Order Code RL31881

Mercury Emissions to the Air: Regulatory and Legislative Proposals

Updated May 26, 2004

James E. McCarthy
Specialist in Environmental Policy
Resources, Science, and Industry Division

Mercury Emissions to the Air: Regulatory and Legislative Proposals

Summary

On December 15, 2003, the Environmental Protection Agency (EPA) proposed standards for emissions of mercury from coal-fired electric power plants, under the authority of Sections 111 and 112 of the Clean Air Act. (The proposal appeared in the Federal Register January 30, 2004.) In their first phase, the standards could require a 29% reduction in emissions by 2008 or 2010, depending on the regulatory option chosen. A nearly 70% reduction would take effect in 2018, although EPA indicates that flexibility built into the proposed standards could delay the full 70% reduction to as late as 2030.

EPA's analysis of the proposed rule indicates that its benefits would outweigh the compliance costs by a factor of at least 16 to 1, leading many critics of the proposal to ask why the regulations should not be more stringent, or implemented more quickly. The Agency's official position is that technology will not be available to achieve reductions greater than 30% until after 2010. EPA's own Office of Research and Development (ORD) appears to disagree, however. A recent ORD white paper found that reductions of 72% - 98%, depending on coal type, are already being achieved at some plants using current technology. Other issues likely to be raised in the public comment period, which extends until June 29, include the impacts on eastern coal production and the effect of the proposals on mercury "hot spots."

In addition to EPA's regulatory effort, in the current Congress nine bills have been introduced to regulate these emissions. An Administration bill, the "Clear Skies Act," has many points in common with the EPA regulatory proposal. The other bills before Congress are generally more stringent than the Administration's approach.

These regulatory and legislative proposals reflect increasing concern over the potential health effects of mercury emissions. Mercury is a potent neurotoxin that can affect human health at very low concentrations. EPA considers children born to women with umbilical cord blood-mercury concentrations above 5.8 parts per billion to be at increased risk for adverse health effects, such as delayed development, neurological defects, and mental retardation. Recent EPA studies conclude that at least 7.8% (and possibly as many as 15.7%) of American women of child-bearing age have blood mercury levels above this threshold.

U.S. air emissions of mercury come from eight principal sources. Of these, the largest source, and the last major source for which emission standards have been proposed, is coal-fired electric power plants. Coal-fired power plants account for between one-third and one-half of total U.S. mercury emissions.

This report provides background on mercury and reviews regulatory and legislative proposals to reduce emissions of mercury to the air. CRS Report RL32203 and CRS Report RL31908 discuss legal issues raised by EPA's proposed rules and mercury in products and waste, respectively. This report will be updated as warranted.

Contents

List of Tables

Mercury Emissions to the Air: Regulatory and Legislative Proposals

Background

Mercury is a potent neurotoxin that can cause adverse health effects at very low concentrations. Concerns about public exposure to mercury have grown in recent years as research has indicated its presence at significant levels in numerous species of fish, and as analyses of dietary intake and resulting blood levels have pointed to potential health risks from mercury ingestion, particularly for women of child-bearing age and developing fetuses.

According to the Environmental Protection Agency (EPA), as of December 2002, 45 states had issued fish consumption advisories due to mercury. Eighteen states (primarily in the Midwest and Northeast) have issued statewide advisories for mercury in all their freshwater lakes and/or rivers. Ten states, primarily in the South, have statewide advisories for mercury in their coastal waters. In all, the advisories cover more than 12 million acres of lakes and roughly 473,000 river miles.[1]

Mercury reaches water bodies from naturally occurring sources, from past uses (many of which, such as fungicide application to crops, are now banned), from disposal of mercury-containing products, and from current activities (principally combustion of fuels containing mercury in trace amounts). Mercury released to the atmosphere can circulate for up to a year before being deposited on land or in water. Thus, it is widely dispersed, and often is transported thousands of miles from the sources of emissions.[2] According to EPA, U.S. sources contributed only 3% of the 5,500 tons of mercury emitted to the atmosphere on a global basis in 1995.[3] Of the mercury deposited in the United States, however, about 60% comes from U.S. sources.[4]

---

[1] U.S. EPA, Office of Water, "Update: National Listing of Fish and Wildlife Advisories," Fact Sheet, May 2003, pp. 4-5, available at [http://www.epa.gov/waterscience/fish/advisories/factsheet.pdf].

[2] U.S. EPA, Office of Air Quality Planning and Standards, *1997 Mercury Study Report to Congress: Overview*, December 1997, p. 1, available at [http://www.epa.gov/ttn/atw/112nmerc/mercover.html].

[3] Ibid.

[4] U.S. EPA, Office of Air and Radiation, Mercury White Paper, p. 1, available at [http://www.epa.gov/ttn/oarpg/t3/memoranda/whtpaper.pdf].

Because mercury emissions are concentrated in specific areas, and because of variations in precipitation patterns, mercury is not deposited evenly across the United States. The highest deposition rates, according to EPA, "occur in the southern Great Lakes, the Ohio Valley, the Northeast, and scattered areas in the Southeast."[5]

Of particular concern for aquatic organisms and human health is mercury in the form of methyl mercury. Nearly all of the mercury that accumulates in fish tissue is methyl mercury, an organic compound formed by a microbial process, often in wetland environments. Once formed, methyl mercury tends to bio-accumulate in aquatic organisms, increasing concentrations at each level of the food chain. "As a result, top predators in a food chain, such as largemouth bass or walleye, may have concentrations of these chemicals in their tissues that may be a million times higher than the concentrations in the water."[6]

Children born to women with fetal cord blood concentrations of mercury above 5.8 parts per billion (ppb) "are at some increased risk of adverse health effects,"[7] according to EPA. These health effects include delayed development, neurological defects, and mental retardation. Recent EPA analyses conclude that at least 7.8% (and possibly as many as 15.7%) of women of child-bearing age had blood-mercury levels high enough that their umbilical cord blood would have been above the 5.8 ppb threshold in 1999-2000.[8]

Sources of Emissions / Status of Regulations

As shown in **Table 1**, U.S. air emissions of mercury come from eight principal sources. Of these, the largest source, and the last source for which emission standards have been proposed or implemented, is coal-fired utility boilers (i.e., coal-fired electric power plants). These accounted for an estimated 52 tons of mercury emissions per year in 1994-1995, about one-third of total U.S. mercury emissions at the time.[9]

Regulation of Non-Utility Sources. As of December 2003, EPA had proposed or promulgated regulations for all major sources of mercury emissions.

---

[5] Ibid.

[6] National Listing of Fish and Wildlife Advisories, previously cited, p. 5.

[7] U.S. EPA, Office of Children's Health Protection, *America's Children and the Environment: Measures of Contaminants, Body Burdens, and Illnesses*, 2nd edition, February 2003, available at [http://www.epa.gov/envirohealth/children/ace_2003.pdf], p. 59.

[8] Kathryn R. Mahaffey, "Methylmercury: Epidemiology Update,", presented at U.S. EPA National Forum on Contaminants in Fish, San Diego, CA, January 26, 2004, p. 5. Available at [http://www.epa.gov/waterscience/fish/forum/2004/presentations/monday/mahaffey.pdf].

[9] EPA does not have current data for all sources of mercury emissions. Since the mid-1990s, mercury emissions have been reduced substantially from the three waste combustor/incinerator categories, and marginally from electric utilities. In its regulatory impact analysis for the proposed electric utility rule, EPA used 1999 data showing utility emissions of 48 tons as the baseline against which to compare reductions.

Table 1. Mercury (Hg) Emissions Estimates and Current Regulatory Status

Source	Emissions (tons/year)	Percentage of Total	Current Status of Hg Regulations
Coal-fired Utility Boilers	52	33%	12/15/03 proposal would reduce emissions 69% (to 15 tons) by 2018, or 29% (to 34 tons) in 2007.
Large (>250 tons per day) Municipal Waste Combustors (MWC)	30	19%	Regulated: reductions estimated at about 95% from 1990 levels.
Coal-fired Commercial/ Industrial Boilers	21	13%	Rule proposed 1/13/03 would reduce emissions about 30%.
Medical Waste Incinerators	16	10%	Regulated: reductions estimated at about 94% from 1990 levels, mostly through closures.
Oil-fired Commercial/ Industrial Boilers	8	5%	Rule proposed 1/13/03 would reduce emissions about 30%.
Mercury Cell Chlor-alkali Plants	7**	4%	Rule promulgated 12/19/03 will reduce emissions 73% by 12/19/06.
Hazardous Waste Combustors	7	4%	Regulated: reductions estimated at about 50% from 1990 levels.
Portland Cement Plants	5	3%	Rule, promulgated 6/14/99, reduces hazardous air pollutant metal emissions 24%; remanded by U.S. Court of Appeals, D.C. Circuit to require specific standard for mercury and 2 other pollutants.
TOTAL*	146 of 158	92%	

*Emissions estimates are for 1994-1995. Totals may not add due to rounding. Other sources include residential boilers (4 tons); other manufacturing, including pulp and paper manufacturing and 9 other industries (4 tons); area sources, such as lamp breakage, lab use, and dental preparations (3.4 tons); and geothermal power (1.4 tons).

** Data for the chlor-alkali sector are subject to considerable uncertainty. Chlor-alkali plants produce chlorine by subjecting liquid mercury and saturated brine to an electric current. The mercury binds with potassium or sodium in the process, but later is separated and reused. In the year 2000, 65 tons of mercury that the plants consumed could not be accounted for.

Sources: Emissions data from U.S. EPA, *Mercury Study: Report to Congress*, Volume II. RPS-452/R-97-004 (December 1997), p. ES-6; regulatory status from EPA, *Mercury White Paper* (not dated), with information updated by telephone communications with EPA.

The authority for most of these regulations is Section 112 of the Clean Air Act, which requires National Emission Standards for Hazardous Air Pollutants. In amending Section 112 in 1990, Congress included a list of 188 hazardous air pollutants to be regulated – mercury among them. EPA was directed to identify sources of these pollutants and impose Maximum Achievable Control Technology (MACT). Sources of mercury emissions, including coal- and oil- fired commercial and industrial boilers, chlor-alkali plants, and Portland cement plants, have regulations either proposed or promulgated under this authority.

Separately, Section 129 of the Clean Air Act requires emission standards for solid waste incinerator units, including municipal and medical waste incinerators. These standards, which were promulgated in the mid-1990s, limit 11 categories of pollutants, including mercury. Under the standards, municipal and medical waste incinerators, which together accounted for 29% of total U.S. mercury emissions before regulation, have achieved emission reductions of 95%, and together emitted only 2.2 tons of mercury in 2000, according to EPA.[10] As a result, coal-fired utilities may now account for nearly half of U.S. mercury emissions.[11]

Electric Utilities and Mercury

Electric utilities were singled out for special consideration by the 1990 Clean Air Act Amendments. Under Section 112(n), EPA was required to undertake two studies of mercury emissions and other hazardous air pollutants from electric utility steam generating units, and to report to Congress before deciding whether to impose MACT standards. One study was to characterize emissions from utilities, municipal waste incinerators, and other sources, determine their health and environmental effects, identify the technologies available to control emissions, and estimate the costs of such technologies. The other study was to determine the hazards to public health anticipated as a result of emissions of all hazardous air pollutants emitted by electric utilities after imposition of other requirements of the act, and describe "alternative control strategies for emissions which may warrant regulation under this section." After considering the results of this study, "the Administrator shall regulate electric utility steam generating units under this section [Section 112], if the Administrator finds such regulation is appropriate and necessary...."

Having submitted the required reports to Congress under this section in 1997 and 1998,[12] EPA Administrator Carol Browner did find such regulation appropriate

---

[10] "Major Reductions in Toxics, Metals Seen from Controls on Incinerators, EPA Says," *Daily Environment Report*, June 25, 2002, p. A-3.

[11] In the TRI database, electric utilities accounted for 60.6% of total air emissions of mercury and mercury compounds in 2001. The database somewhat overstates the utility share of the total because it excludes waste incineration and all sources that emit less than 10 pounds of mercury.

[12] U.S. EPA, Office of Air Quality Planning and Standards, *Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units – Final Report to Congress*, February 1998, 2 volumes, available at [http://www.epa.gov/ttn/atw/combust/utiltox/utoxpg.html#TEC] and U.S. EPA, OAQPS and

(continued...)

and necessary, and issued a formal finding to that effect in December 2000.[13] The finding set in motion the development of MACT standards. The standards were to be proposed by December 15, 2003 (a deadline EPA met). A final MACT rule must be signed by March 15, 2005, with compliance for existing facilities required three years after promulgation.[14]

Section 112 defines MACT for new facilities as an emission standard no less stringent than what is achieved in practice by the best controlled similar source (i.e., the best demonstrated technology). For existing facilities, it allows a somewhat less stringent standard, setting the average emissions of the best performing 12% of units in the category as a minimum, but giving EPA discretion to set a more stringent standard. While there is considerable disagreement regarding the level of emissions reduction being achieved (a point discussed below on p. 9, under the heading, "Should the Standards Be More Stringent?"), at present no U.S. coal-fired power plants have installed equipment specifically intended to control mercury emissions. Four full-scale field tests of a technology called "activated carbon injection" (ACI) have been conducted by the Department of Energy, with emission reductions of 60% to 90% achieved, depending on the type of coal and type of auxiliary control equipment utilized.[15] ACI has also shown itself capable of reducing mercury emissions by more than 90% on incinerators and other facilities. Thus, the technologies appear promising, but the limited number of demonstrations on operating full-scale coal-fired power plants may give EPA considerable latitude to choose what will be the MACT standard for the utility sector.

EPA's December 15 Proposal. In its December 15, 2003 proposal (which appeared in the Federal Register January 30, 2004), EPA offered two alternative regulatory approaches to controlling electric utility emissions. In one proposed approach, regulation of electric utilities under §112(d) of the Clean Air Act is held to be "appropriate and necessary," as it was in the Agency's December 2000 Regulatory Finding, and a MACT standard (which would likely take effect in 2008) is proposed.

In the other approach, the Agency argues that regulation of electric utilities under Section 112 is "appropriate," but is not "necessary" because the Agency could

---

[12] (...continued)
Office of Research and Development, *Mercury Study Report to Congress*, December 1997, 8 volumes, available at [http://www.epa.gov/airprogm/oar/mercury.html].

[13] Regulatory Finding on the Emissions of Hazardous Air Pollutants from Electric Utility Steam Generating Units, 65 Federal Register 79825, December 20, 2000.

[14] These dates are fixed in a modified settlement agreement filed November 17, 1998. The case is Natural Resources Defense Council, Inc. v. U.S. EPA, No. 92-1415 (D.C. Cir.). Originally, the deadline for promulgation was December 15, 2004. In late April 2004, NRDC offered to extend the deadline 90 days in order to allow for additional analysis of regulatory options. EPA accepted the offer.

[15] See Michael D. Durham, ADA Environmental Solutions, "Results from Four Full-Scale Field Tests of ACI for Control of Mercury Emissions," presentation to U.S. EPA's Utility MACT Working Group, March 4, 2003, p. 29, available at [http://www.epa.gov/ttn/atw/combust/utiltox/adamact.pdf]

use another section of the Clean Air Act to control the emissions. In this alternative, it proposes to amend its December 2000 Regulatory Finding, freeing itself from the requirement to impose MACT standards. Instead, it would use a less prescriptive approach to regulation known as "cap and trade," under Section 111 of the act.[16] The legality of this approach is almost certain to be challenged in court. (For a discussion of the legal issues, see CRS Report RL32203, *Legal Analysis and Background on the EPA's Proposed Rules for Regulating Mercury Emissions from Electric Utilities*.)

The alternative proposal (which EPA prefers) would establish national and state rather than facility-specific caps on emissions of mercury, and would allow electric generating facilities to comply either by installing pollution controls or by purchasing emission credits from other facilities that may have reduced pollution by more than the required amount. This cap and trade proposal mirrors the approach used to control emissions of sulfur dioxide (SO_2) from power plants under Title IV of the Clean Air Act (the acid rain program). It also mirrors, in key respects, the Administration's proposed mercury control program under its Clear Skies bill (S. 485 / H.R. 999, and more closely, a revised version of the bill introduced by Senator Inhofe, S. 1844).[17] States would be free to establish more stringent standards for new or existing units than are required under the proposal.

New facilities, in addition to existing facilities, would be covered under the mercury cap and would be required to purchase allowances equivalent to their emissions. The Agency notes that this is an advantage of the cap and trade approach: the total amount of allowed emissions will not increase, even if there is a substantial increase in coal-fired capacity. Under a MACT standard (which is specific to individual plants), if coal-fired capacity increases, total emissions would increase proportionately. DOE projects a 26% increase in coal consumption by 2020. If this occurs without a further strengthening of the standards, MACT would permit emissions of 43 tons of mercury in 2020.

Section 111(d), on which the Agency is relying for the cap and trade proposal's legislative authority, has rarely been used until now, and has never been used to regulate a hazardous air pollutant listed under Section 112. EPA staff say that it has previously been used to regulate sulfur emissions from pulp and paper mills and

---

[16] Neither Section 111 nor Section 112 actually mention cap and trade programs. Section 111 requires "standards of performance," defined as a standard that "reflects the degree of emission limitation achievable through the application of the *best system of emission reduction* [emphasis added] which ... the Administrator determines has been adequately demonstrated." EPA argues that this language would allow a cap and trade system. Section 112(d) also uses broad language, referring to "measures, processes, methods, systems, or techniques," but in elaborating on this definition for nearly a page, the statute provides numerous examples and specifics, without once mentioning cap and trade systems. Arguably that makes it more difficult to use its language to justify a cap and trade approach.

[17] Clear Skies' cap and trade proposal is also mirrored in another regulatory proposal published in the Federal Register the same day as the mercury proposal, the Interstate Air Quality Rule, leading some to conclude that the Agency intends to implement major elements of Clear Skies through regulation if it cannot do so through legislation. For further information, see CRS Report RL32273, *Air Quality: EPA's Proposed Interstate Air Quality Rule*.

fluoride emissions from aluminum smelters, neither of which are controlled elsewhere in the act. While it is potentially more flexible, the initial deadline for implementation by existing sources is two years later than under MACT, and, because of the paucity of nondiscretionary deadlines in Section 111(d), court challenges to Agency action (or inaction) may also take longer than under Section 112. On the other hand, the Section 111(d) proposal would establish a second phase of regulation, with more stringent requirements; any more stringent standards under Section 112 would require a new rule-making, a less certain prospect.

What the Standards Would Achieve. If implemented as proposed, the MACT standards for coal-fired power plants would result in emissions of 34 tons of mercury annually, a reduction of 29% from the 1999 level. This estimate somewhat overstates the impact of the proposed regulation, because emissions of mercury from electric utilities are declining even in the absence of MACT.

Two factors are contributing to this decline. First, pollution controls for sulfur dioxide and nitrogen oxides required under other sections of the Clean Air Act have reduced mercury emissions over the last decade. EPA expects this trend to continue. Under its proposed Interstate Air Quality Rule, projected mercury emissions would decrease to 34 tons by 2010 without any controls specifically designed to reduce mercury emissions being imposed.[18]

Second, state standards are beginning to target mercury from power plants. At least five states (Connecticut, Massachusetts, Wisconsin, North Carolina, and New Jersey) have proposed or promulgated standards that will reduce mercury emissions from power plants by 60% to 95%. Other states are expected to follow suit, particularly if EPA's national standards do not impose what the states consider sufficiently stringent requirements.

The cap and trade program that EPA is proposing under Section 111 would require more stringent controls, but not until 2018. The proposal would be implemented in two phases. The first phase, effective in 2010 would impose a cap, the amount of which is yet to be determined. Early drafts of the regulation set this cap at 34 tons, but the proposal discusses several possibilities and asks for comments on what the level should be. The second phase would set a 15 ton cap in 2018 (a 69% reduction from 1999 levels).

Under the cap and trade proposal, existing sources would earn credits for emission reductions achieved prior to the effective dates, which means that some reductions would likely be achieved sooner than required. To the extent that early reductions happen, however, some of the credits they generate may be used in lieu of reductions required at later dates. This would delay the date on which full compliance would be achieved.

---

[18] U.S. EPA, *Proposed National Emission Standards for Hazardous Air Pollutants; and, in the Alternative, Proposed Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units* (hereafter, the Mercury Proposal), Preamble, Table 9, 69 Federal Register 4712, January 30, 2004.

Residual Risks. The MACT proposal does not have a second phase, but if MACT standards are promulgated, Section 112(f) of the act would require the Administrator to consider imposing "residual risk" standards. Under Section 112(f), the Administrator must promulgate such standards eight years after the promulgation of MACT (December 2012, in this case) if they "are required in order to provide an ample margin of safety to protect public health ... or to prevent ... an adverse environmental effect." To date, EPA has not used this authority for any category of sources, however.

Costs and Benefits. EPA estimates the annualized cost of compliance with the 34-ton electric utility MACT at $945 million. Adding in additional costs to consumers of affected products raises the annual "social costs" to an estimated $1.6 billion. Quantifiable benefits are estimated at more than $15 billion annually (about 16 times the compliance cost, or more than 9 times the social costs).

The quantified benefits all result from the controls' effect on emissions of fine particulates ($PM_{2.5}$), which are a cobenefit of the mercury controls, rather than the effects of controlling mercury itself. The reductions in $PM_{2.5}$ would avoid 2,200 premature deaths annually, 2,900 non-fatal heart attacks, thousands of hospital and emergency room visits, and millions of work loss and restricted activity days, according to EPA.[19]

EPA's analysis lists 11 health and welfare benefits of controlling mercury itself (i.e., effects separate from those attributable to the side effects from reducing $PM_{2.5}$). These include reductions in neurological disorders, learning disabilities, and developmental delays; impacts on birds and mammals, such as reproductive effects; impacts on commercial, subsistence, and recreational fishing; and reduced "existence values" for currently healthy ecosystems. It also lists as potential mercury control benefits reductions in cardiovascular effects, altered blood pressure regulation, and reproductive effects in humans. None of these benefits are quantified, but the Agency believes that they "are large enough to justify substantial investment in Hg emission reductions."[20]

EPA does not estimate the costs of compliance with the Section 111 proposal,[21] but one may presume, given the Agency's intention to set the 2010 standard to "reflect the level of emissions resulting from the co-benefits of controlling SO_2 and

---

[19] Ibid., Section V. F., p. 4710.

[20] Ibid., pp. 4711, 4708.

[21] Table 8, on p. 4712 of the proposal preamble, does provide a cost estimate of Section 111 plus the Interstate Air Quality Rule combined, but there is no separate estimate for §111.

NOx"[22] under its separate Interstate Air Quality Rule,[23] that no controls would be required to specifically address mercury emissions in 2010. In that case, the incremental cost of controlling mercury would be zero under Section 111. No cost estimates are provided for the 2018 standard under Section 111 either, but the Agency states that "such controls should not have any significant impact on power availability, reliability, or pricing. Nor should a 15-ton cap cause any significant shift in the fuels currently utilized by power plants or in the source of these fuels."[24] (In fact, the Agency projects that coal production for the electric power sector will increase 147 million tons, or 16%, by 2010.[25])

EPA's analysis of the Interstate Air Quality Rule (IAQR), like its analysis of the mercury MACT proposal, shows disproportionate costs and benefits. Annual benefits of the rule are estimated at $58 billion in 2010, with annual social costs of $3 billion; in 2015, when the IAQR is fully implemented, annual benefits are estimated at $84 billion versus social costs of $4 billion.[26]

Should the Standards Be More Stringent? Given these analyses, some question why the regulations should not be more stringent, or implemented more quickly. EPA's response appears to be that the technology required for mercury control will not be adequately demonstrated until after 2010,[27] and that the technologies for SO_2 and NOx, while available now, cannot be implemented at a faster pace without causing "extremely high" costs and overwhelming the capacity of equipment suppliers.[28]

These conclusions are among the issues likely to be questioned in the public comment period, which has been extended through June. The Agency's concerns with regard to the availability and cost of technology appear to be at odds with the views of a number of experts. For example, a recent paper co-authored by representatives of two power companies, the Electric Power Research Institute, the

---

[22] The quote is from Table 9, note 2, p. 4712. The rationale is also discussed in Section IV. D.2 of the proposal at p. 4698. Another approach would be to assume that Section 111 requires a 34-ton emission limit (as Table 9 implies). In that case, the estimated compliance cost might be as high as that of MACT, although it would depend on whether the same or a different subset of facilities are assumed to install controls.

[23] The proposed Interstate Air Quality Rule (IAQR) appeared in the Federal Register on the same day as the Mercury Proposal (69 Federal Register 4565, January 30, 2004). The IAQR proposes to reduce power plant emissions of SO_2 and NOx in 29 Eastern states about 40% by 2010 and 70% by 2015. These reductions mirror those that would be required by the Administration's Clear Skies bill, but only for Eastern states.

[24] Mercury proposal, Section IV.D.2, p. 4699.

[25] Ibid., Section VI.H., p. 4715.

[26] U.S. EPA, *Rule to Reduce Interstate Transport of Fine Particulate Matter and Ozone (Interstate Air Quality Rule); Proposed Rule*, Section I.A., 69 Federal Register 4571, January 30, 2004.

[27] Mercury Proposal, Section IV.D.2., p. 4698.

[28] Ibid.

U.S. Department of Energy, and ADA-ES, a leading consultant on advanced mercury control technologies concludes:

> Recent full-scale field tests have proven the effectiveness of activated carbon injection for reducing mercury emissions. This technology is ideally suited for use on existing coal-fired boilers as it provides the following advantages:
>
> - Minimal capital cost of equipment (<$3/kW);
> - Can be retrofit with little or no downtime of the operating unit;
> - Effective for both bituminous and subbituminous coals;
> - Can achieve 90% removal when used with a fabric filter that has been designed properly for carbon injection; and
> - It can be integrated to enhance mercury capture with virtually every configuration of air pollution control equipment including ESPs [electrostatic precipitators], fabric filters, wet and dry scrubbers.[29]

The Agency also appears not to have incorporated the conclusions of its own Office of Research and Development (ORD) in determining the level of emissions control being achieved at the best controlled existing plants. In a white paper posted on the EPA website March 2, 2004, ORD concluded that fabric filters, a relatively simple technology that is currently installed on more than 12% of power plants, achieve a 90% reduction in mercury emissions at bituminous coal plants and a 72% reduction at subbituminous plants. The addition of a scrubber increased the emission reduction to 98% at bituminous plants, according to ORD.[30]

The white paper further stated that, by 2010, activated carbon injection with a fabric filter "has the potential to achieve 90% Hg reduction" on any rank of coal, and could be installed within 1-2 years of signing a contract to do so.[31] Since the white paper was written, there have been reports that a European firm, Donau Carbon, has begun offering commercial guarantees for mercury removal from coal-fired power plants using ACI technology.[32]

---

[29] Michael Durham, et al., "Full-Scale Results of Mercury Control by Injecting Activated Carbon Upstream of ESPs and Fabric Filters," paper presented at PowerGen 2003, Las Vegas, NV, December 9-11, 2003, p. 19.

[30] U.S. EPA, Office of Research and Development, "Control of Mercury Emissions from Coal-Fired Electric Utility Boilers," undated, posted March 2, 2004, available at [http://www.epa.gov/ttn/atw/utility/hgwhitepaperfinal.pdf].

[31] Ibid., pp. 13-15.

[32] Personal communication, U.S. EPA, Office of Air and Radiation, May 21, 2004.

Hot Spots. One of the main criticisms of the cap and trade proposal is that it would not address "hot spots," areas where mercury emissions and/or concentrations in water bodies are greater than elsewhere. EPA has developed data on such hot spots: Environmental Defense released a report on December 9 based on EPA's data that concluded: "At hot spots, local sources within a state commonly account for 50% to 80% of the mercury deposition."[33]

That the local contribution to hot spot concentrations is this high is disputed by utility sources, particularly for mercury emitted by power plants. Utility spokespersons argue that much of the mercury emitted by utilities is in the elemental form, is non-water soluble, and is released from taller stacks. The result, they say, is that it is less available to fish and disperses over a wider area – with much of it entering a global mercury cycle.[34]

The concern over hot spots, and the impetus to address them, were recently reinforced by a study of mercury contamination in the Everglades. The study found that concentrations of mercury in fish and wading birds in the area dropped around 75% after Florida imposed stringent controls on incinerators and other local sources of mercury emissions in the 1990s.[35] Backers of strong controls on utility emissions have cited these results in arguing against a cap and trade approach.

Unless a national cap is so stringent that it requires virtually all facilities to impose some form of emission control, cap and trade programs do not appear well designed to address hot spots. They allow facilities to purchase allowances and avoid any emission controls, if that is the compliance approach that makes the most sense to a plant's owners and operators. If plants near hot spots purchase allowances rather than install controls, the cap and trade system may not have an impact on mercury concentrations at the most contaminated sites. By contrast, a MACT standard requires reductions at all plants, and would therefore be expected to improve conditions at hot spots.

EPA's response to this is threefold.[36] First, it notes that all states would remain free to establish more stringent controls to address local health-based concerns separate from the mercury cap-and-trade program requirements. But it goes on to state that the Agency does not anticipate hot spots, for two reasons. First, the Agency's modeling suggests that larger coal-fired units, which have the highest

---

[33] Environmental Defense, *Out of Control and Close to Home,* December 2003, p. 12.

[34] See Electric Power Research Institute written statement, as quoted in "Backers of Utility Rules Expect Florida Study of Effect of Mercury to Affect EPA Decisions," Bureau of National Affairs, *Daily Environment Report*, November 19, 2003, p. A-10. Also, see EPRI's press statement, "Power Plants and Mercury," available at [http://www.epri.com/corporate/discover_epri/news/HotTopics/env_mercury.pdf].

[35] Florida Department of Environmental Protection, *Integrating Atmospheric Mercury Deposition With Aquatic Cycling in South Florida*, revised November 2003, available at [ftp://ftp.dep.state.fl.us/pub/labs/assessment/mercury/tmdlreport03.pdf]. See especially, pp. 56-59.

[36] Mercury proposal, 69 Federal Register 4702-4703.

"local deposition footprints," are likely to control emissions more than required and sell excess allowances achieved through overcompliance to smaller units. Second, mercury emissions come in several forms. The most difficult to control is elemental mercury, according to the Agency, and it is the most likely to be transported long distances from the generating units. Thus, if plants focus on the more easily controlled forms of mercury, they will control mercury that would more likely be deposited locally. The Agency requests further comments on its analysis, and raises the possibility that it could adjust the trading program to favor controls at units in sensitive areas.[37]

Effects on Eastern and Western Coal. Whether imposition of controls on mercury will affect the total amount and/or the types of coal consumed at the nation's power plants is another issue raised by critics of EPA's proposed regulations. The United Mine Workers of America, for example, in comments to the EPA Rulemaking Docket, concluded that:

> EPA's proposed mercury MACT standards could be met by a majority of western subbituminous coals without the need for any emission control technologies. Eastern bituminous coals, representing roughly one-half of domestic coal production, would need to meet an average emission removal rate of 75% .... The MACT proposal is a recipe for massive fuel-switching from eastern to western coals that would disrupt coal-producing regions throughout the East ....[38]

The MACT standard, as proposed, would set plant-specific emission limits for five subcategories of utilities, based on coal rank (i.e., coal type) or technology. The five subcategories are: bituminous, subbituminous, lignite, integrated coal gasification combined cycle (IGCC), and coal refuse.[39] The standards would apply to each plant individually. There would be no averaging, banking, or trading of emission allowances.[40] The proposed standards and the number of existing units to which each applies are summarized in Table 2.

As can be seen in the table, bituminous (largely eastern) coal would have a far lower emission limit under the proposed MACT standard than would subbituminous or lignite (largely western) coals. Why? The proposed limits reflect the statutory minimum requirement for MACT standards, established in Section 112(d) of the Clean Air Act. This subsection requires that MACT standards be at least as stringent as the reductions achieved in practice by the best performing 12% of sources (for

---

[37] Ibid., p. 4701.

[38] Comments of Cecil E. Roberts on behalf of the United Mine Workers of America to EPA Docket ID No. OAR-2002-0056, April 30, 2004, p. 1.

[39] For a description of these subcategories, see the Mercury proposal at 69 FR 4665-7.

[40] There are two forms of flexibility, however: 1) the standard is expressed as a rolling 12-month average, rather than a limit that must be met at all times; and 2) a plant can average all the units at its location in determining compliance. Both of these factors reduce the stringency of the standard.

existing sources) or the best single source (for new sources) within the subcategories EPA chooses for an industry.

The best-performing power plants – whether bituminous, subbituminous or lignite – are those with scrubbers and fabric filters. These controls were installed primarily to capture sulfur dioxide, but they have the cobenefit of reducing emissions

Table 2. Mercury Emission Standards Under the Proposed Utility MACT Rule
(in 10^{-6} lb/MWh)

Subcategory	Number of Existing Units	Proposed Standard (Existing Units)	Proposed Standard (New Units)
Bituminous	701	21	6.0
Subbituminous	236	61	20
Lignite	24	98	62
IGCC	2	200	20
Coal refuse	17	4.1	1.1

Source: U.S. EPA, Mercury Proposal, pp. 4662-3 (standards). RTI International (number of units). The standards for existing units are also expressed in the proposal on a heat input basis (i.e., lbs. Hg per trillion Btu). Existing units may comply with either the input or output-based limit.

of mercury. EPA notes that it is easier for this control equipment to capture mercury from bituminous plants because of the speciation of the mercury emissions: more of the mercury is particle-bound or oxidized in emissions from eastern bituminous plants, and less is in elemental form, as compared to mercury emissions from western subbituminous and lignite coal plants. Even bituminous plants without scrubbers can capture high amounts of mercury if they have particulate controls such as fabric filters (also known as baghouses).

For these reasons, EPA's proposal sets more stringent limits on emissions from bituminous plants: as shown in Table 3, the proposed MACT rule's costs and reductions in emissions come almost entirely from controls on bituminous units. According to EPA, *all* of the net emission reductions occur in the bituminous sector, and 97% of the rule's cost is borne by bituminous units.

EPA's analysis, while differing on the degree of impact, agrees with the United Mine Workers that the proposed MACT rule would lead to less use of eastern coal and would increase use of western coal. The Integrated Planning Model, which EPA uses to assess the impact of proposed regulations on utilities and the coal industry, divides the coal-producing states into several geographic regions: Appalachian (including Pennsylvania, Ohio, West Virginia, Eastern Kentucky, Tennessee and

Alabama); Interior (including Illinois, Indiana, and Western Kentucky); and Western (principally the Rocky Mountain states and North Dakota, including the Powder River basin). In EPA's analysis, use of coal from Interior states would be unchanged as a result of the MACT rule, but Appalachian coal use would decline, while western coal use would increase. This analysis is summarized below in Table 4.

Table 3. Estimated Emission Reductions and Cost of Proposed Utility MACT Rule, by Coal Type

Coal Rank*	Tons of Mercury Reduced	Annual Cost (in million 1999 $)
Bituminous	15.2	$1,551
Subbituminous	-0.4**	47**
Lignite	-0.1**	2**
Total	14.6	1,600

* Coal types (or ranks) differ in their age, carbon content, heating value, volatile content, and amount of moisture. Lignite coals, the youngest or lowest rank, have relatively low heating value and high moisture and volatile content. Bituminous coals have higher heating value and lower moisture. Subbituminous fall in between.

** Total emissions increase for these subcategories because of an approximately 20% increase in use of these types of coal. On a per unit basis, however, emissions are subject to a modest level of control; hence some cost.

Source: U.S. EPA, Clean Air Markets Division, "Economic and Energy Impact Analysis for the Proposed Utility MACT Rulemaking, January 28, 2004.

Table 4. Estimated Changes in Coal Use from Imposition of the Proposed Utility MACT Rule, 2000-2010, by Region

(in million tons)

Coal Supply Region	Year 2000	2010 Base Case (no MACT Rule)	2010 with MACT
Appalachia	299	315	303
Interior	131	177	177
Western	475	536	554
National Total	905	1,028	1,034

Source: U.S. EPA Clean Air Markets Division, previously cited.

Surprisingly, EPA did not estimate the effects on coal choice of its cap and trade proposals. Despite the fact that cap and trade is described by EPA as its preferred approach to mercury control, there is no economic analysis of that proposal in the

docket. Likewise, EPA did not analyze the impacts of the MACT rule combined with the Interstate Air Quality Rule, which would control SO_2 and NOx emissions from many of the same utility sources – even though the connections between the controls for mercury and the other two pollutants stimulated the Agency to simultaneously propose the MACT and IAQR rules.

Finally, it is important to note that negative impacts on eastern coal are not inherent in the imposition of mercury controls. Rather, they result from EPA's decisions regarding subcategorization of the utility industry and its decision not to go beyond what it viewed as the statutory minimum requirement for MACT standards.[41]

Legislation in the 108th Congress[42]

Although EPA is proceeding to develop standards for electric utility mercury emissions under both Sections 111 and 112 of the Clean Air Act, the Administration has also proposed that Congress amend the act by passing multi-pollutant legislation for utilities, which it refers to as the "Clear Skies" bill. Clear Skies (H.R. 999 / S. 485) would replace more than half a dozen specific regulatory programs for electric power plants with a "cap and trade" program for three pollutants: sulfur dioxide (SO_2), nitrogen oxides (NOx), and mercury. Several other mercury bills also have been introduced. For a comparison of Clear Skies and these bills, see Table 2.[43]

[On November 10, 2003, Senator Inhofe introduced a variant of the Clear Skies bill (S. 1844). This bill is also entitled the Clear Skies Act. The Administration appears to support this revised bill, which contains less stringent mercury requirements than the original Clear Skies or any of the other bills. The following discussion uses the term "Clear Skies" for the original bill, but notes key differences in S. 1844.]

---

[41] For example, see United Mine Workers of America (UMWA) comments, previously cited, p. 4. UMWA notes that within the Mercury MACT Working Group, a varied group of stakeholders that advised the Agency from 2001 to 2003, an industry group that included all major coal producers and virtually the entire electric utility industry proposed tighter standards than EPA ultimately chose for the subbituminous and lignite subcategories. Had the Agency adopted such tighter standards, a major incentive to switch to western coal could have been eliminated. Similarly, if the standard for the industry as a whole were more stringent (under either a cap and trade or MACT rule), the incentive to switch to eastern coal would likely be lessened or eliminated, since users of western coal could not escape the need to install controls.

[42] This report focuses on mercury emissions to the air and on legislation to address such emissions. Congress is also considering legislation to reduce the amount of mercury in products and waste streams. For information on mercury in products and wastes, including congressional and state actions on the subject, see CRS Report RL31908, *Mercury in Products and Waste: Legislative and Regulatory Activities to Control Mercury.*

[43] There were also bills introduced in the 107th Congress. One of these, Sen. Jeffords' S. 556, which is similar to this Congress's S. 366, was reported by the Environment and Public Works Committee (S.Rept. 107-347), but no further action was taken.

Under the Clear Skies bill, the programs that would be replaced include New Source Review, Prevention of Significant Deterioration, New Source Performance Standards, the NOx SIP call,[44] nonattainment area requirements, Best Available Retrofit Technology, and the mercury MACT. (For a discussion of these programs' requirements, see CRS Report RL30878, *Electricity Generation and Air Quality: Multi-Pollutant Strategies*, pp. 5-11, 29-35.)

In replacing the mercury MACT requirement, Clear Skies would also eliminate the current law's "residual risk" provisions (Section 112(f)), under which EPA is required to address remaining risks posed to human health and the environment eight years after the imposition of MACT standards. Residual risk standards are required to provide "an ample margin of safety to protect public health." As noted previously, this program has not yet been implemented for any source of hazardous air pollutants, but it could lead to more stringent requirements if and when implemented.

Under Clear Skies' cap and trade program, national or regional limits would be established for total utility emissions of each of the three pollutants. For mercury, the bill proposes a national limit of 26 tons of emissions in 2010 (a 50% reduction from 1994-1995 levels), and 15 tons in 2018 (a 70% reduction).[45] The revised bill introduced by Senator Inhofe, S. 1844, sets the 2010 cap at 34 tons. These amounts are expected to be attainable for the most part as co-benefits of installing emission controls for sulfur dioxide and nitrogen oxides: EPA's analysis concludes that only about 2% of coal-fired capacity would install mercury-specific controls by 2010, even with a 26-ton cap.[46]

Each existing utility would receive "allowances" to emit specific amounts of mercury, based on their current emission levels. As the national cap becomes more stringent, the allowances given to each source would be reduced, and increasingly over time, allowances would be auctioned to the highest bidders. Individual utilities could comply with the standards either by reducing emissions, by purchasing excess allowances from other utilities that have reduced emissions more than required, or by using allowances from previous years that they have "banked" (i.e., not used). The proposal would allow companies to generate allowances through early reductions, and bank them for future use. It also assumes that mercury emissions are a national problem, and that it makes little difference where reductions in emissions occur, a point that opponents of allowances disagree with, based on concerns over the

---

[44] The NOx SIP call refers to regulations under which State Implementation Plans in 22 eastern states and the District of Columbia must be revised to control NOx emissions in order to improve ozone air quality in downwind states.

[45] Some of this reduction has already been achieved. EPA estimates 1999 emissions of mercury from power plants at 48 tons, a reduction of 7.7% compared to the 1994-995 base. Since 1999, additional pollution controls have been installed to reduce SO2 and NOx emissions in response to Phase 2 of the acid rain program and the NOx SIP call, further reducing mercury emissions as a co-benefit.

[46] U.S. EPA, *The Clear Skies Act, Technical Support Package*, July 11, 2003, Section G., p. 3, available at [http://www.epa.gov/air/clearskies/econ.html]. The analysis states that only 2-6 gigawatts (GW) of generation would install activated carbon injection in 2010 under Clear Skies. Total coal-fired electric generating capacity is approximately 300 GW.

regional variation in mercury deposition described earlier. The Clear Skies allowance program is based on the Clean Air Act's current program for acid precipitation, which is credited with achieving reductions faster and greater than required at a small fraction of the projected cost.

Most other legislation would reduce mercury emissions more and faster than Clear Skies. Under Senator Jeffords' S. 366, for example, utility mercury emissions would be reduced to a total of 5 tons (i.e., greater than 90%) by 2008. Senator Leahy's S. 484 and Representative Waxman's H.R. 2042 would set comparable requirements, a reduction of at least 90% from 1999 levels within three-and-a-half years of the bill's enactment (Leahy) or January 1, 2009 (Waxman). Under the Jeffords, Leahy, and Waxman bills, there would be no allowance trading and banking programs for mercury. Senator Leahy's bill also would set stringent standards for commercial and industrial boilers, chlor-alkali plants and Portland cement plants, and would require the separation of mercury-containing items from solid waste. The Leahy, Jeffords, and Waxman bills would also require EPA to ensure that mercury captured by emission controls is not re-released into the environment.

Senator Carper's S. 843 and its House counterpart, Representative Bass's H.R. 3093, present a middle ground between Clear Skies and the Jeffords, Leahy, and Waxman bills. Like Clear Skies, the Carper/Bass bill focuses only on coal-fired electric generating units, and it would establish a tradeable allowance program to ease compliance. But it would mandate sharper reductions sooner than the Administration bill – an 80% reduction in mercury emissions by 2013.

Under Representative Sweeney's H.R. 203, the Clean Air Act's existing provisions for mercury are essentially restated, with EPA to promulgate regulations for utility mercury emissions by December 15, 2004.

Conclusion

High concentrations of mercury in aquatic environments, and the resulting advisories to limit consumption of fish in order to protect human health, have focused attention on the role of mercury emissions from a variety of sources. Among the principal sources of mercury emissions, coal-fired power plants are the largest source and are the last category for which regulations have been proposed. Under a consent agreement, however, EPA agreed to propose regulations controlling mercury emissions from this category by December 15, 2003 (a deadline it met), with promulgation one year later. The Agency is considering several options regarding the form of these regulations.

While moving forward with the development of these regulations, EPA is, at the same time, asking Congress to eliminate the regulatory requirement in favor of a statutory cap and trade program for mercury and two other pollutants, through its Clear Skies bill. EPA has maintained that enacting Clear Skies will reduce mercury emissions with greater certainty and sooner than would the existing regulatory authority. The statement assumes that litigation will delay the implementation of MACT standards by three or more years, and that legislation will be enacted sooner, not later. It also assumes that we would start to see the benefits "immediately upon

passage of the legislation," presumably because companies would have an interest in banking credits for use or sale at a later date.[47]

Others in Congress have proposed legislation that would reduce mercury emissions from power plants to a greater degree and faster than Clear Skies. If swiftness and certainty are the main selling points of a legislative approach, Clear Skies is not the only available solution.

On the other hand, if the goal is to minimize cost by relying on co-benefits from the control of other pollutants, Clear Skies (or its regulatory cousins, the Interstate Air Quality Rule and the Section 111 mercury proposal) may be the preferred alternative. Emission controls designed to capture other pollutants have the effect of reducing mercury emissions. EPA notes, for example, that existing controls for sulfur dioxide and nitrogen oxides had already reduced mercury emissions from power plants by about one-third as of 1999.[48] The Administration's Clear Skies bill and its Section 111 proposal rely almost entirely on such co-benefits to achieve their mercury reductions: 2% or less of coal-fired electric capacity would need to install equipment specifically designed to reduce mercury by 2010 to achieve the reductions in mercury emissions required by the Clear Skies bill in its first phase. The 2018 (Phase 2) requirements also rely almost entirely on co-benefits to achieve the required 70% reduction in emissions, according to EPA's analysis.[49]

This situation raises equity concerns: other combustion sources (municipal waste combustors and medical waste incinerators) have been required to reduce emissions more than 90% under existing Clean Air Act authority, with considerably shorter deadlines than those in Clear Skies or the Section 111 proposal. Since similar technologies could be applied to coal-fired power plants, the absence of a requirement to do so is a notable feature of the Administration's legislative and regulatory approaches. Also notable is the elimination of any future residual risk regulations, which remain a possibility for other sources of mercury.

With the 1990 Clean Air Act amendments, however, Congress determined that electric utilities would be treated differently from other sources of hazardous air pollutants. The amendments required that EPA report to Congress before determining whether regulating utility emissions of these pollutants was appropriate and necessary. The special treatment for electric power producers was motivated by a number of factors, including a desire to preserve the use of coal as an energy

---

[47] Statement of EPA Administrator Christine Todd Whitman, *Fiscal Year 2004 Budget of the Environmental Protection Agency*, Hearing, Senate Environment and Public Works Committee, February 26, 2003.

[48] Ellen S. Brown, Office of Air and Radiation, U.S. EPA, "Overview of the Utility MACT Development and Issues," presentation to the Environmental and Energy Study Institute, March 7, 2003, p. 3.

[49] See ICF Consulting, "Updated Financial Impact Analysis of a Multi-Pollutant Emissions Policy," 2003 Update, November 20, 2003, p. 7, available at [http://www.epa.gov/air/clearskies/pdfs/yag1975-20031120.pdf]. The analysis concludes that only 1% of utility coal-fired capacity would install mercury-specific controls under a three-pollutant program such as Clear Skies.

option, for both economic and energy security reasons. Whether these concerns continue to justify more lenient treatment of the utility sector, or whether environmental and equity concerns outweigh them, will be at the core of congressional debate over mercury issues.

Table 5. Comparison of Mercury Emission Legislation

Provisions	H.R. 203 (Sweeney)	H.R. 999/S. 485 (Barton/Inhofe, by request) (Administration's Clear Skies bill)	H.R. 2042 (Waxman)	S. 366 (Jeffords)	S. 484 (Leahy)	S. 843/ H.R. 3093 (Carper/ Bass)	S. 1844 (Inhofe)
Pollutants covered	mercury, SO_2, NOx	mercury, SO_2, NOx	mercury, SO_2, NOx, and CO_2	mercury, SO_2, NOx, and CO_2	mercury	mercury, SO_2, NOx, and CO_2	mercury, SO_2, NOx
Affected electric generating units	electric utility sources (not further defined)	existing coal-fired electric generating facilities 25 MW or greater and new coal-fired units of all sizes	electric generating facilities 15 MW or greater	coal-fired electric generating facilities 15 MW or greater	fossil fueled utility steam generating units	coal-fired electric generating facilities 25 MW or greater	same as Clear Skies
Mercury emissions cap	EPA to promulgate regulations by December 15, 2004	26 tons in 2010; 15 tons in 2018	4.8 tons by 2009 (90% reduction from 1999 levels)	5 tons by 2008	about 5 tons (at least 90% reduction from 1999 levels) three and a half years after enactment	24 tons by 2009; 10 tons by 2013	34 tons in 2010; 15 tons in 2018
Trading provisions	no trading for mercury	tradeable allowance system	no trading for mercury	no trading for mercury, but allows plantwide averaging	no trading for mercury, but allows plantwide averaging	tradeable allowance system	tradeable allowance system

Provisions	H.R. 203 (Sweeney)	H.R. 999/S. 485 (Barton/Inhofe, by request) (Administration's Clear Skies bill)	H.R. 2042 (Waxman)	S. 366 (Jeffords)	S. 484 (Leahy)	S. 843/ H.R. 3093 (Carper/ Bass)	S. 1844 (Inhofe)
Residual risk	not addressed; thus, current Section 112 authority is retained, allowing EPA to set more stringent standards to address any residual risk in December 2012	coal-fired electric generating facilities would be exempt from MACT and residual risk requirements for mercury emissions	current Section 112 authority is retained	not addressed; thus, current Section 112 authority is retained	not addressed; thus, current Section 112 authority is retained	EPA would be required to address residual risk and if necessary promul-gate standards eight years after enactment	same as Clear Skies
Penalties for non-compliance	not specified; Clean Air Act enforcement provisions would apply	penalty equals the clearing price for emission allowances plus a one-to-one offset from future emission allocations, if paid within 30 days; otherwise the penalty is 3 times the clearing price plus offsets	not specified; Clean Air Act enforce-ment provisions would apply	three times the average mercury control cost per gram of excess emissions	not specified; Clean Air Act enforcement provisions would apply	$10,000 per pound (adjusted for inflation) plus one-for-one offset from future emission allocations	same as Clear Skies

Provisions	H.R. 203 (Sweeney)	H.R. 999/S. 485 (Barton/Inhofe, by request) (Administration's Clear Skies bill)	H.R. 2042 (Waxman)	S. 366 (Jeffords)	S. 484 (Leahy)	S. 843/ H.R. 3093 (Carper/ Bass)	S. 1844 (Inhofe)
Non-electric generating sources affected?	yes – requires EPA to promulgate regulations controlling industrial source mercury emissions by December 15, 2004	no	not later than two years after enactment, EPA shall promulgate regulations to ensure that any captured or recovered mercury is not re-released into the environ-ment	yes – not later than January 1, 2005, the EPA Administrator shall promulgate regulations to ensure that any mercury captured by emission controls at an electric generating facility is not re-released into the environ-ment; this requires regulations on disposal and reuse of coal combustion waste	yes – requires at least 90% emission reduction for coal- and oil-fired commercial and industrial boilers and at least 95% reduction for chlor-alkali and Portland cement plants; EPA to promulgate rules requiring separa-tion of mercury-containing items from solid waste streams; also requires EPA to promulgate regulations to ensure that any mercury captured by emission controls at an electric generating facility is not re-released into the environment	no; requires a report to Congress on the use of captured or recovered mercury 18 months after enactment	no

Provisions	H.R. 203 (Sweeney)	H.R. 999/S. 485 (Barton/Inhofe, by request) (Administration's Clear Skies bill)	H.R. 2042 (Waxman)	S. 366 (Jeffords)	S. 484 (Leahy)	S. 843/ H.R. 3093 (Carper/ Bass)	S. 1844 (Inhofe)
Other	requires EPA to determine by 12/31/11 whether additional standards are necessary to protect sensitive ecosystems and, if so, to promulgate them by 12/31/13; does not address state standards (under current law, they may be more stringent)	allows more stringent state standards; also, EPA, in consultation with DOE, is to study and report to Congress by July 1, 2009 whether mercury limits should be adjusted based on cost-benefit analysis and the cost-effectiveness of controlling various sources of mercury emissions	allows additional reductions if EPA determines the specified reductions are not reasonably anticipated to protect public health or welfare; does not address state standards (under current law, they may be more stringent)	allows more stringent state standards; ecosystem protection provisions identical to H.R. 203	allows more stringent state standards	allows more stringent state standards; also, not later than 15 years after enactment, EPA may revise the annual tonnage limit, after consider-ing impact on health, environ-ment, economy, and costs, with revised standards to take effect 20 years after enactment	provides for research and reports to Congress on mercury, but does not authorize more stringent standards