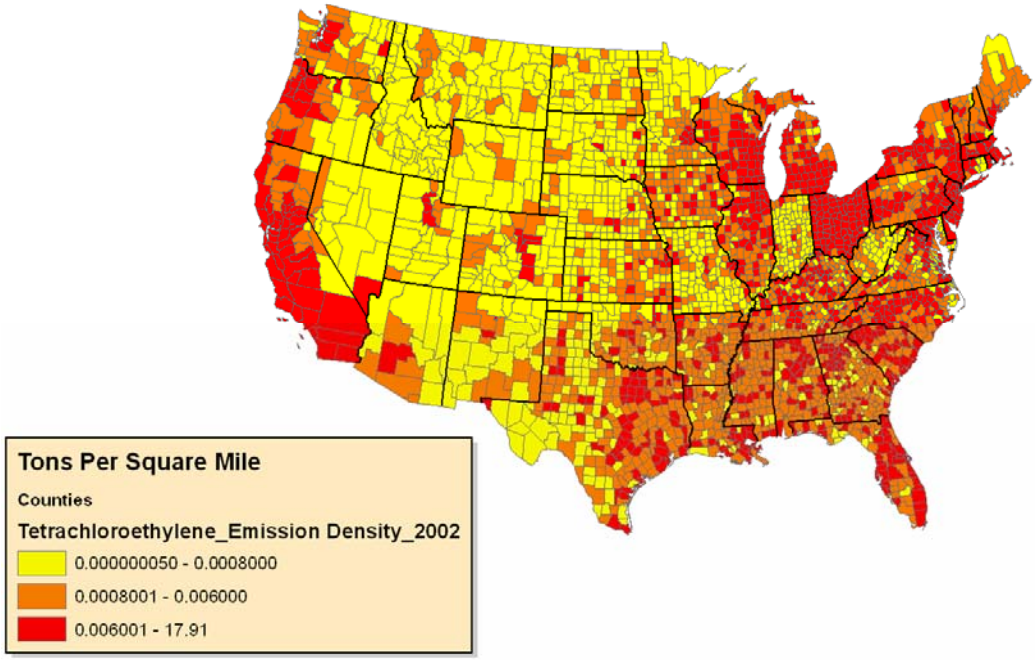
Trichloroethylene (cont.)





- The "Other" Category shown in the Major Source Categorization pie chart includes consumer and commercial products usage, incineration and landfill categories.

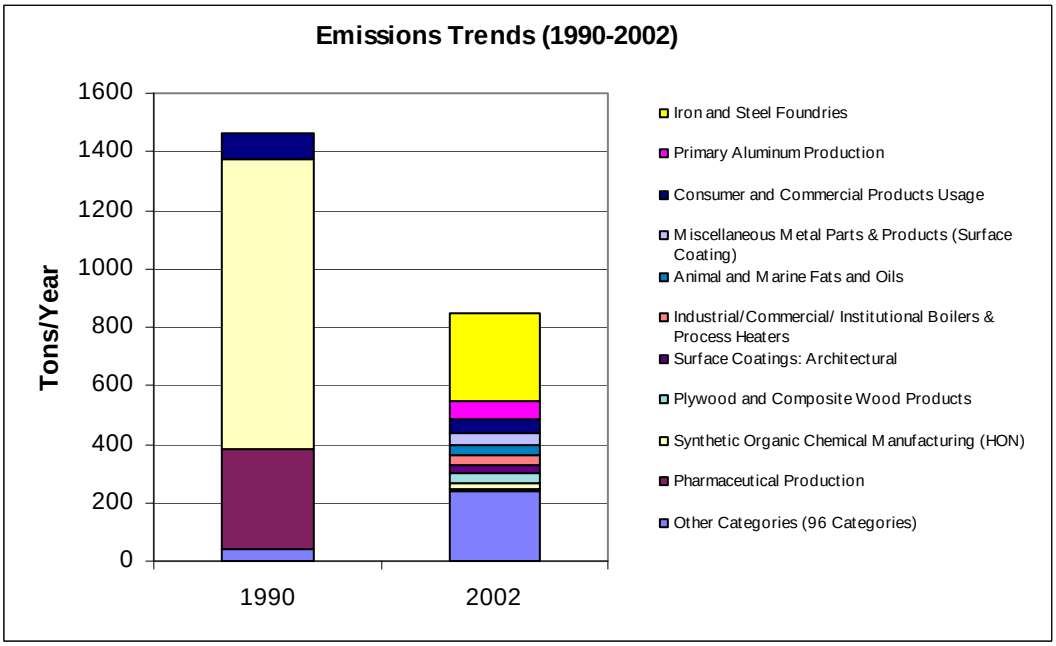
2002 Emissions Density Map



- The emissions density map shows that trichloroethylene is emitted in higher concentrations in areas with greater population. The primary source of trichloroethylene emissions in 2002 is solvent use, which can be correlated to population.

Triethylamine

- HAP Category Name: Triethylamine
- CAS Number: 121-44-8
- Chemical Formula: $C_6H_{15}N$ Molecular Weight: 101.19
- Toxicity: Potential NonCancer Effects
- 106 Source Categories (2002)
- 2002 Total Emissions: 851 tons



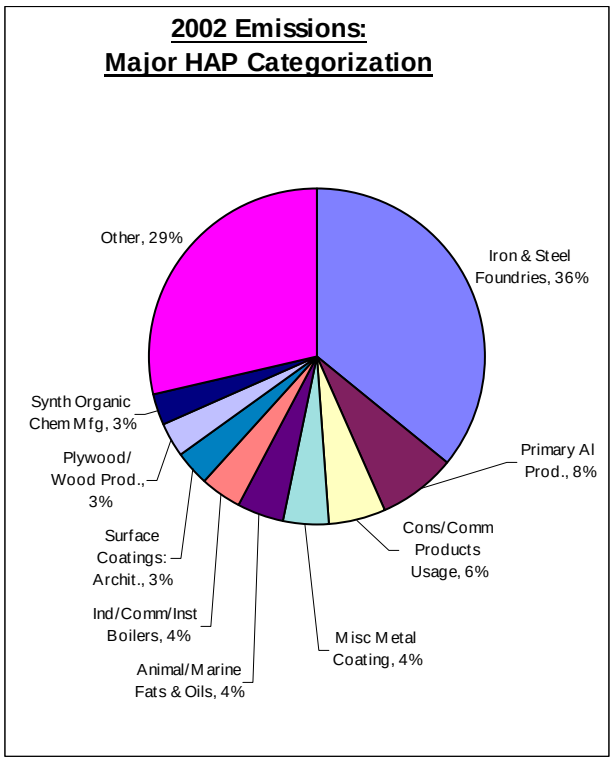
Emissions (Tons) 11/20/06

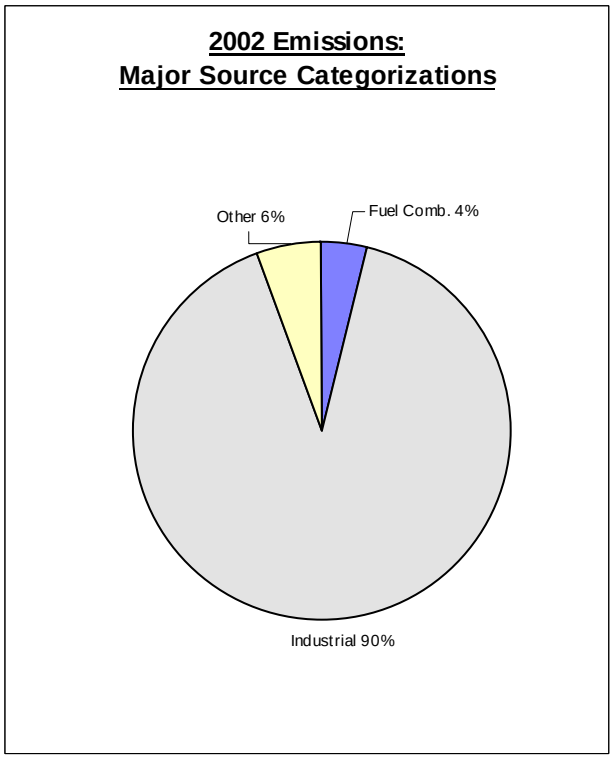
	1990	2002	Pct Change
Iron and Steel Foundries		304.68	
Primary Aluminum Production		63.86	
Consumer and Commercial Products Usage	92.9	47.8	-49%
Miscellaneous Metal Parts & Products (Surface Coating)	0.29	37.18	12721%
Animal and Marine Fats and Oils		37.16	
Industrial/Commercial/ Institutional Boilers & Process Heaters		33.26	
Surface Coatings: Architectural		29.45	
Plywood and Composite Wood Products		27.77	
Synthetic Organic Chemical Manufacturing (HON)	991.63	26.05	-97%
Pharmaceutical Production	337.74	4.2	-99%
Other Categories (96 Categories)	42.86	239.42	459%
TOTAL	**1,465.4**	**850.8**	**-42%**

- Triethylamine is only emitted from stationary sources.
- Significant stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the HON, Pharmaceutical Production, and surface coating sources.
- A number of sources present in 2002 NEI are not present in the 1990 NEI.

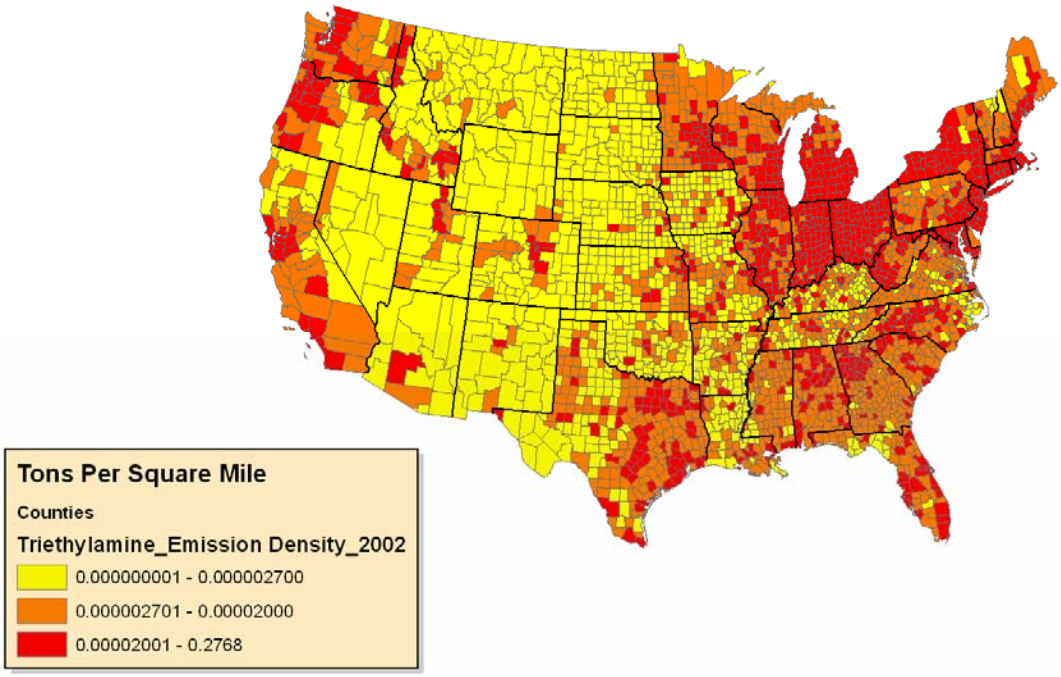
Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

Triethylamine (cont.)





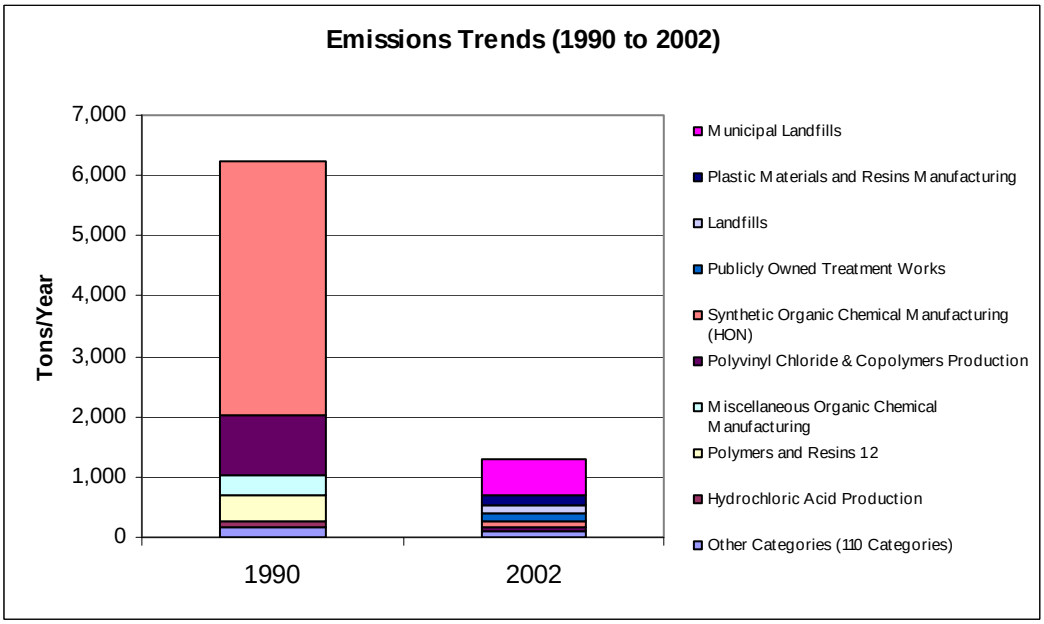
2002 Emissions Density Map



- The emissions density map shows that triethylamine is emitted in higher concentrations in areas with greater population. The primary source of triethylamine emissions in 2002 is solvent use, which can be correlated to population

Vinyl chloride

- HAP Category Name: Vinyl chloride
- CAS Number: 75-01-4
- Chemical Formula: C_2H_3Cl Molecular Weight: 62.5
- Toxicity: Potential Cancer Risks and NonCancer Effects
- 137 Source Categories (2002)
- 2002 Total Emissions: 1,308 tons



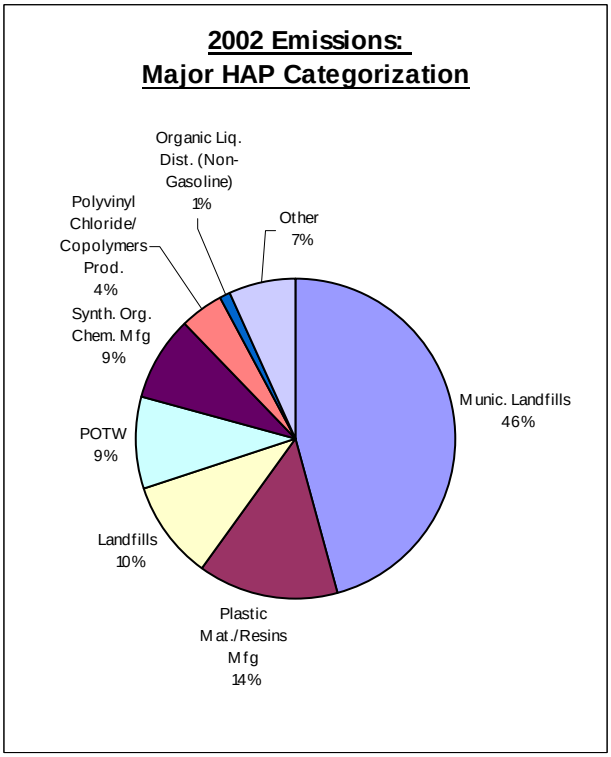
Emissions (Tons)

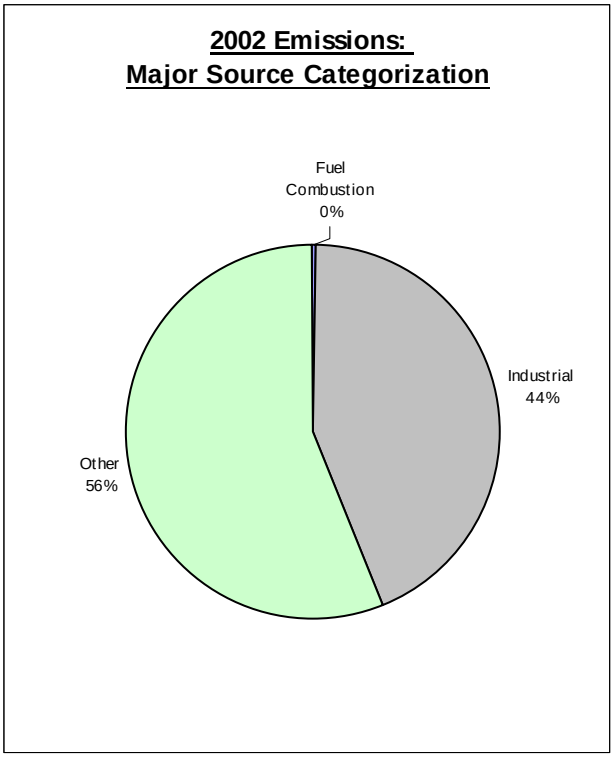
	1990	2002	Pct Change
Municipal Landfills	10.12	598.52	5814.2%
Plastic Materials and Resins Manufactu	0.51	187.99	36760.8%
Landfills		130.92	
Publicly Owned Treatment Works	0.42	119.14	28266.7%
Synthetic Organic Chemical Manufactu	4,198.24	112.29	-97.3%
Polyvinyl Chloride & Copolymers Produ	1,012.89	58.11	-94.3%
Miscellaneous Organic Chemical Manu	304.48	0.26	-99.9%
Polymers and Resins 1 2	457.14		
Hydrochloric Acid Production	93.08		
Other Categories (110 Categories)	159.44	101.05	-36.6%
TOTAL	**6,236.32**	**1,308.28**	**-79.0%**

- Vinyl chloride is only emitted from stationary sources.
- Significant stationary source reductions have occurred due to the implementation of Maximum Achievable Control Technology (MACT) standards for the HON, Polyvinyl Chloride & Copolymers Production, and Miscellaneous Organic Chemical Manufacturing.
- Landfills, the largest source category in the 2002 NEI, are not characterized well in the 1990 NEI.

Source: 2002 NEI version 1. Emission estimates are subject to updates for subsequent revised versions of the 2002 NEI and do not reflect emission changes considered in ongoing regulatory rulemakings such as the Lead NAAQS or Risk and Technology Review Assessment (RTR).

Vinyl chloride (cont.)





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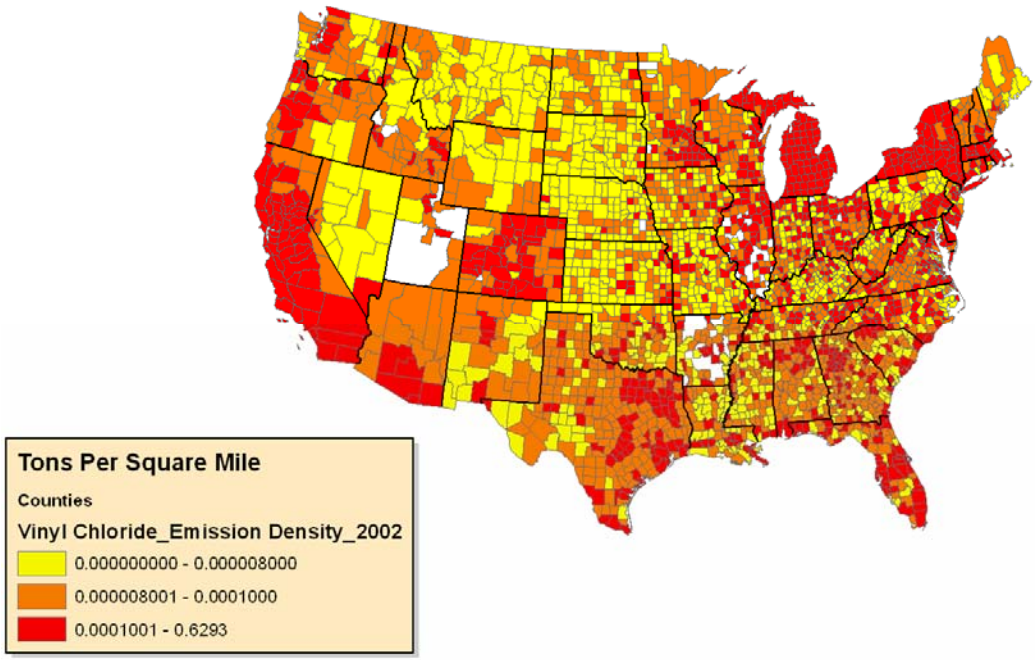
2002 Emissions Density Map



- The County Density map shows that vinyl chloride is emitted in 3060 counties of the 3141 counties in the 50 states.
- Lowest range extends below 10^{-9} tons/sq. mi. White areas identify counties with actual zero emissions.