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Air Toxics: What Progress Has EPA Made in Regulating Hazardous Air Pollutants?

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Abstract. The 1990 Amendments completely rewrote Section 112 of the Clean Air Act and established four different programs for the regulation of hazardous air pollutants (HAPs): maximum achievable control technology, residual risk, urban air toxics, and mobile source air toxics. This report describes these programs, including the current status of each program and what significant issues still remain in their implementation. While EPA has made progress in regulating HAPs, many of the deadlines set by the 1990 Amendments have not been met. Each of the four air toxics programs are behind the schedule envisioned by Congress, and appear likely to remain so for reasons outlined in this report.

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Summary

The Clean Air Act Amendments of 1990 contained four programs to ensure that the Environmental Protection Agency (EPA) would regulate hazardous air pollutants (HAPs) more quickly than the Agency had under the original act. The first program directed EPA to establish emission standards for stationary sources of HAPs based on maximum achievable control technology (MACT). The second program, known as the residual risk program, required EPA to examine the risk remaining from these sources after implementation of MACT standards. If warranted, EPA must promulgate additional standards to protect public health or the environment. Third, Congress instructed EPA to regulate HAPs that are a particular problem for urban areas. Fourth, Congress directed EPA to evaluate mobile sources, such as cars, to determine their HAP emissions and to regulate these sources.

EPA has made progress in regulating HAPs under some of these programs, particularly in comparison to its pre-1990 record (when only 7 HAPs were regulated over a 20-year period). But the pace of regulation has fallen behind that envisioned in the 1990 Amendments. Under the MACT program, for example, the Agency originally named 174 source categories subject to regulation for their HAP emissions. In the statute, Congress specified that MACT standards for all of these categories were to be promulgated by November 15, 2000. By May 15, 2002, EPA still had not promulgated final standards for 56 source categories (a little less than one-third of those to be regulated), covering a combined total of 84,000 major emitting sources.

Under the 1990 amendments, if EPA has not promulgated standards by 18 months after the deadline, states and industries must develop MACT standards themselves. Rather than allow this “hammer” to strike, however, EPA issued a rule in April 2002 that will give these sources until May 15, 2004 to develop MACT standards. The Sierra Club has filed suit challenging the deadline extension.

The residual risk program, intended to examine whether risk remains after MACT standards are implemented, is also behind schedule. The first residual risk standards, for coke ovens, were due in 2001; 12 other categories are to be reviewed before the end of 2002. While EPA has developed a methodology for determining residual risk, the methodology and the availability of the data for conducting the analyses have been questioned by the Agency’s Science Advisory Board. It is unlikely that EPA will meet deadlines for residual risk standards.

Both the urban air toxics and mobile source air toxics programs have also been delayed. Questions have been raised regarding the adequacy of the mobile source air toxics standards; most standards for urban air toxics have yet to be promulgated.

Issues for Congress include the adequacy of Agency resources for the HAPs programs; the feasibility of the residual risk program, given inadequacies of the available data and concerns over the risk assessment methodology; and whether the Agency is complying with congressional intent in key areas of the HAPs programs. This report will be updated as events warrant.

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This report was prepared under the research supervision of James E. McCarthy, Specialist in Environmental Policy.

Air Toxics: What Progress Has EPA Made in Regulating Hazardous Air Pollutants?

Hazardous air pollutants (HAPs), or air toxics, are pollutants that are either known or suspected to cause cancer or other adverse health effects, such as damage to reproductive functions or birth defects. Polychlorinated biphenyls (PCBs), arsenic compounds, formaldehyde, asbestos, methanol, and chlorine are just some of the chemicals and chemical compounds that are considered air toxics. HAPs come from both mobile and stationary sources.

Under the original Clean Air Act (CAA), EPA was directed to take a risk-based approach to regulating HAPs. Congress, dissatisfied with the fact that only 7 HAPs were regulated from 1970 to 1990 using the risk-based approach, amended the CAA in 1990 to direct EPA to use a technology-based approach to reduce HAP emissions. A separate risk based program was also contained in these amendments. Rather than have EPA determine what air toxics should be regulated, as was done under the original CAA, Congress included a specific list of 188 air toxics in the Amendments.[1] Some of the air toxics on this list are included in Table 2 at the end of this report, along with the main sources that produce them.

The 1990 Amendments completely rewrote Section 112 of the Clean Air Act and established four different programs for the regulation of HAPs: maximum achievable control technology, residual risk, urban air toxics, and mobile source air toxics. This report describes these programs, including the current status of each program and what significant issues still remain in their implementation. While EPA has made progress in regulating HAPs, many of the deadlines set by the 1990 Amendments have not been met. Each of the four air toxics programs are behind the schedule envisioned by Congress, and appear likely to remain so for reasons outlined below.

Maximum Achievable Control Technology Standards

Section 112 of the CAA (42 U.S.C. 7412), is the main section regulating HAPs. One method of regulation is known as maximum achievable control technology (MACT). The purpose of MACT standards is to achieve "the maximum degree of reduction in emissions of [HAPs]" (42 U.S.C. 7412(d)(2)). There are a number of provisions relating to MACT. First, EPA was directed to determine major sources of the 188 HAPs listed in §112(b) by November 15, 1991. EPA published the source list in the Federal Register on July 16, 1992; it included 174 source categories (57 FR

[1]The amendments originally specified 190 pollutants. One, hydrogen sulfide, appeared on the list due to a clerical error and was removed in 1991 by Pub. Law 102-187. A second, caprolactum, was removed by EPA in 1996 using its authority under Section 112(b)(3).

31576). Second, the CAA Amendments directed EPA to develop a schedule of promulgation dates for source category standards by November 15, 1992. EPA published the schedule December 3, 1993 (58 FR 63941). Section 112(e) of the Clean Air Act partially determined EPA's schedule by requiring promulgation of emissions standards for:

- 40 categories by November 15, 1992
- 25% of categories by November 15, 1994
- An additional 25% of categories by November 15, 1997
- All categories by November 15, 2000.

Based on EPA's original listing of 174 source categories, the mandated percentage targets listed above require standards for:

- 40 source categories within 2 years of the enactment of the 1990 Amendments
- A total of 44 source categories within 4 years (an additional 4)
- An additional 43 source categories within 7 years
- All 174 within 10 years (an additional 77).

Aside from these specific deadlines, EPA had discretion in prioritizing promulgation of standards based on: adverse effects on public health and the environment, the quantity and location of HAPs emissions, and the efficiency of grouping source categories based on pollutants rather than based on processes.

The standard to which sources will be held, the MACT standard, is codified in Section 112(d)(2) as

> the maximum degree of reduction in emissions ... (including a prohibition on such emissions, where achievable) that the Administrator, taking into consideration the cost of achieving such emission reduction, and any non-air[-]quality health and environmental impacts and energy requirements, determines is achievable for new or existing sources.

The law requires that standards for new sources be no less stringent than the emissions control achieved in practice by the best-controlled similar source. Existing sources may have a less stringent standard than new sources, but not less stringent than either the average control achieved by the best-performing 12% of existing sources, or the average control achieved by the best-performing 5 sources, if there are fewer than 30 sources of the HAP. These minimum standards for new and existing sources are known as "MACT floors."

Section 112 distinguishes between major sources and area sources. A major source is a stationary source that emits, or has the potential to emit, 10 tons or more per year of any single HAP or 25 tons or more per year of any combination of HAPs. An area source is a stationary source that emits less than these threshold amounts. Although area sources do not emit as much pollution as major sources, area sources may create local pollution problems, particularly in densely populated urban areas. In regulating area sources, the Administrator of the EPA may decide to base emission standards on "generally achievable control technology,"or GACT, rather than MACT.

Congress also provided an assurance that air pollutants would be regulated even if EPA failed to promulgate standards for source categories on time. This is known as the "MACT hammer." Section 112(j) states that if EPA has not promulgated standards by 18 months after the deadline, then owners and operators will be forced to apply to states for permits, and states will have to create regulations for the remaining unregulated source categories. The last hammer date was May 15, 2002, for MACT standards that were due November 15, 2000.

Current Status. EPA missed the May 15 deadline for 56 source categories. Final rules for 10 source categories were promulgated as of July 22, 2002, meaning 46 source categories remain with no final MACT standards. However, some of these source categories are the subject of proposed MACT standards, which might be of assistance to states and industries should they be required to develop MACT standards themselves.

Table 1 shows the evolution of EPA's MACT schedule. The first row gives the number of additional source categories due at each statutory deadline, based on the percentage targets given in the 1990 Amendments. For instance, the standards for 4 source categories due by November 15, 1994 are in addition to the standards for 40 source categories EPA had to complete by November 15, 1992. EPA's original schedule was published December 3, 1993. The numbers in the second row are based on this schedule. EPA has updated its schedule several times since then; the numbers in the third row reflect EPA's February 2002 schedule.

EPA refers to source categories as being in "bins;" source categories with standards due November 14, 1992 are the "2-year bin" and source categories with standards due November 15, 1994 are the "4-year bin." The numbers in the last row reflect how many source categories in each of the bins have final standards. For instance, of the 6 source categories in the 2-year bin, EPA has promulgated MACT standards for all of them; thus, EPA is finished with the 2-year bin. EPA is also finished promulgating standards for source categories in the 4-year and 7-year bins. It should be noted that the numbers in the last row do not reflect how many source categories had standards promulgated by the deadlines. Rather, the numbers reflect how many source categories scheduled for that deadline have been finalized. A number of the standards in the 2-year, 4-year, and 7-year bins were promulgated after their respective deadlines had passed.

The "Total" column of Table 1 reflects the total number of source categories EPA has listed. Of the 196 source categories EPA had identified by July 2002, EPA is finished with 150 of them – 87 source categories have final standards and 63 source categories have been delisted (indicating EPA has decided not to promulgate a standard for that category) or subsumed (incorporated into a broader category for which a MACT standard has been promulgated). Thus, 46 source categories remain with no final MACT standards. All of these source categories are in the 10-year bin.

Table 1. MACT Source Category Final Rules: Schedule Requirements and Actual Promulgations as of July 22, 2002

Statutory Deadlines	11/15/1992	11/15/1994	11/15/1997	11/15/2000	TOTAL
Statutorily Mandated[a]	40	4	43	87	174
EPA's Original Schedule[b]	6	39[c]	42[d]	87	174
EPA's Most Recent Schedule[e]	6	39	48	103[f]	196[g]
Actual Promulgations[h]	6 final	38 final 1 delisted	25 final 23 delisted or subsumed	18 final 39 delisted or subsumed 27 proposed 19 no action	87 final 63 delisted or subsumed 27 proposed 19 no action

[a] These numbers were determined using the CAA Amendments promulgation schedule and the EPA's original 174 source categories. 57 Fed. Reg. 31576.

[b] These numbers are based on EPA's original schedule, published December 3, 1993. 58 Fed. Reg. 63941.

[c] This number includes the source category "Coke Ovens: Charging, Topside, and Door Leaks" that had a statutorily mandated promulgation of December 31, 1992.

[d] This number includes the source category "Publicly Owned Treatment Works" that had a statutorily mandated promulgation date of November 15, 1995.

[e] These numbers are based on EPA's most recent schedule, published February 12, 2002. 67 Fed. Reg. 6521.

[f] This number includes two source categories (wet-formed fiberglass mat production and coal- and oil-fired electric utility steam generating units) that were listed late enough to be subject to Section 112(c)(5). This section gives EPA two years to develop MACT standards for source categories listed after November 15, 1998. These source categories were not technically due November 15, 2000.

[g] EPA has added, delisted, and subsumed a number of source categories since the publication of the original source category list in 1992. Of the original 174 source categories listed, 17 have been delisted, 46 have been subsumed into other categories, and 22 have been added, giving a total of 133 source categories requiring standards as of July 22, 2002.

[h] The numbers in this row reflect how many source categories scheduled to be promulgated by the corresponding deadline have been finalized. The numbers do not reflect how many standards EPA had promulgated by the deadline.

Source: Congressional Research Service, using Federal Register notices and rules and information available on EPA's Air Toxics Website: http://www.epa.gov/ttn/atw/eparules.html (July 22, 2002).

Under the Clean Air Act, owners and operators of facilities for which MACT standards were not finalized were to submit complete permit applications by May 15, 2002. But, on April 5, 2002, EPA promulgated a final rule to ease the requirements for these sources, allowing them an additional two years to submit most of the information required in a permit application.

State permit applications (or Title V permits) are submitted in two parts. Part 1 contains basic information about the facility, while Part 2 is much more detailed and requires identification of MACT, the MACT floor, and other information. At a minimum, EPA noted that Part 1 would have to be submitted by the hammer date to comply with the statute. Therefore, every facility that could reasonably be expected to be subject to MACT standards had to submit a Part 1 application by May 15, 2002. However, EPA extended the deadline to submit Part 2 of the application to May 15, 2004. EPA anticipates promulgating all MACT rules by this later date. Increasing the time to submit the Part 2 application ensures that the estimated 84,000 facilities that were subject to the MACT hammer provisions will not needlessly expend resources determining case-by-case MACT standards.

The Sierra Club filed suit against the EPA challenging the April 5 rule extending the deadline. In the Sierra Club's view, EPA's action was clearly illegal under the CAA. As of July 2002, this case was in settlement negotiations.[2] According to EPA's Office of Air Quality Planning and Standards, a settlement with the Sierra Club may include decreasing the amount of time for permit submission from two years to 18 months or even one year.[3]

Another recent controversial MACT matter involves a new source category. In December 2000, EPA added coal- and oil-fired electric utility steam generating units to its list of source categories. Under Section 112(n)(1)(A), Congress directed EPA to study HAP emissions from these sources and regulate them if appropriate and necessary.[4] Congress also directed EPA to study mercury emissions from these sources.[5] In the 2000 notice, EPA remarked that it did not find regulation of HAP emissions for natural-gas-fired electric utility steam generating units to be necessary. However, coal- and oil-fired units would be subject to MACT standards for mercury emissions. Two utility groups filed suit shortly after the ruling to challenge EPA's listing of the source category.[6] Although the case was dismissed, this rulemaking, a proposal for which is expected in 2003, may be one of the most controversial MACT standards that EPA will issue because some utilities do not believe they should be subject to MACT for mercury emissions and are likely to file lawsuits once EPA issues a MACT standard.

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[2]*Sierra Club v. EPA*, No. 02-1135 (D.C. Cir. filed April 25, 2002).

[3]Steve Cook, "Settlement Talks Could Make 80,000 Sources Subject to 'MACT Hammer,' EPA Official Says," Daily Environment Report (28 Jun. 2002): A-1.

[4]EPA, *Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units – Final Report to Congress*. February 1998. EPA-453/R-98-004.

[5]EPA, *Mercury Study Report to Congress*. December 1997. EPA-452/R-97-003. http://www.epa.gov/ttn/atw/112nmerc/mercury.html (June 28, 2002).

[6]*Utility Air Regulatory Group v. EPA*, No. 01-1074 (D.C. Cir. filed February 16, 2001).

Remaining Issues. Lawyers in the Sierra Club case have expressed concern that EPA will not be able to promulgate all MACT standards by 2004. If that is the case, the amount of money the states would have to spend to determine site-specific standards could be significant. EPA estimated in its April 5 rule that the cost to affected facilities to file Part 1 of the permit would be $9,000,000 (67 FR 16593). Businesses, on the other hand, have estimated that the costs to determine case-by-case MACT (Part 2 of the permit application) could be between $10,000 and $50,000 per affected facility. With EPA's estimate of 84,000 facilities that are subject to the MACT hammer, the costs could run from $840 million to $4.2 billion to determine case-by-case standards.

By contrast, EPA spent only $17 million annually in FY2001 and 2002 on the MACT program. The Agency's request for 2003 calls for a cut in program spending, to $12 million. EPA's position is that spending can be cut because the regulation development program is winding down.[7] It is the case that standards remain to be issued for less than half of EPA's identified source categories. However, delays continue in the program and the outcome of the MACT hammer extension is still unclear. EPA may not need as large a budget because proposed standards for many of the remaining source categories have already been developed. However, the decreased budget request may also reflect a sense that some of the burden for developing MACT standards may now fall to states and industries.

The Residual Risk Program

A second program of the 1990 CAA Amendments is known as the residual risk program. This program, found in Section 112(f) consists of two parts: a report to Congress and the development of additional HAP emissions standards. The report to Congress, due November 15, 1996 was required to include a number of items:

- available methods of reducing residual risk and their costs
- public health significance of residual risk
- actual health effects to people living near emissions sources
- risks from background concentrations of HAPs
- negative health or environmental effects created by reducing residual risk
- available epidemiological and other health studies
- methods of calculating residual risk
- uncertainties in the risk assessment methodology
- recommendations regarding legislation on residual risk.

EPA issued its *Residual Risk Report to Congress* in March 1999.[8] Because EPA had not issued any residual risk standards at the time of the report, many of the mandated items were answered generally rather than specifically. EPA did not provide concrete information for any of the first six items listed above. For instance,

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[7]Personal Communication, Tom Coda, U.S. EPA Office of Air Quality Planning and Standards, July 2, 2002.

[8]EPA, *Residual Risk Report to Congress*. March 1999. EPA-453/R-99-001. http://www.epa.gov/ttn/oarpg/t3/reports/risk_rep.pdf (June 11, 2002).

EPA addressed broad methods of reducing residual risk, but did not address any specific technological or commercially available methods to reduce risks.

In the report, EPA did broadly outline its residual risk framework. This framework is based on methodology developed by the National Research Council of the National Academy of Sciences and the Commission on Risk Assessment and Risk Management.[9] EPA noted that uncertainties associated with this framework fall into four categories: uncertainties surrounding exposure, uncertainty in models, uncertainties in input values, and inherent data variance. The Agency identified some questions that can be asked to reduce the uncertainty associated with residual risk calculation. EPA elected not to make any recommendations regarding legislation on residual risk, as the Agency felt the current legislation gave it sufficient authority and flexibility. Finally, EPA noted in the report that it plans to set priorities for assessing residual risk based on "achieving the largest, most cost-effective risk reductions first," while still respecting statutory deadlines based on MACT promulgation.[10]

The second part of the residual risk program is the promulgation of additional standards. Congress, in Section 112(f)(2), directed EPA to develop more stringent standards for the source categories identified under the MACT program if they would be necessary to "provide an ample margin of safety to protect public health" or to prevent adverse environmental impacts. When assessing whether adverse environmental impacts should be prevented, EPA is to take into account costs, energy, safety and other relevant factors. If MACT standards have not reduced the lifetime cancer risk of the most exposed person to one in one million, then EPA should promulgate additional standards.

Residual risk standards are to be promulgated within 8 years (9 years for MACT standards due November 15, 1992) after the promulgation of MACT standards. The standards become effective immediately upon promulgation. However, existing sources have up to 90 days to meet the standards and can apply for a waiver of up to 2 years. Section 112(f)(5) exempts EPA from assessing residual risks of area sources subject to generally achievable control technology (GACT) standards. However, EPA has interpreted the legislation to mean that residual risk must still be assessed for area sources subject to MACT standards.[11]

Current Status. The first MACT standards were promulgated September 22, 1993. Because these standards were due November 15, 1992, EPA has 9 years to issue the standards. Thus, the latest date to promulgate residual risk standards for the first group of sources is September 22, 2002. EPA promulgated standards for coke ovens on November 27, 1993. Because these standards had a statutorily mandated promulgation date of December 31, 1992, only 8 years are allowed for residual risk standard setting. Thus, under this schedule, EPA was slated to issue a residual risk

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[9]The Commission on Risk Assessment and Risk Management was a temporary body established by Section 303 of the 1990 CAA Amendments. This commission consisted of 10 appointees and was to evaluate several aspects of risk assessment, as well as the results of the National Academy of Sciences report.

[10]EPA, *Residual Risk Report to Congress*, p. 113.

[11]EPA, *Residual Risk Report to Congress*, p. 106.

assessment for coke ovens by November 27, 2001. However, EPA has not yet issued residual risk standards for any source categories.

EPA did release a draft residual risk case study of secondary lead smelters in 2000 for review by its Science Advisory Board. The Science Advisory Board (SAB) is an advisory body of independent experts who provide scientific advice and review to the Agency and relevant Congressional committees. Although the SAB stated that EPA's document used assumptions consistent with current practice and consistent with the Report to Congress methodology, the SAB also expressed concerns about missing elements and data.

Remaining Issues. Not long after its review of the draft residual risk case study on secondary lead smelters, the SAB commented unfavorably on EPA's ability to carry out residual risk assessment in a "credible manner."[12] The SAB's concern stems from the dearth of scientific and monitoring information available regarding HAPs emissions. The SAB is not certain that "scientific analysis will be able to generate the type of information envisioned in the [Clean Air Act Amendments]."[13] This comment on the residual risk program and the SAB's request in the comment that Congress review the mandates of the CAA Amendments led to a Senate Environment and Public Works Committee hearing on October 3, 2000 that was partially intended to examine issues with residual risk.

In their testimony, a witness from Sciences International, Inc., a witness from the SAB, and a witness representing the American Chemistry Council (ACC) addressed the lack of resources available to EPA to complete residual risk assessments.[14] The SAB witness and the ACC witness questioned the viability of the models used by EPA on account of a lack of peer review. The ACC witness and the Sciences International witness noted that EPA's risk information database contains outdated information. The witness from the ACC indicated concern about the inability of EPA to make residual risk determinations by the statutory deadlines. The witness from the SAB and the witness from Sciences International criticized EPA for using overly conservative estimates in its assessments. The Sciences International witness noted that such estimates could result in a significant number of overestimated risks. The witness representing the ACC also criticized the residual risk program because of the mandate that industry comply with residual risk standards within 90 days of their promulgation. This witness noted that meeting this timetable may be impossible for many industries.

However, a witness from the National Wildlife Federation noted the importance of the residual risk program. Positive comments from this witness about the residual risk program included its ability to be comprehensive in its approach, to address harm from persistent bioaccumulative toxics, and to incorporate cumulative risk. EPA also

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[12]SAB, *Executive Committee Commentary on Residual Risk Program*, EPA-SAB-EC-COM-00-005, p. 2. http://www.epa.gov/sab/eccm005.pdf (June 11, 2002).

[13]SAB, *Executive Committee Commentary*, p. 2.

[14]Since this hearing, appropriations for the residual risk program have more than tripled, but they are still only $5.2 million in FY2002.

defended its residual risk approach, stating that its residual risk estimates are plausible because they reflect the suggestions of the scientific community. Further, EPA stated that it does not use conservative assumptions for all the parameters that go into a residual risk assessment. In fact, EPA noted that "where we lack adequate information to support a quantitative assessment for a pollutant, we implicitly assume that the risks from that pollutant are zero."[15]

In July 2001, EPA requested information from the public on improvements to the Integrated Risk Information System (IRIS). This database is the one that was criticized by certain witnesses at the Senate hearing for being outdated and inaccurate. EPA indicated it would use the information provided to set the IRIS 2002-2005 agenda, as well as determine the need for updating IRIS more frequently and for adding new chemicals to the database. A summary of this needs assessment is to be posted on EPA's IRIS webpage when completed. As of July 2002, this summary had not yet been posted.

It is unclear whether EPA's methodology will be successful in meeting the goals Congress envisioned in setting up the residual risk program. While this methodology has been reviewed by the scientific community and the SAB asserts that the Agency has made a "good faith start"[16] in using the methodology, it may be that the science and data available at this point in time are not adequate for such rigorous assessment. EPA has missed the deadline for coke oven residual risk standards; decisions on 12 other standards are due by the end of 2002. It is unlikely that any of these standards will be promulgated by that deadline.

The Urban Air Toxics Program

Under Section 112(k)(3) of the Clean Air Act, EPA is required to develop a strategy to address air toxics in urban areas. These air toxics are generally emitted from area sources. Area sources can be distinguished from major sources, as discussed in the MACT section. Area sources are defined as those sources emitting, or having the potential to emit, less than 10 tons of any single HAP or less than 25 tons of any combination of HAPs per year.

Congress ordered EPA to identify at least 30 air toxics emitted from area sources that represent the greatest threat to urban public health and to identify the sources of these air toxics. Area sources that represent 90% of emissions of each of the 30 air toxics must be subject to standards such as MACT or GACT (Section 112(k)(3)(B)(ii)). Congress also directed that this strategy "shall achieve a reduction in the incidence of cancer attributable to exposure to [HAPs] emitted by stationary sources of not less than 75 [percent]" (Section 112(k)(3)(C)). The strategy was to be submitted to Congress by November 15, 1995.

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[15]Robert Brenner, "Testimony of Robert Brenner, Deputy Assistant Administrator, Office of Air and Radiation, U.S. Environmental Protection Agency, Before the Committee on Environment and Public Works, United States Senate, October 3, 2000." Available at: http://www.senate.gov/~epw/bre_1003.htm (July 1, 2002).

[16]SAB, *Executive Committee Commentary*, p. 1.

EPA released the final Integrated Urban Air Toxics Strategy on July 19, 1999 (64 Fed. Reg. 38706-38740). This strategy identified 33 urban HAPs, with 30 of these having significant contributions from area sources. The HAPs and their main sources can be found in Table 2 at the end of this report. EPA identified 29 area source categories of the 33 urban HAPs. In releasing the strategy, the Agency also delineated its time line to implement the rest of the requirements under Section 112(k). By 2004, EPA expects to promulgate standards for the new area source categories it identified in the strategy (some area source categories were already regulated or were proposed for regulation under MACT standards or other authorities of the CAA). By 2006, EPA expects to promulgate additional standards to meet the statutory requirement that sources representing 90% of the emissions of each urban HAP be controlled. EPA expects to finish promulgating these standards in 2009. Because compliance is required by no later than 3 years from promulgation of the standard, EPA projects that all sources will be in compliance by 2012. However, under the original deadlines outlined in the CAA, all sources were scheduled to have been in compliance with the strategy by November 15, 1999.

Congress also directed EPA to establish a research program to study the health effects of HAPs (Section 112(k)(2)). EPA's nationwide program is known as the National-Scale Air Toxics Assessment (NATA). NATA gives an inventory of air toxics, their ambient concentrations, estimates of population exposures, and a characterization of the potential public health risk of these urban air toxics. EPA will use this information to develop baseline information, determine the progress made in meeting reduction goals, and prioritize the list of urban HAPs. In the future, NATA is expected to evaluate all 188 HAPs and diesel particulate matter.

Current Status. In May 2002, EPA finished releasing the first NATA data. The first set of NATA data is based on 1996 emissions data for the 33 urban HAPs. These data show that when risks from all urban air toxics are combined, 200 million people are estimated to have a potential cancer risk greater than ten in one million. For 20 million people, the potential cancer risk is estimated to be greater than 100 in one million. NATA found benzene, chromium, and formaldehyde to pose the greatest potential risk of cancer across the entire United States while arsenic, coke oven emissions, 1,3-butadiene and polycyclic organic matter pose the greatest potential risk of cancer regionally. Table 2, at the end of this report, identifies the main sources of these urban HAPs.

EPA also used NATA to assess the cancer risk from background sources of urban HAPs. EPA estimates that the entire population of the United States exceeds a cancer risk of ten in one million due to background concentrations of air toxics compounds. This assessment partially answers one question EPA left open in its 1999 *Residual Risk Report to Congress*.

EPA's Integrated Urban Air Toxics Strategy noted that the Agency would conduct a research program at the urban level. This urban research program takes a case study approach – studying a few cities that will serve as models for understanding urban HAPs risk. The first city selected as a pilot for this project is Cleveland, Ohio. The pilot project began in March 2001. The three goals for the project are to reduce air toxics in Cleveland, sustain efforts to reduce air toxics over time, and replicate the approach in other urban areas. The pilot project's initial

programs include a car pooling and public transportation campaign, low sulfur diesel fuel for bus transportation, and a toxics collection day.

Section 112(k)(5) also required EPA to provide reports to Congress in 1998 and 2002. In these reports, Congress directed EPA to include information on the actions taken to reduce public health risks from area source HAP emissions and to identify urban areas that have high risks to public health due to continuing emissions from area sources. EPA submitted its first urban air toxics report to Congress in 2000.[17] In this report, EPA did not identify the specific urban areas with continuing health risks. EPA did outline the steps it will take to reduce public health risks from HAPs based on the final Integrated Urban Air Toxics Strategy released in 1999. EPA also identified thirteen subject areas in need of further research in the 2000 report.

Remaining Issues. EPA has not yet regulated at least 13 of the area source categories identified in its 1999 Integrated Urban Air Toxics Strategy. Since issuing the strategy EPA has added 19 area source categories, bringing the total number of area source categories to 48.[18] Of these additional area source categories, 18 have yet to be regulated. EPA's schedule indicates that the area sources responsible for 90% of the emissions of each of the urban HAPs will not all be regulated until 2009. In addition, EPA still needs to identify the metropolitan areas with increased health risks due to continued emissions of HAPs. The recently released NATA data are most meaningful at the state or national level and therefore do not help EPA identify metropolitan areas with increased health risks.

The Mobile Source Air Toxics Program

Congress included in the CAA Amendments of 1990 a program to evaluate and regulate air toxics from mobile sources. Under Section 202(l) of the CAA, codified as 42 U.S.C. 7521, Congress directed EPA to complete a study on the need for and feasibility of controlling mobile source air toxics (MSATs). The focus for the study was to be on those MSATs posing the greatest risk to human health or that have significant uncertainty associated with their risks to health; in particular, benzene, formaldehyde and 1,3-butadiene were to be included in the study. The study was due May 15, 1992. EPA completed the study in 1993, and updated it in 1999.

Subsequent to the study, EPA was directed to promulgate rules containing "reasonable requirements" to control MSAT emissions. The regulations are to achieve the greatest degree of emission reduction through the application of available technology, taking into consideration costs, noise, energy, safety, lead time, and standards previously set under Section 202(a) (42 U.S.C. 7521(l)(2)). At a minimum, Congress charged EPA with promulgating rules applying to benzene and

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[17]EPA, *National Air Toxics Program: The Integrated Urban Strategy, Report to Congress*. July 2000. EPA-453/R-99-007. http://www.epa.gov/ttn/atw/urban/urbanpg.html (June 11, 2002).

[18]EPA added secondary aluminum production as an area source on January 30, 2001 (66 Fed. Reg. 8820-8829) and added another 18 area sources on June 26, 2002 (67 Fed. Reg. 43112-43113).

formaldehyde. These regulations are to be promulgated under Sections 202(a)(1) and 211(c)(1).

Section 202(a)(1) requires EPA to regulate MSAT emissions from new motor vehicles or new motor vehicle engines when there is a danger to the public health and welfare. Section 211(c)(1) allows EPA to control or prohibit the manufacture, introduction or sale of fuel or fuel additives that either 1) contribute to air pollution that endangers the public health or welfare or 2) impairs the performance of emission control devices that are either currently in use or are expected to be in use in a reasonable time. Section 202(a)(1) applies only to motor vehicles and motor vehicle engines, while Section 211(c)(1) applies to fuel being used in motor vehicles, in motor vehicle engines, in nonroad engines, or in nonroad vehicles.

Current Status. In March 2001, EPA issued its final MSAT emission control rule (66 Fed. Reg. 17230-19273). This rule identified 21 MSATs, including 13 that are also considered urban air toxics. Twenty of these air toxics are listed in Section 112(b) of the CAA. The last MSAT is diesel particulate matter and diesel emission organic gases (DPM + DEOG), which are a part of diesel exhaust. Diesel exhaust is not included in the list of 188 air toxics developed by Congress, though many of its constituent chemicals are. In its final rule, EPA noted that no new vehicle standards (Section 202(a)(1)) were necessary at the time to reduce impacts on the public health and welfare. Several programs that were put in place to meet other requirements of the Clean Air Act have reduced MSAT emissions, including the National Low Emission Vehicle Program, limits on gasoline volatility, the reformulated gasoline program, and the phase out of leaded gas.

EPA did finalize a fuel-based standard under Section 211(c)(1) authority in the March 2001 rule. This fuel-based standard is known as the gasoline toxic emission performance requirement, or TPR. TPR requires that gasoline not exceed the average total toxic emissions emitted from 1998-2000 beginning January 1, 2002. These emissions include benzene and formaldehyde, among others, thus complying with Congress' desire that EPA regulate these two MSATs. This standard essentially codifies the fact that many refineries were overcomplying with emissions standards during the 1998-2000 period. Thus, the rule prevents future increases in MSAT emissions that might have occurred had refineries stopped making gasoline that overcomplied with the previous standards. In the rule, EPA committed to a future rule-making by 2004.

EPA's first NATA assessment provided some information on the hazards of mobile sources. According to the first set of NATA data, which again is based on 1996 emissions, more than 100 million people face a cancer risk of greater than ten in one million from mobile sources. EPA's assessment also estimates that approximately 200 million people face a noncancer risk (respiratory irritation) from emissions of acrolein that are above reference concentrations. However, EPA believes that by 2007, existing standards for new vehicles will have decreased risks of onroad exposures to 50% of 1996 levels. Risks of nonroad exposures are also expected to decrease.

Remaining Issues. The March 2001 MSAT rule was not without controversy. Because EPA had originally proposed to regulate only the benzene

content of gasoline, but then finalized the rule as one that regulates gasoline toxic emission performance, many refineries were "surprised" by the final rule. Some in the industry noted that the final rule could be very expensive for refiners. EPA, however, believed that the rule would not impose large costs on the industry because the rule did not ask industry to install any new technology. Environmental groups and others disagreed with industry and sued EPA, claiming that the rule did not go far enough in regulating mobile air toxics.[19] These groups consider EPA to be in violation of the CAA because the Agency has not promulgated any rules to control MSAT emissions. The case has not yet been adjudicated.

Conclusions

Congress amended the CAA in 1990 in part to ensure that EPA would regulate HAPs more quickly than it had in the previous 20 years. Although EPA has made much more progress under the programs created in 1990 than it had under the 1970 Act, all four of the air toxics programs are behind schedule. While EPA has promulgated MACT standards for 87 source categories as of July 22, 2002, 46 source categories remain without final standards. If EPA's extension of the MACT hammer deadline is found to be unlawful, states and industries will have to determine their own MACT standards on a case-by-case basis; such an endeavor could be costly.

No standards have been issued in the residual risk program. Decisions on 12 standards are statutorily mandated for the end of 2002 but are unlikely to be finished. According to EPA's own urban air toxics schedule released in 1999, the urban air toxics program is about 13 years behind the schedule established by Congress. Finally, the fuel-based standards for mobile source HAP emissions have been challenged for not going far enough in regulating these sources.

In light of the deadlines that were missed and will continue to be missed by EPA, Congress might decide to examine the factors that have contributed to the Agency's difficulty in implementing the four air toxics programs under the schedule Congress established. These factors might include lack of adequate resources, limitations of the available data and analytical tools, or management issues within EPA, among other possibilities.

[19] *Sierra Club v. EPA*, No. 01-1228 (D.C. Cir. filed May 24, 2001).

Table 2. Urban Air Toxics and Their Major Sources

Urban Air Toxic	Main Sources of Emissions
Acetaldehyde[d]	Residential fireplaces; wood stoves
Acrolein[d]	Smoking; automobiles; oil and coal power plants
Acrylonitrile	Acrylic acid and modacrylic fiber manufacture
Arsenic compounds[c,d]	Inorganic arsenic emissions are mainly from metal smelters, soil, and burning plywood treated with an arsenic wood preservative
Benzene[b,d]	Tobacco smoke; industries that manufacture or use benzene
Beryllium compounds	Workplaces where beryllium is mined, processed, or converted into alloys or chemicals
1,3-Butadiene[c,d]	Oil refineries; chemical manufacturing plants; plastic and rubber factories
Cadmium compounds	Fossil fuel use; incineration of municipal wastes
Carbon Tetrachloride[a]	Manufacture or use of the chemical
Chloroform	Wastewater; pulp and paper mills; drinking water; swimming pools; hazardous waste sites; sanitary landfills; workplaces that manufacture and use chloroform
Chromium compounds[b,d]	Ferrochrome production
Coke oven emissions[a,c]	Aluminum, steel, graphite, electrical, and construction industries
1,2-Dibromoethane (ethylene dibromide)[a]	Production and process facilities; past use in leaded gasoline and as a fumigant
1,2-Dichloropropane (propylene dichloride)	Production and use of the chemical
1,3-Dichloropropene	Application, manufacture, or formulation as a soil fumigant
Ethylene dichloride (1,2-dichloroethane)	Production, storage, use, transport, and disposal of the chemical
Ethylene oxide	Smoking; occupations that manufacture, process or use to sterilize; fumigation
Formaldehyde[b,d]	Power plants; manufacturing facilities; smoking; incinerators; exhaust

Hexachlorobenzene	Industrial sites or waste facilities where chemical is used/disposed
Hydrazine	Use as a chemical blowing agent, photography chemical, or pharmaceutical intermediate
Lead compounds[d]	Leaded gasoline combustion; tobacco smoke; combustion of solid waste, coal, and oils; lead smelters; lead-based paints and lead pipes
Manganese compounds[d]	Iron and steel plants; power plants; coke ovens
Mercury compounds[d]	Methyl mercury: eating contaminated fish; Elemental mercury: occupational exposures
Methylene chloride (dichloromethane)	Spray painting or other chemical uses in the workplace
Nickel compounds[d]	Nickel production, processing, and use; contact with items containing nickel
Polychlorinated biphenyls (PCBs)	Redistribution of PCBs already present in soil and air
Polycyclic organic matter (POM)[c,d]	Formation during combustion
Quinoline	Manufacture of dyes; metallurgical processes
2,3,7,8-tetrachlorodibenzo-p-dioxin & congeners & TCDF congeners (dioxin)	Combustion of fossil fuels and wood; byproduct of some industrial processes that use chlorine
1,1,2,2-Tetrachloroethane	Chemical production activities in which it is an intermediate product
Tetrachloroethylene (perchloroethylene)	Drycleaning; industries using or manufacturing the chemical
Trichloroethylene	Factories where it is manufactured or used; adhesives and spot removers
Vinyl Chloride	Use, production, transport, storage, and disposal of the chemical in the workplace

Source: EPA, "Appendix: HAP Profiles." National Air Toxics Program: The Integrated Urban Strategy, Report to Congress. July 2000. EPA-452/R-99/007. Available at http://www.epa.gov/ttn/atw/urban/urbanpg.html (June 11, 2002).

[a] These three HAPs have emissions mainly from major sources rather than area sources.
[b] These three HAPs are associated with the greatest potential risk of cancer across the United States.
[c] These four HAPs have been identified to pose the greatest risk of cancer regionally.
[d] These twelve urban air toxics are also considered mobile source air toxics.