

ENVIRONMENTAL PROTECTION AGENCY

[40 CFR ]

[FRL]

[Docket No. A-97-05]

Clean Air Act, Section 112(c)(6), Specific Pollutants

AGENCY: Environmental Protection Agency (EPA)

ACTION: Notice of draft source category listing for section 112(d)(2) rulemaking pursuant section 112(c)(6) requirements.

SUMMARY: This action provides, for public review and comment, a draft list of source categories to be added to EPA's list of source categories for regulation under section 112(d). This action is being taken pursuant to section 112(c)(6) of the Clean Air Act (Act), as amended in 1990, and a consent decree entered in Sierra Club v. Browner, Civ. No. 95-1747 (consolidated with Sierra Club v. Browner, Civ. No. 96-436). Draft and final lists are required under the consent decree to be completed and made available by EPA by June 11, 1997 and December 19, 1997, respectively.

A listing under section 112(c)(6) is necessary before standards under sections 112(d)(2) or (d)(4) can be developed, but by itself does not automatically result in regulation or control of emissions from sources within these source categories. Once the list is finalized, EPA will

perform further analyses on emissions and control methods for the listed source categories. This regulatory development analysis will determine any ultimate regulatory requirements.

DATES: Written comments must be received on or before [insert the date 30 days after the date of publication]

Requests for extensions to this comment period are not anticipated to be granted due to the limited time available for publication of the final list.

ADDRESSES: Docket. Docket No. A-97-05, containing information considered by EPA in developing this notice, is available for public inspection and copying between 8:00 a.m. and 5:30 p.m., Monday through Friday except for Federal holidays, at the following address: U.S. Environmental Protection Agency, Air and Radiation Docket and Information Center (MC-6102), 401 M Street, SW, Washington, DC 20460; telephone (202) 260-7548. The docket is located at the above address in Room M-1500, Waterside Mall (ground floor). A reasonable fee may be charged for copying.

Comments. Comments should be submitted (in duplicate, if possible) to Air Docket (6102), Attn: Docket Number A-97-05, Environmental Protection Agency, 401 M Street SW, Washington, DC 20460. Refer to SUPPLEMENTARY INFORMATION for information regarding electronic submittal of comments. FOR FURTHER INFORMATION CONTACT: Laurel Driver, Office of

Air Quality Planning and Standards (MD-15), U.S.  
Environmental Protection Agency, Research Triangle Park,  
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SUPPLEMENTARY INFORMATION:

Docket. The docket for this regulatory action is A-97-05. The docket is an organized and complete file of all the information submitted to or otherwise considered by the Agency in the development of this list of categories for sources for section 112(c)(6). The principal purpose of this docket is to allow interested parties to identify and locate documents that serve as a record of the process engaged in by the Agency to publish today's notice. The docket is available for public inspection at the EPA's Air and Radiation Docket and Information Center, which is listed in the addresses section of this notice.

Electronic Submittal of Comments. Comments and data may also be submitted electronically to A-and-R-Docket@epamail.epa.gov. No Confidential Business Information (CBI) should be submitted through e-mail. Electronic comments must be submitted as an ASCII file avoiding the use of special characters and any form of encryption. Electronic comments on this notice may be filed online at many Federal Depository Libraries.

Comments and data will also be accepted on disks in WordPerfect 5.1 or 6.1 file format or ASCII file format.

All comments and data for this notice, whether in paper form or in electronic forms such as through e-mail or on disk, must be identified by the docket number A-97-05.

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Table 1. Summary of 1990 Emission Inventory Data for Section 112(c)(6) Pollutants

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Figure 1. Percent Contributions by Source Categories

I. Introduction

A. Statutory Requirements

Section 112(c)(6) of the Act prescribes the following program for seven specific pollutants:

With respect to alkylated lead compounds, polycyclic organic matter, hexachlorobenzene, mercury, polychlorinated biphenyls, 2,3,7,8-tetrachlorodibenzo-furans and 2,3,7,8-tetrachlorodibenzo-p-dioxin, the Administrator shall, not later than 5 years after the date of enactment of the Clean Air Act Amendments of 1990, list categories and subcategories of sources assuring that sources accounting for not less than 90 percentum of the aggregate emissions of each such pollutant are subject to standards under subsections (d)(2) or (d)(4). Such standards shall be promulgated not later than 10 years after such date of enactment. This paragraph shall not be construed to require the Administrator to promulgate standards for such pollutants emitted by electric utility steam generating units.

B. Schedule

The EPA has entered into a consent decree with the Sierra Club Legal Defense Fund, Inc., in response to Sierra Club v. Browner, Civ. No. 95-1747 (consolidated with Sierra Club v. Browner, Civ. No. 96-436). These actions concern performance of certain duties under Act sections 112(c)(3), (c)(6), (k), and 202(1), and require, among other actions, that EPA publish a draft of the list described in

section 112(c)(6) no later than June 11, 1997, making a final list available no later than December 19, 1997.

## II. Background

### A. Overview of Regulatory Authority

Section 112 of the Act, as amended in 1990, contains the EPA's authorities for reducing emissions of hazardous air pollutants (HAP). Subsection 112(b)(1) contains an initial list of 189 HAP (recently revised to contain 188 HAP, 61 FR 30816, June 18, 1996). Subsection 112(c)(1) requires the Administrator to publish a list of all categories and subcategories of major sources and area sources of the air pollutants listed pursuant to subsection 112(b). Subsection 112(d) requires the Administrator to promulgate regulations establishing emission standards for each category or subcategory of major sources and area sources of HAP listed. Subsection 112(d)(2) specifies that emission standards promulgated under the subsection shall require the maximum degree of reductions in emissions of the HAP subject to section 112 that are deemed achievable, i.e., the maximum achievable control technology (MACT). These regulations are termed "technology-based" standards because they are based on technologies that the best performing sources are using. These technologies may include equipment or process design, chemical substitution, collection and treatment of emissions, work practices, and other measures.

Subsection 112(d)(4) provides for consideration of

health thresholds with an ample margin of safety. Certain other subsections of section 112 require EPA, in addition to technology-based standards, to evaluate risk to public health and the environment in determining whether other control measures are appropriate.

Section 112(c)(6) names seven specific HAP that EPA must evaluate to be certain the sources of these HAP have been identified and subjected to standards. These specific pollutants are alkylated lead compounds, polycyclic organic matter (POM), hexachlorobenzene (HCB), mercury, polychlorinated biphenyls (PCB's), 2,3,7,8-tetrachlorodibenzofuran, and 2,3,7,8-tetrachlorodibenzo-p-dioxin.

#### B. General Procedure

In order to determine the sources of the seven HAP named in section 112(c)(6), EPA developed an emissions inventory of known sources of each HAP. The EPA used the emission inventory to determine the sources that account for the emissions of each section 112(c)(6) pollutant. Once these sources of the total emissions were identified, only the stationary, anthropogenic source categories which fall within the scope of section 112 were evaluated to determine whether they were currently regulated or scheduled for regulation under section 112(d)(2) or (d)(4).

In several cases, source categories identified as contributors to the estimates of the emissions of

section 112(c)(6) pollutants are not currently listed for regulation under section 112, but are subject to other standards required by the Act. In some cases, EPA is planning to credit regulations for sources of these emissions as meeting the substantive purposes of section 112(c)(6) even though they are not actually section 112(d)(2) or (d)(4) standards. The EPA believes other regulatory authorities address these source categories' emissions in a manner comparable to section 112(d)(2) and, thus, additional regulation under section 112(c)(6) may not contribute additional environmental benefits. The EPA invites comment on this approach. More details on the specific source categories evaluated and the applicable regulatory authorities are given in section IV.

### III. Section 112(c)(6) Emissions Inventory

#### A. General Methodology

In order to implement the section 112(c)(6) requirements, EPA developed a national inventory of sources and emissions for the designated pollutants for the base year 1990. The base year inventory report can be obtained from the EPA's Internet World Wide Web site ([www.epa.gov/oar/oaqps/airtox/112c6fac.html](http://www.epa.gov/oar/oaqps/airtox/112c6fac.html)). It should be noted that current emissions may be lower or higher than emissions calculated for the 1990 base year.

The base year inventory document includes estimates for



all sources of the section 112(c)(6) pollutants for which the Agency could establish estimation techniques.

Therefore, this inventory includes estimates for sources that EPA believes would not be subject to section 112 regulations, i.e., mobile sources, wild and prescribed fires, residential fuel combustion, and pesticides application. More detail on the sources and emissions considered in meeting the requirements of section 112(c)(6) appears in section IV.A. The EPA believes this base year inventory report will be a useful reference to readers who wish to understand the relative relationship of stationary source emissions (and in particular those that have been evaluated for section 112(c)(6) purposes) to emissions from other types of sources. In addition, where EPA did not have data to support an emissions estimate but did have information to suggest a source category was a potential emitter of a section 112(c)(6) pollutant, it is so noted in the inventory document.

For the purposes of section 112(c)(6), only stationary source emissions are relevant. The inventory not only quantifies emissions from individual stationary source categories, but also provides information concerning "major" and "area" sources for each source category as defined in section 112(a) of the Act.

1. Top Down versus Bottom Up

To address the requirements of section 112(c)(6), EPA

developed a national inventory of sources and emissions of the designated pollutants based on data collected from extensive searches of published technical literature, the EPA's MACT standards programs, EPA Locating and Estimating (L&E) documents, EPA's Urban Area Toxics Program, the Toxics Release Inventory (TRI), the Great Waters Study, and the Clean Air Act-mandated Reports to Congress on mercury and utility boilers.

With the exception of TRI data, the inventory primarily represents the product of a "top-down" calculational methodology. This means emissions were estimated by using some measure of source category activity (on the national level) and associated emission factors or speciation profiles for the category and its processes. With a few exceptions (e.g., dioxin emissions from municipal waste combustors), section 112(c)(6) national emissions are not the sum of individual facility estimates (i.e., a "bottom-up" process). The initial phase of the section 112(c)(6) emissions inventory effort constituted a screening analysis since EPA was attempting to preliminarily quantify atmospheric releases of all sources of the section 112(c)(6) pollutants. A top-down approach is generally considered an appropriate and cost-effective use of resources for screening efforts such as those needed to assess section 112(c)(6) pollutants. The level of effort required to estimate emissions using a bottom-up approach

for all source categories that emit these pollutants would be extremely costly. Should it be dictated as a result of this analysis and draft listing, such detailed, facility-specific emissions information may be collected during the technical analysis phase of MACT program development for the source categories listed for future section 112(d)(2) rulemaking consideration.

## 2. Sources of Data

The national emissions estimates developed for the purposes of the section 112(c)(6) process were determined from various data sources. The primary sources of existing national emissions estimates were EPA regulatory programs (i.e., MACT studies) and industry-provided estimates (provided either through the TRI program or directly to the section 112(c)(6) process as a part of the public review). Where national estimates did not exist, efforts were made to develop data using a top-down methodology. In these cases, emission factor data and national category activity information were collected. Emission factors were obtained from EPA's Compilation of Air Pollutant Emission Factors, Volume I: Stationary, Point and Area Sources (AP-42) document, EPA's Factor Information Retrieval System (FIRE) emission factor database, EPA's MACT programs, published literature, and industry studies. Activity data were obtained from published government reports (e.g., vehicle miles traveled (VMT) data from the Department of

Transportation's annual highway statistics, energy consumption data from Department of Energy publications), industry trade publications, industrial economic reports, industry trade groups, and EPA's MACT development programs.

### 3. Base Year

The EPA chose the base year 1990 for the emissions inventory. It is EPA's presumption that the concerns that led Congress to adopt provisions such as section 112(c)(6) were based on facts and circumstances that existed at the time the Act was amended. Because section 112(c)(6) requires a comparative accounting of the sources of these specific pollutants, EPA considered it important that, to the greatest extent possible, all emissions be estimated from the same base year. In several cases, other and perhaps better emissions estimates were available that represent more current emissions levels. In these instances, the more current estimate was noted, but the 1990 emissions estimate was used for the section 112(c)(6) accounting of the sources of the specific pollutants. Examples of source categories that have significantly reduced emissions since 1990 include:

Medical Waste Incinerator Units - For 1990, dioxin emissions (in tons per year toxic equivalency or TEQ factors) were estimated at 0.0007 tons. In 1995, emissions were 0.00016 tons (a reduction of 77 percent).

Hazardous Waste Incineration Units - For 1990, dioxin

emissions were estimated at 0.000032 tons. In 1996, dioxin emissions were 0.00002 tons (a reduction of 27 percent).

Municipal Waste Combustion Units - For 1990, mercury emissions were estimated to be 55 tons. For 1995, mercury emissions were 29 tons (a reduction of 47 percent).

Portland Cement: Hazardous Waste Kilns - For 1990, mercury emissions were estimated to be 3.5 tons and dioxin emissions were 432 grams. For 1996, emissions were 2.9 tons for mercury (a reduction of 17 percent) and 57 grams for dioxin (a reduction of 87 percent).

Alkylated lead emissions from gasoline distribution from the refinery to the storage tanks at service stations (commonly referred to as Stage I) for onroad mobile sources were estimated to be 0.086 tons in 1990. By 1996, there were no alkylated lead emissions from this source (a reduction of 100 percent). In 1990, 1 percent of the onroad motor vehicle fuel distributed was classified as leaded fuel. The EPA had initiated a program at that time to phase out all lead in fuels used for onroad vehicles. On December 31, 1995, the phaseout of leaded onroad motor vehicle fuel was completed, and there are currently no alkylated lead emissions from the distribution and use of onroad vehicle fuels.

It should be noted that the lead phaseout does not include fuels used for aviation, nonroad engines, marine vessels, and automotive racing purposes. Evaporative

emissions of alkylated lead occur during the distribution of fuel and the refueling of the above sources. Aviation fuel distribution and refueling operations were included in the section 112(c)(6) emission inventory document and are discussed further in section V. Data were insufficient to estimate emissions from fuel usage from nonroad engines, marine vessels, and automotive racing. Alkylated lead emissions due to fuel combustion in any of these leaded fuel sources are expected to be minimal or nonexistent because the alkylated lead species are converted to lead oxides upon combustion. The EPA solicits additional information to help quantify alkylated lead emissions from these sources.

#### 4. Pollutant Definitions

a. Polycyclic Organic Matter (POM). Various conventions were adopted for inventorying some of the pollutants where no standardized methods currently exist. This is most notably the case for POM, which is defined in section 112(b) of the Act as organic compounds with more than one benzene ring and a boiling point greater than or equal to 100°C, which would include a complex mixture of thousands of polynuclear aromatic hydrocarbons (PAH).

Because inventorying all POM compounds individually is currently impossible, surrogate approaches have been used. For instance, some of the available POM data are in terms of the solvent-extractable fraction of particulate matter (referred to as extractable organic matter or EOM). The EOM

is believed to contain the PAH and substitute-PAH compounds that predict cancer risk better than any individual PAH or any sum of PAH (Lewtas, J., "Complex Mixtures of Air Pollutants: Characterizing the Cancer Risk of Polycyclic Organic Matter." In: "Environmental Health Perspectives," Volume 100, pp 4-6, June 1993). Currently, EOM emission factors are available for only a limited number of the sources categories suspected of emitting POM.

Other POM data are defined as being included in either the group of 7 or group of 16 individual PAH species referred to as 7-PAH and 16-PAH, respectively. The species that make up 7-PAH are probable human carcinogens, and the 16-PAH are those species that are measured by EPA Method 610. The 16-PAH include the 7-PAH group.

The EPA and others are engaged in further efforts to better characterize the constituents of POM that are most significant in evaluating health and environmental effects. For a more complete discussion of POM surrogates, refer to the section 112(c)(6) emissions inventory document. Rather than attempt to resolve the issue of defining POM in this discussion by adopting one specific surrogate POM approach, data for all three approaches discussed above were evaluated in the section 112(c)(6) inventory and in turn used in this regulatory assessment. Because the available emissions estimate data vary for each of the three approaches, different source categories are listed under each of the

three approaches. These differences in identified source categories are summarized in table 1 (located at the end of this notice).

A decision by the Agency to select a particular definition of POM as most relevant to health and environmental effects can affect the list of sources for which standards are required. Consequently, EPA solicits comment, supporting technical information and legal rationale on the following questions concerning its definition of POM: (1) What surrogate measurement of POM would provide the best combination of emissions estimates and health benchmarks that can be used to identify specific source categories or subcategories for regulation under the Clean Air Act? (2) In the absence of information which clearly establishes the basis for selection of one particular surrogate for POM, should EPA rely in the interim on that surrogate which results in the least inclusive, or the most inclusive list of sources subject to standards under section 112(c)(6)?

b. Dioxins and Furans. Section 112(c)(6) specifies that of all the dioxin and furan congeners, only 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) and 2,3,7,8-tetrachlorodibenzofuran (2,3,7,8-TCDF) are to be considered in this assessment. In developing the emissions inventory to support this action, EPA initially attempted to inventory the specific 2,3,7,8-TCDD and 2,3,7,8-TCDF congeners but



soon found a significant shortage of available emissions data for these pollutants for all pertinent source categories. During the data collection phase of the process, EPA found that more emission estimates and emission factors were available for dioxins and furans on the basis of 2,3,7,8-TCDD toxic equivalent quantities (TEQ, 1989 international-NATO). Both EPA's MACT program and the ongoing Office of Research and Development Dioxin Reassessment Study predominantly report emission estimates on a 2,3,7,8-TCDD TEQ basis. Therefore, to maximize the number of source categories for which national estimates could be determined on a common basis and best carry out the objectives of section 112(c)(6), EPA chose to use the TEQ method for inventorying 2,3,7,8-TCDD and 2,3,7,8-TCDF as specified under section 112(c)(6). It should be understood that TEQs aggregate all of the dioxin and furan species into one factor weighted by toxicity, so that the dioxin and furan emissions estimates included in this inventory include 2,3,7,8-TCDD and 2,3,7,8-TCDF as well as other congeners. More information on the use of the TEQ method can be obtained from the section 112(c)(6) inventory report ([www.epa.gov/oar/oaqps/airtox/112c6fac.html](http://www.epa.gov/oar/oaqps/airtox/112c6fac.html)).

##### 5. Major versus Area Sources

In most cases, section 112(d)(2) standards regulate only "major" sources. To better understand what portion of the emissions in a category are subject to standards, the

inventory distinguishes between major and "area" sources for each of the source categories studied. According to section 112(a) of the Act, a major source is

any stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit, considering controls in the aggregate, 10 tons per year or more of any hazardous air pollutant or 25 tons per year or more of any combination of hazardous air pollutants.

An area source is any "stationary source of hazardous air pollutants that is not a major source."

The distinction between major and area sources is relevant here because of the way these sources are listed and regulated. The majority of source categories listed for section 112(d) regulations to date are listed as major sources. The level of control applied to these major sources may be MACT under subsection 112(d)(2) or for pollutants for which a health threshold has been established, a standard under subsection 112(d)(4). In addition to MACT for major sources, the Administrator must list under subsection 112(c)(3) "each category or subcategory of area sources which the Administrator finds presents a threat of adverse effects to human health or the environment . . . warranting regulation under this section." The level of control applied to these area sources may be MACT under subsection 112(d)(2), an alternative standard for area sources under subsection 112(d)(5), or, for pollutants for which a health threshold has been established, a

standard under subsection 112(d)(4). Regulation under some of these subsections may result in a level of control that may be equal or less stringent than that for major sources.

For the purposes of section 112(c)(6), determining the percentage of a source category's emissions that come from major sources generally establishes the percentage subject to a given section 112(d)(2) standard unless area sources for the category have been listed and regulated.

The major/area source split used in this analysis is a rough approximation based on EPA's understanding of the industries concerned. Where specific data pertaining to major/area splits are available, it is typically derived from definitions of facilities, not necessarily emissions. The fact that emissions were not specifically defined as originating from major or area sources is not a significant problem for this section 112(c)(6) evaluation. The majority of section 112(c)(6) sources within a source category are either all major or all area, so that it could be assumed that the emissions from most source categories were solely from major or area sources, respectively.

#### B. Assumptions

The emissions inventory developed to support section 112(c)(6) activities contains data of highly varying specificity and reliability. In some cases, emissions estimates were prepared by EPA or industry in response to other regulatory initiatives. These data are, in several

cases, based on individual facility data or representative, category-wide data developed from extensive testing. Other more source-specific estimate data are based on industry-submitted estimates to TRI, which have been based on testing or intimate process-specific knowledge. Other estimates were based on a top-down approach utilizing limited emission factors. Generally, activity data even for these categories were of reasonably good quality. The emission factor data, however, varied considerably in terms of number, quality, and representativeness.

This is particularly true for some of the source categories that contribute lesser amounts to total emissions of a pollutant. For these categories that may have been perceived in the past as being of lesser importance, fewer and less representative emissions characterization studies have been performed. This fact necessitated that the limited data that were available had to be used and extrapolated to the fullest to develop a national estimate for a given category. As an example, for several of the combustion categories, emission factors had to be based on the only available test data, which were about 15 years old. In some cases, the data age issue was complicated by the fact that current measurement methodologies for a given pollutant may have changed from those used to determine the original factors. In other cases, one or two data points had to be used to develop factors that were applied to an

area source category with sources nationwide.

There is also an issue of completeness for pollutants that are defined by different surrogates (e.g., POM, dioxins and furans). For instance, several sources have been identified as being POM sources because there are 16-PAH emission estimates, but the same categories do not have any EOM emission estimates. This does not necessarily mean that these sources do not emit EOM; emission factors have just not been developed for these source categories at this time.

Where possible, sources were identified that are suspected to emit section 112(c)(6) pollutants, but data were not available to allow for quantification of emissions. As a part of this draft listing, EPA seeks additional and better-quality 1990 emissions data that may be available for section 112(c)(6) sources. Any new data received will be evaluated and if determined to constitute an improvement to the current inventory will be used to revise the inventory. If the inventory is revised, the contributions and ranking of source categories may change so that section 112(c)(6) listing decisions could be altered.

#### C. Review Process

A draft of the section 112(c)(6) emissions inventory was made available on EPA's Internet World Wide Web site for review by individuals within and external to the EPA (i.e., trade organizations, environmental advocacy groups). In addition, EPA identified a list of contacts in trade

organizations, industry, and environmental advocacy groups and contacted them individually by letter to announce the availability of the inventory and to request their reviews. The EPA requested that any comments on the draft section 112(c)(6) inventory be submitted between October 16, 1996 to November 30, 1996. The 59 comments submitted are summarized in the revised emissions inventory document, which can be obtained from the EPA's Internet Web site ([www.epa.gov/oar/oaqps/airtox/112c6fac.html](http://www.epa.gov/oar/oaqps/airtox/112c6fac.html)). Changes were made to the inventory to reflect new data or data specific to section 112 standards. Although EPA has endeavored to make the most accurate estimates possible and to use the most reliable information available, other information may demonstrate the need for further revisions to this inventory. Consequently, EPA again requests information that may improve 1990 estimates of sources and emissions of the section 112(c)(6) HAP.

#### D. Inventory Results

Table 1 summarizes the results of the 1990 emissions inventory for each of the section 112(c)(6) pollutants in tons per year. This summary includes emissions from all sources for which estimation data were available. Figure 1 provides a graphic illustration of stationary, mobile, and biogenic source contributions. These inventory data form the basis for the listing analysis.

#### IV. Listing Determination Process

During the listing determination process, source categories that are not considered appropriate for section 112 regulation were identified and excluded from further evaluation for potential listing. Source categories that currently are subject to section 112(d)(2) and (d)(4) standards were identified, along with sources that are subject to other standards required by the Act that substantively meet the requirements of section 112(c)(6). The emission contributions from these source categories were tallied for each pollutant to determine whether the sources of 90 percent of emissions are subject to standards (as required by section 112(c)(6)). Those pollutants that did not have 90 percent coverage required listing of additional source categories to attain the 90 percent level.

A. Sources Excluded from Section 112(c)(6) Analysis

As stated previously, certain sources of section 112(c)(6) pollutants, although included in the emissions inventory documentation, are not included in the analysis of source categories subject to section 112(c)(6). For example, section 112 applies to stationary sources, therefore mobile source emissions were excluded.

1. Wild and Prescribed Fires

Wild and prescribed fires may be a significant source of certain toxic air pollutants; however, they are not "stationary sources," as that term is defined in section 112(a)(3) or section 111(a)(2), in that they are not

"buildings, structures, facilities, or installations." Moreover, they represent types of emissions that are either nonanthropogenic and uncontrollable, or for which no technological control techniques are known to exist. Thus, while programs have been employed at the State and local level to regulate when, where, and how certain burning activities may be conducted, e.g., in order to reduce particulate matter (PM) emissions, EPA believes that these activities represent sources that are not amenable to further regulation under section 112.

## 2. Residential Fuel Combustion

Additionally, EPA believes that emissions from residential fuel combustion have been identified and the public informed of their potential significance, and EPA is engaged in other efforts to reduce their emissions. However, the Agency does not believe that such sources are appropriately regulated under section 112 standards and believes instead that they should be addressed through other means. This view is based on an analysis of the practical limitations in establishing the basis for the control requirements of section 112(d) for existing sources.

The EPA believes that it is both reasonable and practical to establish effective levels of performance for certain new residential fuel combustion sources and has done so under section 111 in the case of residential wood stoves. In this case, there was a relatively small number of known



manufacturers and the availability of control technology and its effectiveness were reasonably ascertainable. Thus, in February 1988, as the result of a negotiated rulemaking that included a substantial number of interested industry and environmental stakeholders, EPA promulgated a standard to decrease emissions of PM from residential wood stoves (53 FR 5860, February 26, 1988). This rule required that wood stoves sold after July 1, 1990 be equipped to meet emission limits specified within the rule. Catalytic and noncatalytic wood stoves complying with the 1990 standards were estimated to emit at least 86 and 75 percent less PM, respectively, than existing conventional wood stoves. Although no emission estimates were made for pollutants other than PM, the rulemaking notice for that standard noted that the control techniques used to reduce PM emissions are expected to reduce POM (the section 112(c)(6) pollutant emitted from this source category) emissions as well.

Of the emissions estimated for the 1990 baseline inventory for residential wood combustion, 21 percent was estimated to have come from fireplaces and 79 percent from wood stoves. An increasing proportion of wood stoves would become subject to the wood stove emission standard as the source population is replaced with new units. When the standard had just become effective in 1990, only about 5 percent of wood stoves were in compliance with the new rule. In the analyses for the regulation, EPA estimated a

useful life for wood stoves was approximately 15 years ("Regulatory Impact Analysis for Residential Wood Heaters New Source Performance Standard," EPA Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, December 1, 1988, page 8-14). Therefore, EPA believes that the number of wood stoves in compliance with the standard has increased and will continue to increase substantially over time as more new, complying wood stoves are purchased to replace older ones.

As noted above, the new source performance standard established for residential wood stoves is expected to achieve a substantial reduction in wood combustion-related emissions as the replacement stoves are phased in over time. In contrast with wood stoves, developing enforceable national regulations for residential fireplaces is much more difficult. Fireplaces are individually designed, often at the residential construction site. Individual useage patterns are highly variable; and compliance and enforcement issues for a national regulation pose difficult problems. The EPA notes that many State and local agencies have programs in place to reduce the use of residential wood burning at times when atmospheric conditions are conducive to a localized buildup of contaminants in the air. The EPA has supported these efforts through the provision of control techniques guidance (e.g., "Technical Information Document for Residential Wood Combustion Best Available Control

Measures," EPA 450/2-92-002, EPA Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, September 1992) and through grant assistance to State air pollution control agencies and expects to continue these efforts in the future. The EPA has identified emissions from this category but does not regard these sources as comprising that portion of the emissions inventory that are potentially subject to section 112(d) standards.

### 3. Pesticide Application

The EPA believes that although pesticide manufacturing is appropriately regulated under the Act, specifically section 112, pesticide application is governed by provisions of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Regulations under FIFRA include restricting the content of HAP in pesticides and specifying pesticide distribution, sale, and application practices. Thus, EPA believes that it would be redundant and inappropriate to include this category of activity within that portion of the inventory of emission sources that are potentially subject to section 112(d) standards.

#### B. Defining "Subject to Standards"

Section 112(c)(6) specifically states that sources that account for 90 percent of emissions of section 112(c)(6) specific pollutants be subject to standards under section 112(d)(2) or section 112(d)(4). It is important to

recognize that in making sources "subject to standards," the language of section 112(c)(6) does not specify either a particular degree of emissions control or a reduction in these specific pollutants' emissions to be achieved by such regulations. Rather, specific control requirements are set forth in other subsections in the course of developing and evaluating appropriate regulations.

1. Section 112(d)(2)

Section 112(d)(2) provides for measures that (a) reduce the volume or eliminate emission of HAP through process changes, substitution of materials or modifications; (b) enclose systems or processes to eliminate HAP emissions; (c) collect, capture, or treat HAP when released from a process, stack, storage, or fugitive emissions point; (d) are design, equipment, work practice, or operational standards (including requirements for operator training or certification); or (e) are a combination of the above. Section 112(d)(2) standards are based on the maximum level of control, defined in section 112(d)(3) as the "maximum degree of reduction in emissions that is deemed achievable" (e.g., MACT), as determined by the best-performing 12 percent of sources within the source category.

Several source categories, which have been identified as ones that account for the emissions of the various section 112(c)(6) pollutants, have previously been listed for section 112(d)(2) regulation and appear on the source

category list promulgated for section 112(c)(1) (57 FR 31576, July 16, 1992; 61 FR 28197, June 4, 1996). These standards are at varying phases of completion, and where the regulatory development has proceeded to a point that data are sufficient to estimate the portion of the emissions from a given source category that will be subject to the regulation, such an estimate was made. For instance, if a section 112(d)(2) standard will apply only to sources determined to be major as defined in section 112(a), then only the fraction of the total source category emissions that are estimated from major sources would be counted as subject to standards. For example, 50 percent of chloralkali plants' mercury emissions were estimated to be subject to the section 112(d)(2) standard under development, 11 percent of the ferroalloy manufacturing emissions, and 10 percent of the Stage I gasoline distribution emissions (refer to table 2).

For other source categories listed for section 112(d)(2) regulation, it is too early in the regulatory development phase to estimate how much of the total emissions will actually be regulated. In these cases, the total emissions from the source category were counted toward meeting the requirements of section 112(c)(6). This may initially lead to overcounting emissions subject to standards, particularly if a standard applies only to major sources and EPA determines, at a later date, that no major

sources exist for a given category, and also EPA does not find that the categories or subcategories of area sources present a threat of adverse effects to human health or environment. The majority of the source categories currently listed are for regulation of major sources only. In the absence of other information that would enable EPA to determine the subset of sources that will actually be subject to future standards, EPA believes all emissions from these source categories will be subject to standards.

2. Section 112(d)(4)

Congress provided in section 112(d)(4) that EPA could, at its discretion, develop risk-based standards for HAP "for which a health threshold has been established," provided that the standard achieves an "ample margin of safety." The full text of the provision reads:

With respect to pollutants for which a health threshold has been established, the Administrator may consider such threshold level, with an ample margin of safety, when establishing emission standards under this subsection.

The legislative history further indicates that if EPA invokes this provision, it must assure that any emission standards would not only result in ambient concentrations that would protect the public health with an ample margin of safety, but that the standards would also be sufficient to protect against the threat of significant or widespread adverse environmental effects.

A threshold pollutant is one considered to have a

concentration below which adverse effects are not expected to occur over a lifetime of exposure. For section 112(d)(4) to apply, the determination of a reference concentration (RfC) or reference dose (RfD) for a pollutant is sufficient to show that a threshold exists and may be sufficient to be considered the ample margin of safety level. (An RfC or RfD is defined as an estimate, with uncertainty spanning perhaps an order of magnitude, of a daily inhalation or noninhalation exposure, respectively, that, over a lifetime, would not likely result in the occurrence of noncancer health effects in humans.) When an RfC/RfD does not exist, a determination that a threshold exists would have to be made based upon the availability of specific data on a pollutant's mechanism of action.

A determination that a threshold exists has not been made for alkylated lead, POM, HCB, PCB's, 2,3,7,8-TCDF, or 2,3,7,8-TCDD. Therefore, section 112(d)(4) authority has not been used to regulate the emissions of any of these pollutants.

The EPA has established an RfD for methylmercury and an RfC for inorganic mercury, but section 112(d)(4) has not been used in regulating the emissions of this group of mercury compounds.

The focus of the earliest regulations under section 112 has been to initially control emissions of air toxics using the maximum achievable control technologies available for

each industry source category emitting HAP. In the next phase of section 112 programs, reductions of emissions will be health-based and be required to protect the public and environmental health to levels deemed "safe." These latter determinations will rely on information required by the 1990 Amendments to the Act or gathered since they were passed. For example, the Dioxin Reassessment Study, the Great Waters Report to Congress, and the Mercury Report to Congress represent extensive assessments of the health effects and the potential exposure of humans and the environment to the pollutants identified in section 112(c)(6). This information will be used in future decisions regarding the imposition of health-based emission reductions.

### 3. Other Regulatory Actions

In several cases, source categories identified as contributors to the estimates of emissions of section 112(c)(6) pollutants are not currently listed for regulation under section 112(d)(2), but are subject to other standards required by the Act. In some cases, EPA is planning to consider these regulations as meeting its substantive obligations under section 112(c)(6), even though these standards do not constitute section 112(d)(2) or (d)(4) standards. The EPA believes this approach is reasonable where other regulatory authorities address these source categories' emissions in a comparable fashion. In such cases, additional regulations under section 112(c)(6)



may not impose substantially different control requirements, may not contribute significant additional environmental benefits, and thus would not justify the significant additional administrative burden associated with developing new section 112(d) regulations. A discussion of these source categories regulated under other authorities follows.

a. Utility Study, Section 112(n)(1). The language in section 112(c)(6) states that the "paragraph shall not be construed to require the Administrator to promulgate standards for such pollutants emitted by electric utility steam generating units." The EPA believes this statement gives the Agency discretion in determining the subsection of section 112 under which to regulate utility emissions and in particular whether EPA is required to include utility emissions in the section 112(c)(6) analysis. In section 112(n)(1)(A), EPA is required to assess the HAP emissions from electric utility steam generating units and to regulate if "appropriate and necessary." More information about the utility study can be obtained from the Clean Air Act Amendments bulletin board of the EPA's electronic Technology Transfer Network (TTN) under "Recently Signed Rules," (<http://ttnwww.rtpnc.epa.gov>).

The EPA believes that section 112(n)(1)(A) is the appropriate authority for evaluating utility emissions and determining the necessity of regulation for this source category. The EPA plans to credit the emissions of

section 112(c)(6) pollutants from utilities as subject to standards through section 112(n)(1)(A).

b. Section 129 Standards. Section 129 regulates emissions from existing and new solid waste incinerators (e.g., municipal and medical waste incineration).

Section 129(h)(2) prohibits subjecting solid waste incinerators to both section 129 and section 112(d) standards. Section 129 standards provide a similar level of control as section 112(d)(2) in that for existing sources, control can be no less stringent than the average emission limitation achieved by the best-performing 12 percent of sources. Under section 129(a)(4), controls are to be specified for PM (total and fine), opacity, sulfur dioxide, hydrogen chloride, oxides of nitrogen, carbon monoxide, lead, cadmium, mercury, dioxins, and dibenzofurans. The PCBs and HCB are not section 129 pollutants. Even though PCBs and HCB are not included in section 129, the Agency anticipates that they would be controlled coincidentally with the control of other section 129 pollutants. Though data on co-control of specific chlorinated compounds are limited, properly operated combustion systems equipped with post combustion control effectively control chlorinated compound(s) in a two step process. First, the combustion system destroys the primary chlorinated compounds and converts them into less toxic secondary compounds. Next, the post combustion air pollution control system removes the

secondary compounds. For instance, the section 129 standards for municipal and medical waste incinerators require both good combustion practices and post combustion control and typically achieve more than 95 percent control of chlorinated compounds.

There is no major or area source distinction in section 129, though there may be a threshold that triggers applicability of a standard to specific sources. For instance, municipal waste combustors capable of combusting more than 250 tons per day (tpd) of municipal solid waste are subject to section 129 standards under subparts Ea, Eb, or Cb, depending on when the MWC was constructed. Regulations are also being developed under section 129 to regulate medical waste combustors in the 40 to 250 tpd size range. Facilities that burn less than 40 tons municipal solid waste per day would be subject to the industrial combustion coordinated rulemaking (described below).

Because section 129 provides for a similar level of control as section 112(d)(2) and because section 129(h)(2) prohibits subjecting solid waste incinerators to both section 129 and section 112(d) standards, the Agency believes that it is appropriate to include section 129 as a regulatory instrument equivalent to section 112(d)(2). The EPA further believes that listing source categories for section 112(c)(6) that are already covered under section 129 would lead to a redundant regulatory effort and would

produce no additional environmental benefit. The EPA plans, therefore, to credit the emissions of section 112(c)(6) pollutants from section 129 source categories as subject to standards under section 112(c)(6).

c. Industrial Combustion Coordinated Rulemaking (ICCR).

The ICCR was designed to reduce emissions from the many various combustion sources by consolidating authorities under sections 129, 112, and 111 of the Act for the following combustion source categories:

industrial-commercial-institutional boilers (i.e., all boilers except residential or utility), process heaters (which could include dryers and industrial furnaces), stationary internal combustion engines, stationary gas turbines, industrial-commercial solid waste incinerators, and all other solid waste incinerators (except municipal waste combustors burning more than 40 tpd of waste and medical waste incinerators, which are covered under specific regulations developed in accordance with section 129). It is important to note that the ICCR is based on the authority of sections 112 and 129 which satisfy the goals of section 112(c)(6). It should also be noted that the ICCR is being conducted under the Federal Advisory Committee Act (FACA). The stakeholders (environmental advocates, State agencies, and industry) will recommend what source categories will ultimately be subject to the ICCR regulation. Under the FACA, stakeholders make their

recommendations directly to the EPA Administrator who is ultimately responsible for the regulation.

The EPA believes that listing these sources categories for additional regulation under section 112(c)(6) would produce a redundant regulatory effort and would substantially frustrate the purposes for which the ICCR was initiated. Therefore, EPA is planning to credit the emissions from source categories included in the ICCR for the purposes of meeting the section 112(c)(6) requirements. More information about the ICCR is available on the EPA TTN or at the ICCR Main Menu on the Internet (<http://ttnwww.rtpnc.epa.gov>). When accessing the World Wide Web site, select "TTN BBS Web" from the first menu, then select "Gateway to Technical Areas" from the second menu, and, finally, select "ICCR-Industrial Combustion Coordinated Rulemaking" from the third menu.

d. Gasoline Distribution Stage II, Sections 182(b)(3) and 202(a). The emissions of POM (primarily naphthalene) from this source category come from the displaced evaporative losses that occur while refueling motor vehicles at service stations. Gasoline pumped into a vehicle's fuel tank displaces the air-vapor mixture in the vehicle tank out through the fuel tank fill neck and into the air. This displaced gasoline vapor contains both HAP and VOC, including naphthalene.

The EPA does not expect to list this category for

section 112(d)(2) or (d)(4) standards, but believes that emissions from this activity have already been sufficiently addressed through rules adopted pursuant to sections 182(b)(3) and 202(a)(6). Section 202(a)(6) requires a nationwide onboard vapor recovery program, and section 182(b)(3) requires Stage II vapor recovery in most ozone nonattainment areas (the most heavily populated areas of the country). Vehicle refueling emission control equipment can be either installed at the service station (Stage II controls) or on the vehicle (onboard controls). Both control systems capture and recover the displaced vehicle refueling emissions.

The 1990 Amendments required the installation of Stage II controls in most ozone nonattainment areas in the early 1990's to achieve VOC and HAP reductions, while onboard controls are being placed on new vehicles sold in the late 1990's to be the national and long-term solution. Once onboard controls are widespread, by the year 2010, Stage II controls could be removed after review by EPA.

Naphthalene, the POM of concern in this emission category, is a HAP and a VOC and will be subject to both control measures. The EPA was presented with both regulatory programs, provided under different sections of the Act, to address a single problem, namely the evaporative loss of volatile organics from gasoline refueling activities. In implementing these control programs under

both sections 182 and 202, EPA believes that it has also effectively discharged its obligations for this category of emissions under section 112(c)(6) as well.

C. Regulatory Coverage for Section 112(c)(6)

Pollutants

Table 2 provides a summary of the source categories that emit section 112(c)(6) HAP and the percentage of emissions attributable to each category. Note that as described in section IV.A., only the sources that EPA believes are suitable for regulation under section 112 are included in this analysis. Table 2 summarizes both the categories EPA has determined meet the requirements of section 112(c)(6) and the categories that are not subject to such regulation.

In table 2, the percent contributions of source categories that are subject to standards are summed for each pollutant in order to identify those section 112(c)(6) pollutants that do not have at least 90 percent of emissions subject to standards. Those section 112(c)(6) pollutants at or above the 90 percent level are: POM (as defined by EOM), 2,3,7,8-TCDD, mercury, PCB's, and HCB. These pollutants do not require the listing of any additional source categories for future rulemaking.

Based on the 1990 baseline emissions inventory, the 90 percent subject to standards requirement is not met for the following pollutants: POM (as defined by 7-PAH), POM

(as defined by 16-PAH), and alkylated lead. For these pollutants, additional source categories will have to be identified to attain the 90 percent level. These additional source categories will require listing under section 112(c)(6) for section 112 standards development.

V. Source Categories that Require Listing as a Result of the Section 112(c)(6) Analysis

A review of the available data indicates that a substantial majority of source categories emitting section 112(c)(6) pollutants have already been listed for regulations under section 112(d)(2) or are subject to regulation under other authorities. Based on EPA's current information, in order to meet the section 112(c)(6) requirement to assure that the sources of 90 percent of the aggregate emissions of each specific HAP is subject to regulation, the following source categories would require such regulation: open burning of scrap tires, gasoline distribution aviation fuel, and wood treatment/wood preservation. A listing under section 112(c)(6) is necessary before standards under section 112(d)(2) or (d)(4) can be developed, but by itself does not automatically result in regulation or control of emissions from sources within these source categories. Once the list is finalized, EPA will perform further analyses on emissions and control methods for the listed source categories. This regulatory development analysis will determine any ultimate regulatory



requirements.

A summary of the reasons for each of the above source category's inclusion follows.

- Open burning of scrap tires: This source category accounts for the largest portion of POM emissions from sources not subject to regulation (53.32 percent defined as 7-PAH, and 26.83 percent defined as 16-PAH). The crediting of emissions from this source will bring 7-PAH emissions up to the level of 99.87 percent, and 16-PAH emissions up to the level of 87.78 percent.

- Wood treatment/wood preservation: This source category emits 7.13 percent of the 1990 estimated emissions of POM (defined as 16-PAH), primarily due to the emissions of naphthalene. After open burning of scrap tires, this is the next largest source of 16-PAH. It should be noted that major sources in this source category had originally appeared on the section 112(c)(1) list for regulation. Later, the source category was removed from the list when EPA determined that no major sources exist for the category (61 FR 28201, June 4, 1996).

The listing of the wood treatment/wood preservation source category and open burning of scrap tires will bring POM (as defined by 16-PAH) source categories subject to standards to the level of 94.92 percent.

- Gasoline distribution, aviation fuel: This category, which consists of evaporative losses from the transfer and

storage of aviation fuel, and aircraft refueling and associated spillage, emitted 78 percent of the estimated 1990 emissions of alkylated lead. Because leaded gasoline has been banned for use in motor vehicles, this source category accounts for the only known remaining emissions of alkylated lead. Based on the 1990 baseline emissions inventory and knowledge of the lead phaseout, listing this source will subject 100 percent of current alkylated lead emissions to standards.

## VI. Regulatory Requirements

### A. General

Today's notice is not a rule; it is essentially a housekeeping or maintenance activity which does not impose regulatory requirements or costs on any sources including small businesses. Therefore, the EPA has not prepared an assessment of the potential costs and benefits pursuant to Executive Order 12866, nor an economic impact analysis pursuant to section 317 of the CAA, nor a regulatory flexibility analysis pursuant to the Regulatory Flexibility Act (Pub. L. 96-354, September 19, 1980), nor a budgetary impact statement pursuant to the Unfunded Mandates Act of 1995. Also, this notice does not contain any information collection requirements and, therefore, is not subject to the Paperwork Reduction Act, 44 U.S.C. 3501 et seq.

### B. Executive Order 12866 and Office of Management and Budget (OMB) Review

Under Executive Order 12866 (58 FR 51735; October 4, 1993), the Agency must determine whether a regulatory action is "significant" and therefore subject to OMB review and the requirements of the Executive Order. The Order defines "significant" regulatory action as one that is likely to lead to a rule that may either (1) have an annual effect on this economy of \$100 million or more, or adversely and materially affect a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local or tribal governments or communities; (2) create a serious inconsistency or otherwise interfere with an action taken or planned by another agency; (3) materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or (4) raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

Pursuant to the terms of Executive Order 12866, this is a not a "significant regulatory action" within the meaning of the Executive Order. This notice was submitted to OMB for review. Any written comments from OMB and written EPA responses are available in the docket.

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Date

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Mary Nichols  
Assistant Administrator

Table 1. Summary of 1990 Emission Inventory Data for Section 112(c)(6) Pollutants (tons/yr)

SOURCE CATEGORY	POM			2,3,7,8-TCDD TEQ	Mercury	PCB	HCB	Alkylated Lead
	7-PAH	16-PAH	EOM					
Asphalt Hot-Mix Production	0.094	43.7						
Asphalt Roofing Production	1.68	43.6						
Battery Production					0.020			
Carbamate Insecticides Production		4.08						
Carbon Reactivation Furnaces				1.25E-07				
Carbon Black Production	0.45	4.33			0.25			
Chloralkali Production					6.40			
Chlorinated Solvents Production							0.581	
Cigarette Smoke	0.52	3.45						
Coke Ovens: Charging, Topside & Door Leaks	21.2	158	679					
Coke Ovens: Pushing, Quenching & Battery Stacks	30.1	517						
Commercial Coal Combustion	36.0	172.7	2744.0		a			
Commercial Natural Gas Combustion		0.030	1,921					
Commercial Oil Combustion	0.032	53.300	1315.000		a			
Commercial Wood/Wood Residue Combustion	1.01	35.8	1,946					
Crematories	1.42E-08	8.33E-06			4.10E-04			
Dental Preparation and Use					0.80			
Drum and Barrel Reclamation	1.27E-06	8.19E-05		2.51E-07				
Electrical Apparatus Manufacturing					0.46			
Ferroalloy Manufacture	0.26	0.56						
Fluorescent Lamp Recycling					0.006			
Gasoline Distribution (Aviation)								0.375
Gasoline Distribution (Stage I)		353						0.086
Gasoline Distribution (Stage II)		374						0.019
General Laboratory Activities					0.80			
Geothermal Power					1.30			
Hazardous Waste Incineration	0.020	0.17		3.30E-05	3.19	0.0278		
Industrial Coal Combustion	3.09	157.00	2412.00		22.80			
Industrial Natural Gas Combustion		0.020	928					
Industrial Oil Combustion	0.03	50.85	494.00		6.00	4.97E-05		
Industrial Stationary IC Engines - Diesel	0.089	5.02	1,929					
Industrial Stationary IC Engines - Natural Gas	1.03	47.6						
Industrial Waste Oil Combustion	1.34	7.82						
Industrial Wood/Wood Residue Combustion	2.67	152	97,848	1.13E-04				
Instrument Manufacturing					0.50			
Iron and Steel Foundries	0.11	29.7		1.90E-05				
Lamp Breakage					1.50			
Landfill (Gas) Flares	0.001	0.45						
Lightweight Aggregate Kilns (burning hazardous waste)				3.60E-06	0.31			
Lime Manufacturing					0.70			
Medical Waste Incineration		0.80	15	0.0007	50.0	0.0403		
Municipal Waste Combustion		0.099	182	0.0037	55.0	0.0801		

Table 1. Summary of 1990 Emission Inventory Data for Section 112(c)(6) Pollutants (tons/yr) (continued)

SOURCE CATEGORY	POM			EOM	2,3,7,8-TCDD TEQ	Mercury	PCB	HCB	Alkylated Lead
	7-PAH	16-PAH							
Naphthalene - Miscellaneous Uses		1.22							
Naphthalene Production		64.60							
Naphthalene Sulfonates Production		6.53							
Non-Residential Wood Combustion						0.30			
Non-Road Vehicles and Equipment (NRVE) - Aircraft	0.070	1.87							
NRVE - Other				25,116					0.166
On-Road Vehicles	18.8	46.6		56,157	9.50E-05				
Open Burning of Scrap Tires	307	1,720							
Other Biological Incineration			1		1.60E-04		0.0025		
Pesticides Application								0.146	
Pesticides Manufacture								0.458	
Petroleum Refining-Catalytic Cracking Units	16.4	313							
Phthalic Anhydride Production		26.2							
Portland Cement Manufacture: Hazardous Waste Kilns	4.61	28.0			0.0005	3.5			
Portland Cement Manufacture: Non-Hazardous Waste Kilns	2.78	51.0			6.00E-05	5.00			
Primary Aluminum Production	141	662		3,876					
Primary Copper Production						1.90			
Primary Lead Smelting						1.30			
Pulp and Paper - Kraft Recovery Furnaces	3.74	649			3.42E-07				
Pulp and Paper - Lime Kilns	0.25	183							
Pulp and Paper - Sulfite Recovery Furnaces		6.17							
Residential Coal Combustion	31.85	102.80			2.34E-04	0.60			
Residential Natural Gas Combustion	0.080	5.10		4,142					
Residential Oil Combustion	1.700	21.00		1,465	3.78E-06	3.00			
Residential Wood Combustion	572	8,855		235,881	3.40E-05				
Scrap or Waste Tire Incineration	2.17E-05	0.005			3.00E-07		0.0010		
Secondary Aluminum Smelting					1.92E-04				
Secondary Copper Smelting					6.80E-06				
Secondary Lead Smelting	0.019	3.03			4.25E-06				
Secondary Mercury Production						7.40			
Sewage Sludge Incineration	0.009	1.64			2.65E-05	1.80	0.0051		
Stationary Gas Turbines - Diesel		0.016		1,731					
Stationary Turbines - Natural Gas		13.8		739					
Utility Coal Combustion	0.21	7.54		38,627	1.50E-04	51.0			
Utility Natural Gas Combustion		0.69		1,004		0.002			
Utility Oil Combustion	0.050	0.57		531	1.10E-05	0.25	0.0001		
Wildfires and Prescribed Burning	964	2,540			9.50E-05				
Wood Treatment/Wood Preserving		457			3.81E-05				
<b>TOTAL EMISSIONS (tons/yr)</b>	<b>2164.30</b>	<b>17982.08</b>		<b>481683.00</b>	<b>0.01</b>	<b>226.09</b>	<b>0.16</b>	<b>1.19</b>	<b>0.65</b>

a In the draft mercury report to Congress, mercury estimates for commercial and industrial coal combustion, and commercial and industrial oil combustion were combined-these values are provided in this table as industrial coal and oil combustion.

Table 2 . 1990 Anthropogenic Stationary Source Category Percentage Contributions and Associated Regulations<sup>a</sup>

SOURCE CATEGORY	POM			2,3,7,8-TCDD TEQ	Mercury	PCB	HCB	Alkylated Lead	Applicable Regulation <sup>b</sup>
	7-PAH	16-PAH	EOM						
	Percent Contribution								
SOURCE CATEGORIES SUBJECT TO REGULATION									
Asphalt Hot-Mix Production	0.020	0.68							Sec. (d)(2)
Asphalt Roofing Production	0.290	0.68							Sec. (d)(2)
Carbon Black Production	0.078	0.07		0.11					Sec. (d)(2)
Chloralkali Production {Subject to Regulation is 50 % of the total value}				1.44					Sec. (d)(2)
Chlorinated Solvents Production							55.92		Sec. (d)(2)
Coke Ovens: Charging, etc	3.682	2.47	0.43						Sec. (d)(2)
Coke Ovens: Pushing, etc	5.228	8.06							Sec. (d)(2)
Ferroalloy Manufacturing {Subject to Regulation is 11 % of the total value}	< 0.01	< 0.01							Sec. (d)(2)
Gasoline Distribution (Stage I) {Subject to Regulation is 10% of total value}		0.55						1.80 <sup>c</sup>	Sec. (d)(2)
Hazardous Waste Incineration	< 0.01	< 0.01		0.59	1.44	17.70			Sec. (d)(2)
Iron & Steel Foundries	0.020	0.46		0.34					Sec. (d)(2)
Landfill (Gas) Flares	< 0.01	0.01							Sec. (d)(2)
Lightweight Aggregate Kilns (burning hazardous waste)				0.06	0.14				Sec. (d)(2)
Lime Manufacturing					0.31				Sec. (d)(2)
Naphthalene Production		1.01							Sec. (d)(2)
Naphthalene Sulfonates Production		0.10							Sec. (d)(2)
Naphthalene: Miscellaneous Uses		0.02							Sec. (d)(2)
Pesticides Manufacturing						44.08			Sec. (d)(2)
Petroleum Refining - Catalytic Cracking	2.850	4.88							Sec. (d)(2)
Phthalic Anhydride Production		0.41							Sec. (d)(2)
Portland Cement Manufacturing: Hazardous Waste Kilns	0.800	0.44		8.49	1.57				Sec. (d)(2)
Portland Cement Manufacturing: Non-hazardous Waste Kilns	0.480	0.80		1.07	2.25				Sec. (d)(2)
Primary Aluminum Production	24.490	10.33	2.44						Sec. (d)(2)
Primary Copper Production					0.85				Sec. (d)(2)
Primary Lead Smelting					0.58				Sec. (d)(2)
Pulp & Paper: Kraft Recovery Furnaces	0.650	10.13		0.01					Sec. (d)(2)
Pulp & Paper: Lime Kilns	0.040	2.86							Sec. (d)(2)
Pulp & Paper: Sulfite Recovery Furnace		0.10							Sec. (d)(2)
Secondary Aluminum Smelting				3.42					Sec. (d)(2)
Secondary Lead Smelting	< 0.01	0.05		0.08					Sec. (d)(2)
Sewage Sludge Incineration	< 0.01	0.03		0.47	0.81	3.26			Sec. (d)(2)
Utility Coal Combustion	0.040	0.12	24.31	2.68	22.96				Sec. (d)(2)
Utility Natural Gas Combustion		0.01	0.63		<0.01				Sec 112(m)(1)
Utility Oil Combustion	0.010	0.01	0.33	0.20	0.11	0.10			Sec 112(m)(1)
Medical Waste Incineration		0.01	0.01	11.78	22.47	25.66			Sec 129
Municipal Waste Combustion		<0.01	0.11	65.14	24.72	50.99			Sec 129
Commercial Coal Combustion	6.252	2.69	1.73		d				ICCR
Commercial Natural Gas Combustion		< 0.01	1.21						ICCR
Commercial Oil Combustion	0.010	0.83	0.83		d				ICCR
Commercial Wood/Wood Residue Combustion	0.180	0.56	1.22						ICCR
Crematories	< 0.01	< 0.01			< 0.01				ICCR
Industrial Coal Combustion	0.540	2.45	1.52		10.25				ICCR

Table 2. 1990 Anthropogenic Stationary Source Category Percentage Contributions and Associated Regulations<sup>aa</sup> (Continued)

SOURCE CATEGORY	POM		2,3,7,8-TCDD TEQ	Mercury	PCB	HCB	Alkylated Lead	Applicable Regulation <sup>b</sup>
	7-PAH	16-PAH						
SOURCE CATEGORIES SUBJECT TO REGULATION								
Industrial Natural Gas Combustion		< 0.01	0.58					ICCR
Industrial Oil Combustion	0.010	0.79	0.31	2.70	0.03			ICCR
Industrial Stationary IC Engines - Diesel	0.020	0.08	1.21					ICCR
Industrial Stationary IC Engines - Natural Gas	0.180	0.74						ICCR
Industrial Waste Oil Combustion	0.230	0.12						ICCR
Industrial Wood/Wood Residue Combustion	0.460	2.37	61.57	2.01				ICCR
Non-residential Wood Combustion				0.13				ICCR
Other Biological Incineration			< 0.01	2.86	1.58			ICCR
Scrap or Waste Tire Incineration	< 0.01	< 0.01	0.01	0.01	0.67			ICCR
Stationary Turbines - Diesel		< 0.01	1.09					ICCR
Stationary Turbines - Natural Gas		0.22	0.47					ICCR
Gasoline Distribution (Stage II)		5.83					3.99 <sup>c</sup>	ICCR
Total % Contribution for Sources Subject to Regulation								
	46.550	60.95	100.00	99.19	100.00	100.00	100.00	Sec. 202/182
SOURCE CATEGORIES IN DRAFT LISTING								
Gasoline Distribution (Aviation)							78.02	
Open Burning of Scrap Tires	53.320	26.83						
Wood Treatment/Wood Preserving		7.13		0.68				
Cumulative % Contribution Total								
	99.870	94.92	100.00	99.87	100.00	100.00	83.81	
OTHER SOURCE CATEGORIES THAT ARE CANDIDATES FOR LISTING								
Battery Production				0.01				
Carbamate Insecticides Production		0.06						
Carbon Reactivation Furnaces				< 0.01				
Chloralkali Production {Not Subject to Regulation is 50 % of the total value}				1.44				
Cigarette Smoke	0.090	0.05						
Dental Preparation and Use				0.36				
Drum and Barrel Reclamation	< 0.01	< 0.01		< 0.01				
Electrical Apparatus Manufacturing				0.21				
Ferroalloy Manufacturing {Not Subject to Regulation is 89 % of the total value}	0.040	0.01						
Fluorescent Lamp Recycling				< 0.01				
Gasoline Distribution (Stage I) {Not Subject to Regulation is 90% of total value}		4.96					16.19 <sup>c</sup>	
General Laboratory Activities				0.36				
Geothermal Power				0.59				
Instrument Manufacturing				0.23				
Lamp Breakage				0.68				



Table 2. 1990 Anthropogenic Stationary Source Category Percentage Contributions and Associated Regulations<sup>aa</sup> (Continued)

SOURCE CATEGORY	POM		Mercury	PCB	HCB	Alkylated Lead	Applicable Regulation <sup>b</sup>
	7-PAH	16-PAH					
SOURCE CATEGORIES SUBJECT TO REGULATION							
Secondary Copper Smelting							
Secondary Mercury Production			3.33				
Percent Contribution							
			0.12				

a Source categories do not include non-stationary, non-anthropogenic sources or sources not appropriate for section 112(d)(2) Rulemaking.  
 b Sec. 112(d)(2) = Emission Standards; Sec. 122(h)(1) = Electric Utility Steam Generating Units; Sec. 129 = Solid Waste Combustion; ICCR = Industrial Combustion Coordinated Rulemaking, Section 202/182 Gasoline Distribution (Stage II).  
 c Lead phaseout completed on December 31, 1995. Contributions from these sources are currently 0% which means that emissions from Gasoline Distribution (Aviation) represent 100% of total Alkylated Lead emissions.  
 d In the draft mercury report to Congress, mercury estimates for commercial and industrial coal combustion, and commercial and industrial oil combustion were combined-these values are provided in this table as industrial coal and oil combustion.

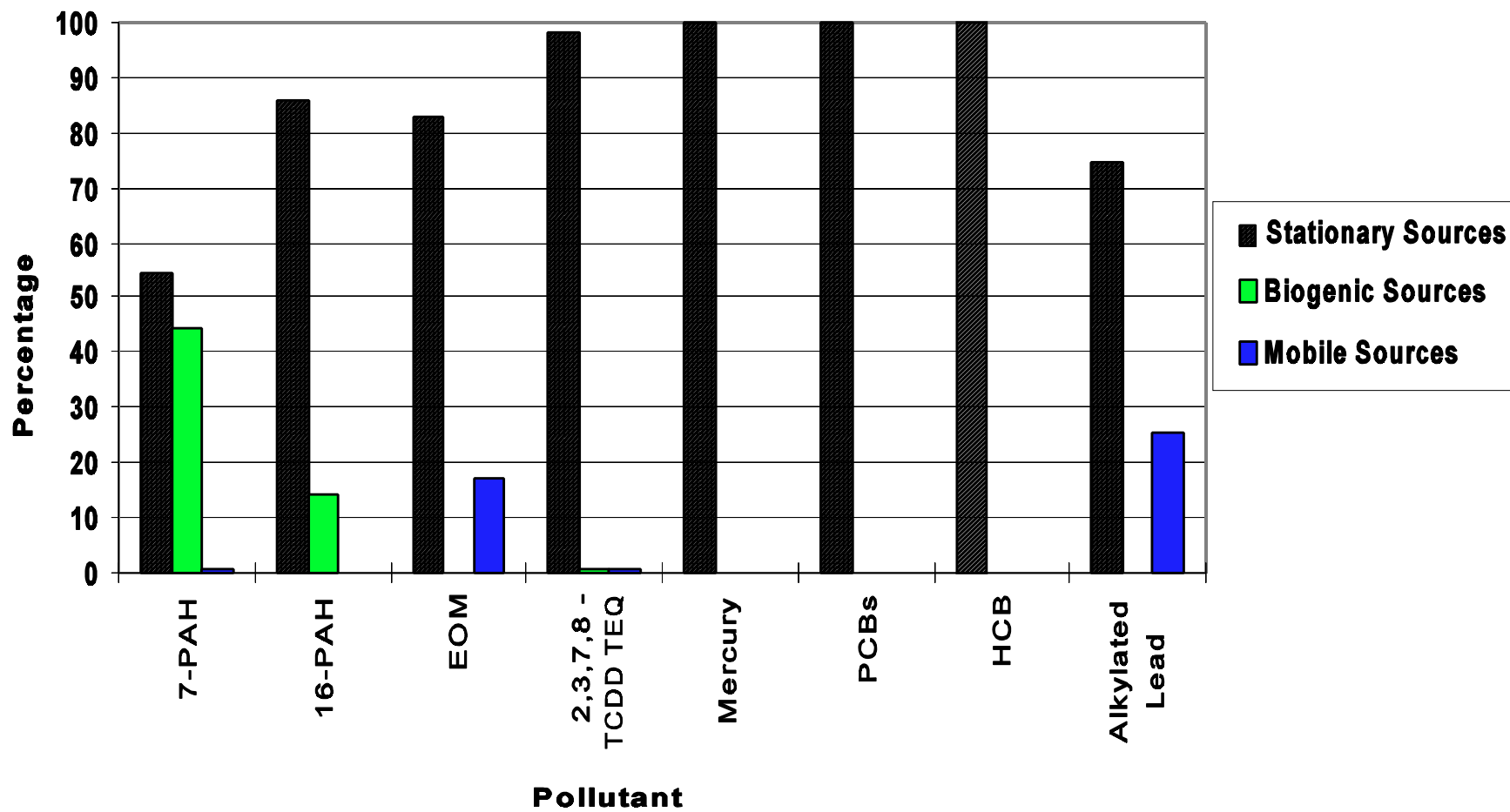


Figure 1. Percent Contributions by Source Categories