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ARTICLES

A Perfect Storm: Mercury and the Bush Administration

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Unprecedented Events

In October 1991, four separate weather systems gathered off the coast of New England: Hurricane Grace from the Atlantic, a cold front from New England, a high pressure system over southeastern Canada, and a low pressure system in the Maritimes.¹ When they converged, they created a storm as strong as any in recorded history, with winds of 120 miles per hour and waves the height of 10-story buildings. The interaction of the weather systems was so rare and its effects so cataclysmic, meteorologists dubbed the results “the perfect storm.” No one caught in the middle of such a phenomenon could survive.

For an Administration hostile to environmental protection, suspicious of regulation in virtually any form, and devoted to the short-term interests of the energy and chemical industries, the circumstances surrounding its decisions in December 2003 to forego meaningful controls on mercury air emissions from power plants and mercury cell chlor-alkali facilities amounted to the regulatory equivalent of the perfect storm.² Four separate policy frameworks—science, law, economics, and justice—combined to create huge pressure in favor of strict and swift controls.

As for science, the threat to public health posed by widespread methyl mercury (MeHg) contamination of the human food chain is recognized by every body of scientific experts that has considered the question. The National Academy of Sciences (NAS) concluded in 2000 that the children of women who eat fish and shellfish regularly during preg-

nancy are at risk of permanent neurological damage.³ The Centers for Disease Control (CDC) has assembled statistics showing that 8% of American women of child-bearing age have levels of mercury in their bloodstreams that could harm their unborn children.⁴ As this Article went to press, the *Washington Post* reported that a new government analysis has nearly doubled—to 630,000—the estimated number of newborn children at risk because of unsafe levels of mercury in their blood.⁵ Unless children and their mothers eliminate fish from their diets, this damage will continue indefinitely.

As for law, the Clean Air Act’s (CAA’s) provisions requiring technology-based regulation were automatically triggered by the U.S. Environmental Protection Agency’s (EPA’s) December 2000 finding that it was appropriate and necessary to regulate mercury from power plants. The same provisions also mandate that mercury emissions from chlor-alkali plants should be eliminated in favor of better technologies that forego the use of mercury altogether.

Economics reinforced the law and the science. Regarding power plants, for example, economic analysis showed that the benefits of regulating mercury—even if one considered only the ancillary benefits that come when other pollutants are reduced as a result of mercury controls—overwhelm the costs. Finally, basic principles of justice cried out for protection of the especially vulnerable groups of people—child-

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1. For a popular account, see SEBASTIAN JUNGER, *THE PERFECT STORM* (1997).
2. 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; Proposed Rule, 69 Fed. Reg. 4652 (Jan. 30, 2004) [hereinafter Proposed Power Plant Rule]; National Emission Standards for Hazardous Air Pollutants: Mercury Emissions From Mercury Cell Chlor-Alkali Plants; Final Rule, 68 Fed. Reg. 70904 (Dec. 19, 2003) [hereinafter Final Chlor-Alkali Rule].

3. NATIONAL RESEARCH COUNCIL, NATIONAL ACADEMY OF SCIENCES (NAS), *TOXICOLOGICAL EFFECTS OF METHYL MERCURY* 9 (2000), available at <http://books.nap.edu/openbook/0309071402/html/index.html> [hereinafter 2000 NAS REPORT].

4. CENTERS FOR DISEASE CONTROL (CDC), *FIRST NATIONAL REPORT ON HUMAN EXPOSURE TO ENVIRONMENTAL CHEMICALS* 18 (2001) (reporting that approximately 10% of women of child-bearing age have mercury levels within one-tenth of the reference dose (RfD) that is associated with an increase in abnormal scores on cognitive function tests among children); CDC, *SECOND NATIONAL REPORT ON HUMAN EXPOSURE TO ENVIRONMENTAL CHEMICALS* 19 (2003) (confirming these estimates and reporting that non-Hispanic white children ages 1-5 years old had lower blood mercury levels than either non-Hispanic blacks or Mexican Americans and that mercury levels in non-Hispanic black women between the ages of 16-49 were higher than levels in non-Hispanic whites and Mexican Americans). Both reports are available at <http://www.cdc.gov/nceh/dls/ner.htm>. The 8% figure refers to women who have levels at or above the RfD—as opposed to the 10% who have levels more of less than one-tenth of the RfD. It was reported by EPA on the basis of the CDC statistics. U.S. EPA, *AMERICA’S CHILDREN AND THE ENVIRONMENT* (2003) (EPA 240-R-03-001) [hereinafter EPA CHILDREN’S HEALTH REPORT].

5. Guy Gugliotta, *Mercury Threat to Fetus Raised, EPA Revises Risk Estimates*, WASH. POST, Feb. 6, 2004, at A3.

dren, pregnant women, communities that rely on fish for subsistence—harmed by mercury emissions.

Rarely does one see all of these fundamental and powerful forces—science, law, economics, and justice—work together so perfectly, all at once, to create an enormous momentum for good and timely regulation.

Although all those who watched this awesome system develop over the last decade expected the Bush Administration to search for routes around the storm, none were prepared for its headlong plunge into the tallest waves. The Administration simply refused to impose meaningful controls on industrial sectors that together produce the lion's share of mercury now poisoning fish across the country. So audacious is the Administration's effort that it has pushed beyond the envelope of what had passed for legitimate disagreements between conservatives, moderates, and progressives regarding the future direction of the nation's environmental and public health policies. We have reached a new plateau, where a new game is being played, and we would all do well to acknowledge that we do not yet understand the implications of these radically different rules.

At this turning point in the history of our efforts to control environmental pollution, it remains to be seen whether the Bush Administration's astounding effort to avoid the clear implications of science, law, economics, and justice will be successful. If it is, the Administration will not only have survived, it will have turned the storm's overwhelming force back on the public, leaving parents and children to fend for themselves and changing for the foreseeable future the ground rules that apply to such decisions.

This Article, the first of a two-part series, begins with a discussion of MeHg's impact on public health. In the course of this discussion, it considers scientific and technical justifications for the Bush Administration's policies, as advanced by conservative commentators. This Article also explains the building blocks of the Administration's emerging policy on mercury: its decision to embrace market-based air emissions trading in lieu of pollution control requirements for coal- and oil-burning power plants and its decision to forego meaningful controls on mercury cell chlor-alkali plants. The second part of the Article, to be published in the June 2004 issue of the *Environmental Law Reporter (ELR)*, will consider the Administration's hasty and one-sided effort to apply cost-benefit analysis to its trading decision, as well as the implications for public health and environmental justice of allowing companies to indulge in unrestricted trades of such an extremely toxic substance.

Because we are committed to a thorough analysis of the reasoning that motivates the creators of the Administration's misguided mercury policies, we have searched high and low for possible justifications of these decisions. This written documentation can be sorted into three categories: (1) remarkable statements from conservative commentators to the effect that MeHg is not a threat to public health and that, even if it is, American power plants are not a significant source of the problem; (2) broad claims by Administration officials that their decisions will accomplish better, or at least equivalent, results for less money; and (3) highly technical, bureaucratic rationales for the chosen actions. Each is considered below and in part two of this series. Not surprisingly, we conclude that these rationales do not hold up, whether evaluated factually or on the basis of their intrinsic logic. Something else must be going on.

That something else is nothing more—nor less—than a decision to relieve the burden on industry regardless of the impact on public health. Meaningful opportunities to control mercury were decimated because the Bush Administration could decimate them, despite persuasive scientific evidence of harm; the CAA's crystal-clear statutory mandates; the availability of better and cleaner alternatives; and the manifest inappropriateness of trading as a mechanism for controlling toxics. It is this stark and unapologetic exercise of power that makes the Administration's mercury policies so much more than business as usual.

Mercury Health Effects: A Little Goes a Long Way

Mercury is a heavy metal that is extraordinarily toxic and persistent in the environment, meaning that it does not break down into less harmful substances easily. MeHg, the form of the metal that is most toxic to people, results from the interaction between elemental mercury and microorganisms in soil and water.⁶ MeHg accumulates easily in fish, and contamination of the human food chain is the primary route of exposure for most people.⁷

Because mercury is so persistent, it circulates and recirculates from air to water to soil and back again without losing its toxic characteristics, producing what scientists call the "global mercury cycle," defined as the amount of mercury circulating in the environment of the planet at any one time.⁸ Of course, mercury's persistence also means that it can remain embedded in sediment, soil, or water long after it was emitted.

A very small amount of mercury goes a very long way. Worldwide, total air emissions from natural and anthropogenic sources are estimated to total 5,500 tons per year (TPY), although this number is far from precise.⁹ To put the relative size of these numbers in perspective, compare them to EPA estimates that in 1999, industrial sources emitted over 97 million tons of carbon monoxide, 25 million tons of nitrogen oxide, and 18 million tons of volatile organic compounds.¹⁰

Obviously, there is little we can do about natural sources of mercury air emissions. However, there is growing evidence that anthropogenic sources dominate the global cycle. Scientists studying ice cores withdrawn from the Upper Fremont Glacier in Wyoming estimate that over the last 100 years, anthropogenic—or man-made—sources account for approximately 70% of the global total, or approximately 3,800 tons.¹¹ American sources contribute a relatively small

6. 2000 NAS REPORT, *supra* note 3, at 1-5.

7. *Id.*

8. For a good description of this phenomenon, see U.S. EPA, DEPOSITION OF AIR POLLUTANTS TO THE GREAT WATERS, THIRD REPORT TO CONGRESS 2-4 (2000) (EPA 453-R-00-005), available at <http://www.epa.gov/oar/oaqps/gr8water>.

9. U.S. EPA, MERCURY STUDY REPORT TO CONGRESS 0-1 & 2-5 (1997) (EPA 452-R-97-003) [hereinafter 1997 EPA MERCURY REPORT].

10. U.S. EPA, NATIONAL AIR QUALITY AND EMISSION TRENDS REPORT (2001) (EPA 454-R-01-004), available at <http://www.epa.gov/air/aqtrnd99/toc.html>; *id.* at 136 (carbon monoxide), 141 (nitrogen oxides), 147 (volatile organic compounds).

11. P.F. Schuster et al., *Atmospheric Mercury Deposition During the Last 270 Years: A Glacial Ice Core Record of Natural and Anthropogenic Sources*, 36 ENVTL. SCI. & TECH. 2303 (2002), available at <http://www.ngdc.noaa.gov/paleo/pubs/schuster2002/schuster2002.html>.

share of this total amount—approximately 158 tons annually.¹² EPA estimates that roughly 87% of these air emissions are from combustion sources.¹³ Although most of the mercury entering U.S. waters results from the deposition of air emissions that can travel thousands of miles, EPA estimates that approximately 60% of the total mercury deposited in the United States comes from American—as opposed to worldwide—anthropogenic sources.¹⁴

Exposure to high levels of mercury has catastrophic effects on individuals exposed in utero and at a young age, effects including mental retardation, cerebral palsy, deafness, and blindness; even adults suffer from less severe sensory and motor impairments.¹⁵ More subtle neurotoxic effects occur at significantly lower doses, including poor performance on neurobehavioral tests, particularly those that evaluate attention, fine-motor function, language, visual-spatial abilities, e.g., drawing, and verbal memory.¹⁶ Recent studies also indicate that MeHg exposure can compound adverse cardiovascular conditions, an especially cruel twist since people suffering from such diseases are urged to make fish—as opposed to other kinds of meat—an integral part of their diets.¹⁷

EPA has established a reference dose (RfD) for MeHg of 0.1 microgram per kilogram ($\mu\text{g}/\text{kg}$) body weight per day for MeHg.¹⁸ A RfD is “an estimate of a daily exposure to the human population (including sensitive subpopulations) that is likely to be without a risk of adverse effects when experienced over a lifetime.”¹⁹ EPA’s number sparked such a vigorous challenge by industry scientists that the U.S. Congress directed the NAS to conduct an extensive review of the available science. To the dismay of those who engineered the referral, the NAS panel ultimately upheld EPA:

The population at highest risk is the children of women who consumed large amounts of fish and seafood during pregnancy. The committee concludes that the risk to that population is likely to be sufficient to result in an increase in the number of children who have to struggle to keep up in school and who might require remedial classes or special education. Because of the beneficial effects of fish consumption, the long-term goal needs

to be a reduction in the concentrations of MeHg in fish rather than a replacement of fish in the diet by other foods. . . . *On the basis of its evaluation, the committee’s consensus is that the value of EPA’s [RfD] is a scientifically justifiable level for the protection of public health.*²⁰

The EPA RfD is calculated to correspond to a whole blood mercury level below 5.8 μg per liter ($\mu\text{g}/\text{l}$) (parts per billion) or a hair level below 1.0 μg per gram ($\mu\text{g}/\text{g}$) (parts per million).²¹ In February 2003, the Agency released its long-awaited report entitled *America’s Children and the Environment*.²² Among other troubling findings, the report cited the CDC statistics that approximately 8% of women of child-bearing age in the United States had “at least 5.8 parts per billion of mercury in their blood in 1999-2000.”²³ This information was so startling and politically volatile that the *Wall Street Journal* reported shortly before the report’s release that it had been suppressed for nine months “while the Bush [A]dministration struggles with how to handle an increasingly contentious environmental problem.”²⁴

Four months later, a panel of experts from the United Nations’ Food and Agriculture Organization (FAO) and the World Health Organization (WHO) voted to decrease the Provisional Tolerable Weekly Intake (PTWI) of MeHg in food from 3.3 $\mu\text{g}/\text{kg}$ body weight per week to 1.6 $\mu\text{g}/\text{kg}$ body weight.²⁵ These international experts followed the same approach to available research as their NAS colleagues three years previously. They concluded that the full range of data from chemical analyses, animal testing, and epidemiological studies of mothers, infants, and children justified the decision to halve the PTWI number, despite one piece of contrary evidence: an epidemiological study involving people on the Seychelles Islands concluding that low levels of MeHg exposure do not have harmful neurological effects.²⁶ We discuss the merits of the Seychelles study and its use by conservative commentators further below.

Last but not least, the 2002 National Listing of Fish and Wildlife Advisories revealed that the number of states issuing advisories for MeHg has risen steadily from 27 in 1993 to 45 in 2002, an increase of 138%.²⁷ Mercury advisories

12. 1997 EPA MERCURY REPORT, *supra* note 9, at 0-1.

13. *Id.*

14. U.S. EPA, Regulatory Finding on Emissions of Hazardous Air Pollutants From Electric Utility Steam-Generating Units, 65 Fed. Reg. 79825, 79827 (2000) [hereinafter 2000 EPA Regulatory Finding].

15. 2000 NAS REPORT, *supra* note 3, at 4.

16. *Id.*

17. On the eve of a decision by a joint committee of experts sponsored by the Food and Agriculture Organization (FAO) of the United Nations and the World Health Organization (WHO), a group of 50 eminent scientists from all over the world urged the Committee to substantially lower the provisional “tolerable weekly intake” of methyl mercury. The letter is the best, most recent summary of the available medical evidence documenting the adverse health effects of MeHg exposure. In addition to reviewing the evidence on neurological effects, it explains these potential cardiovascular problems. Letter to Samuel W. Page, Ph.D., Acting WHO Secretary to JECFA, from Tord Kjellstrom, Professor et al. (June 3, 2003), attach. at 12-13 (“Several studies have linked mercury exposure to cardiovascular disease. These studies are important because consumers are advised to eat fish to protect against heart disease.”), available at <http://www.mercurypolicy.org/new/documents/2WHOcommentsFINAL060303.pdf> [hereinafter 50 Scientists’ Letter].

18. The RfD is set in EPA’s Integrated Risk Information System’s toxicological profile for methyl mercury, CASRN 22967-92-6, available on the Internet at <http://www.epa.gov/iris/subst/0073.htm>.

19. 2000 NAS REPORT, *supra* note 3, at 2.

20. *Id.* at 9, 11 (emphasis added).

21. 50 Scientists’ Letter, *supra* note 17, at 3.

22. EPA CHILDREN’S HEALTH REPORT, *supra* note 4.

23. *Id.* at 59 (emphasis added).

24. John J. Fialka, *Mercury Threat to Children Rising, Says an Unreleased EPA Report*, WALL ST. J., Feb. 20, 2003, at A1.

25. Press Release, WHO, U.N. Committee Recommends New Dietary Intake Limits for Mercury (June 27, 2003), available at <http://www.who.int/mediacentre/notes/2003/np20/en/>.

26. Gary J. Myers et al., *Prenatal Methylmercury Exposure From Ocean Fish Consumption in the Seychelles Child Development Study*, LAN-CET, May 17, 2003, at 1686 [hereinafter 2003 Seychelles Follow-Up Study] (“These data do not support the hypothesis that there is a neurodevelopmental risk from prenatal MeHg exposure resulting solely from ocean fish consumption.”). The committee explained the evidence it considered in Joint FAO/WHO Expert Committee on Food Additives, JECFA/61/SC, Sixty-first meeting, 10-19 June 2003, Summary and Conclusions at 18, available at <http://www.who.int/pcs/jecfa>. See also 50 Scientists’ Letter, *supra* note 17, which was sent to the committee on the eve of its deliberations and contained extensive discussion of the available evidence, including three epidemiological studies discussed in detail later in this Article.

27. U.S. EPA, FACT SHEET, UPDATE: NATIONAL LISTING OF FISH AND WILDLIFE ADVISORIES 5 (2003) (EPA 823-F-03-003), available at <http://www.epa.gov/ost/fish/>.

now cover 12,069,319 lake acres, or close to one-third of all American lakes, and 473,186 river miles, or close to 13% of all American river miles.²⁸ Because contamination of fish is the primary route of exposure for MeHg, populations that depend heavily on this form of nutrition, especially those who are subsistence fishermen, e.g., Native American populations, or who eat larger quantities of large, ocean species such as tuna and shark, are at the greatest risk.

Given this alarming body of evidence regarding the implications of exposure, how could the Bush Administration reject regulatory opportunities that were 14 years in the making? With a national election coming up, one obvious tactic (which the Administration does appear to be pursuing) is to claim that it is taking effective action and hope that the record is sufficiently technical and confused that few but the cognoscenti of such issues will figure out the implications of what it has really done. Despite this double speak, there can be little doubt that the Administration affirmatively decided to either ignore the public health threat or disbelieve its severity. To really understand the meaning of its actions, then, we must examine the larger context of the conservative campaign against *any* government intervention in this arena.

Conservative Counterpunch: Just Say No

The 2000 *NAS Report* upholding EPA's RfD for MeHg was a defining moment for the development of regulation to control those emissions, as acknowledged by Quin Shea, senior director of environmental activities at the Edison Electric Institute (EEI), in a statement issued on the heels of the NAS findings.²⁹ After explaining EEI's dogged commitment to the principles that "environmental policy should be based on credible science," and noting EEI's spirited resistance to various EPA regulatory activities, including tighter restrictions on ozone and particulate matter, Mr. Shea told his members: "The mercury issue is different. . . . We can't just say no."³⁰

But EEI's conservative allies at such groups as the U.S. Chamber of Commerce, the Competitive Enterprise Institute, the Cato Institute, and Frontiers of Freedom were unwilling to engage in such a strategic retreat. Here is the Chamber of Commerce on the mercury issue:

The push to regulate mercury emissions from power plants is an attempt by extreme environmental groups to hinder economic growth and force jobs overseas. Recent science shows that fish consumption, the only major cause of mercury exposure is not harmful to Americans and should be an integral part of a healthy diet. U.S. power plants account for less than 1% of all mercury emissions. These anti-job, anti-growth extremists need to quit scaring the public with bogus information.³¹

28. *Id.*

29. Quin Shea, *Electric Perspectives*, MERCURY MESSAGE, Sept./Oct. 2000, available at http://www.eei.org/magazine/editorial_content/nonav_stories/2000-09-01-apm.htm.

30. *Id.*

31. U.S. CHAMBER OF COMMERCE RADIO ACTUALITY, MERCURY EMISSIONS (2003), available at <http://www.uschamber.com/NR/rdonlyres/ej3hij4xabxpzdgwln7ck7hwmhxm5j6gtpeslpzavxc562c5cbmuao7n65tnucydwuplryxpguwosk5c5ew44h/mercurykovacs120303.txt>.

Conservative arguments against MeHg controls can be sorted into two categories. The first rests on their ubiquitous battle cry that regulatory decisions must be based on "sound science": conservatives contend that there is no good scientific evidence proving that MeHg contamination of the food chain poses a risk to public health.³² They also assert that even if MeHg poses a risk to vulnerable populations, most of the air emissions causing the problem come from power plants elsewhere in the world, making controls on U.S. sources pointless and unfair.³³

The second cluster of arguments revolves around the other transcending principle of the deregulatory crusade—application of cost-benefit analysis. Conservatives contend that the costs of control far outweigh the monetary value of the benefits that will be achieved by control, making mercury a poor candidate for regulation.³⁴ If mercury is regulated, public health will suffer in other, more important ways. For example, pregnant women and others may eat less fish, with the result that their diets will be less healthy.³⁵ Or the cost of power will escalate so dramatically that the poor, and especially the elderly, will be unable to afford air conditioning and will die in record numbers from heat stroke.³⁶

Because these arguments are typical of the most important arguments made against regulation of toxics in virtually all other contexts, and therefore illustrate the radically different decisionmaking framework and worldview embraced by conservatives, we consider them at some length, focusing in this installment of our two-part series on the scientific arguments and tackling the cost-benefit arguments in the next installment, to be published in the June 2004 issue of *ELR*.

The Science on Mercury

Scientific debates over the wisdom of regulating mercury implicate two distinct groupings of disciplines: the life sciences necessary to assess the implications of exposure for public health and the earth sciences necessary to determine the fate and transport of mercury air emissions through the environment. Thus, to decide whether we regulate, it is not enough to know that MeHg contamination of fish is harmful; we must also discover where such contamination originates.

32. U.S. CHAMBER OF COMMERCE, STRAIGHT TALK ABOUT MERCURY 3 (2003), available at <http://www.uschamber.com/government/issues/environment/airquality.htm> [hereinafter STRAIGHT TALK].

33. Patrick J. Michaels, Cato Institute, *EPA: Shoot First, Ask Later* (Mar. 19, 2003), at <http://www.cato.org/dailys/03-19-03.html> [hereinafter *Shoot First*].

34. *Id.* ("In fact, except for a few, very famous outbreaks of mercury poisoning . . . there's precious little sickness to be found on this fairly large planet. . . . This is a classic example of regulating first and asking questions later.")

35. CENTER FOR SCIENCE AND PUBLIC POLICY, WHITE PAPER: EPA MACT RULEMAKING NOT JUSTIFIED BY SCIENCE 4 (2003), available at <http://ff.org/centers/csspp/pdf/CSPP-1203-PP.pdf> [hereinafter WHITE PAPER]. The Center for Science and Public Policy is a project of the Frontiers of Freedom and should not be confused with other institutions that have similar names.

36. *Shoot First*, *supra* note 33 ("When people really need power to save their lives, which they do when it gets hotter than blazes in the nation's urban cores, it may not be there or it may be prohibitively expensive.")

MeHg and Public Health

In the last few years, referral of regulatory controversies to NAS peer review panels has gone from being a useful tool in complex regulatory decisionmaking to becoming a central tactic used to forestall or delay regulation of toxics. From the dangers of arsenic in drinking water to economic analyses of the benefits of controlling air pollution, Congress has seized the initiative from EPA by dropping such controversies in the NAS' increasingly overburdened lap.³⁷ Reflexive NAS referrals add several years to the regulatory process for promulgating new rules. They also have a corrosive effect on the Agency, discrediting its scientific expertise and ensuring that it has far less persuasive power regarding the thousands of policies that influence industrial pollution without maturing into full-fledged rules. For better or worse, however, this trend is likely to continue until either Congress or the executive branch rescues health and safety regulatory policy from this conundrum. Objectively, the controversy over the regulation of MeHg should fuel such a policy change because a comprehensive NAS review upholding EPA's RfD did not diminish resistance to further action, instead returning EPA to square one as if the review had never occurred.

Because conservative commentators have made NAS referrals a hallmark of their crusade to restore "sound science" to regulatory decisionmaking, but on this particular, awkward occasion the NAS panel upheld EPA's RfD for MeHg, conservatives were faced with the Hobson's choice of either re-interpreting the NAS findings or attempting to refute the conclusions of no lesser authority than their own science court of last resort. Ever enterprising, some re-interpreted the report, while others invented a third approach—ignoring its existence entirely.

Re-interpreters shamelessly cherry picked the report's carefully worded conclusions, omitting the crucial finding that pregnant women who consume large amounts of fish during pregnancy will give birth to children who are at risk for neurological problems³⁸ and instead asserting that the NAS found little evidence that children are affected appreciably by low-dose prenatal exposure to mercury.³⁹ Since the NAS upheld EPA's RfD, a target of unmitigated ridicule by these same conservative commentators,⁴⁰ it is quite some feat to claim support from the NAS in the same breath as you argue that MeHg simply does not pose a threat to public health.

Other commentators simply sidestepped the NAS panel, singling out just one of the many pieces of evidence considered by the panel and elevating it to transcendent impor-

tance.⁴¹ This tactic may be even more troubling than blatant distortion, in part because it has been used in a far broader variety of contexts and in part because it represents among the worst examples of the rapidly escalating efforts to politicize science.

To understand these implications, we must first define the far more traditional and widely accepted mode of analysis followed by the NAS panel. It began with an exhaustive effort to assemble all available evidence regarding mercury's toxicity, derived from a range of scientific disciplines and methodologies, including chemical structure analyses, fate and transport modeling, pharmacokinetic modeling, animal studies, and epidemiological studies.⁴² When the panel upheld the EPA RfD, it was therefore able to state unequivocally that it had considered the entire "*body of evidence* from human and animal studies" regarding neurological effects.⁴³ This "weight of scientific evidence" approach is defined elsewhere in the *2000 NAS Report* as all the "considerations involved in assessing the interpretation of published scientific information—quality of methods, ability of a study to detect adverse effects, consistency of results across studies, and biological plausibility of cause-and-effect relationships."⁴⁴ In plain English, the NAS panel believed that both its mandate and its professional responsibility were to consider the entire body of data that had been assembled using a range of scientific disciplines and methodologies. Then, exercising its consensus expert judgment to determine the implications of this evidence taken as a whole, the panel concluded that the EPA RfD is "scientifically justifiable."⁴⁵

Conservatives approach the issue of MeHg's toxicity from a very different perspective. For the most part, they ignore all scientific evidence, especially animal studies, that do not directly measure the effect of MeHg exposure on human beings.⁴⁶ Or, in other words, if adverse health effects are not proven in epidemiological studies, they do not exist. Under this reasoning, the absence of epidemiological studies should foreclose action. When epidemiological studies exist and document a problem, conservatives subject the data to a withering analysis that undercuts its credibility, study-by-study.⁴⁷ By the time each piece of the whole body has been weakened, there is little left to justify action to protect public health. If, on the other hand, epidemiological studies conflict, with some showing adverse effects and others failing to find them, conservatives elevate the second group, urging that action be foreclosed until such potentially false negatives can be disproved.⁴⁸

This is the scenario that describes the conservative analysis of the risks posed by MeHg exposure: a single epidemiological study on the Seychelles Islands did not find a link between the consumption of contaminated fish and neurologi-

37. See, e.g., NAS PRESS, ARSENIC IN DRINKING WATER (1999), available at <http://books.nap.edu/books/0309063337/html/index.html>; NAS PRESS, ESTIMATING THE PUBLIC HEALTH BENEFITS OF PROPOSED AIR POLLUTION REGULATIONS (2002), available at <http://www.nap.edu/books/0309086094/html/>.

38. See passage of 2000 NAS REPORT, quoted in *supra* note 3 and accompanying text.

39. See, e.g., Steven Milloy, *Mercury Scare Rising*, FOX NEWS (Feb. 21, 2003) (quoting out of context the NAS conclusion that "the functional importance of the apparent effects is uncertain"), available at <http://www.foxnews.com/story/0,2933,79140,00.html>.

40. See *id.* ("What's really going on is an effort by eco-activist staffers at the EPA to force backbreaking regulations on coal-fired electric power plants.")

41. Press Release, Frontiers of Freedom, No Detectable Risk From Mercury in Seafood, Study Shows (May 19, 2003), available at <http://www.ff.org/centers/csspp/press/051903-mercury.html> [hereinafter No Risk] (proclaiming Seychelles study definitive proof that mercury in fish is not a problem and neglecting to mention the NAS report).

42. 2000 NAS REPORT, *supra* note 3, at 4-5.

43. *Id.* (emphasis added)

44. *Id.* at 344.

45. *Id.* at 11.

46. See, e.g., No Risk, *supra* note 41.

47. See, e.g., STRAIGHT TALK, *supra* note 32.

48. *Id.*

cal damage in children.⁴⁹ Ergo, there is no good reason to control mercury emissions from U.S. power plants.⁵⁰

Prof. Thomas McGarity has dubbed this tactic the “corpuscular approach” to regulatory science.⁵¹ Such attacks are exhausting to follow, much less fend off. The favored vehicle used by industry practitioners of this tactic is the Information Quality Act, although the Act has not yet been used in the mercury context.⁵² An obscure appropriations rider that allows aggrieved parties to file challenges to scientific information “disseminated” by the government, the Act neither requires the government to provide those who performed the study an opportunity to defend it nor funds that additional burden on their professional time. The inevitable result is that expert panels could end up with unrefuted challenges to so many essential pieces of a scientific puzzle that they are foreclosed from applying their own judgment to the cumulative implications of the whole.

Of course, to be consistent, conservatives would be compelled to acknowledge that the corpuscular approach is a double-edged sword. Or, in other words, if it is a sound methodology, it should apply to the converse situation, as presented by the mercury debate: unless an epidemiological study can withstand the most detailed inspection, it cannot be used to justify inaction. After all, consider the likely reaction of deregulatory advocates if this particular shoe was on the other foot and “environmental extremists” tried to regulate on the basis of a single epidemiological study showing adverse effects when two other studies and the cumulative weight of other scientific evidence exonerated the chemical. Consistency, however, in this as in so many other contexts, appears to be the hobgoblin of a little mind.

Although the NAS panel clearly rejected the elevation of epidemiological data over any other form of scientific evidence, as well as the corpuscular approach to evaluating such research, the panel had the foresight to anticipate and respond directly to the conservative backlash to its conclusions. Consequently, even if policymakers are inclined to take the radical approach of depriving scientists of the ability to weigh all evidence—an extraordinarily controversial proposition in and of itself—they must also reject the NAS interpretation of relevant human data. That data and the competing analyses can be summarized as follows.

Two instances of severe and accidental mercury poisoning in Japan and Iraq provide the first pieces of evidence regarding the catastrophic results of high dose human exposure.⁵³ While data derived from these incidents provide some indication of what happens to people at far lower doses, the completion of three major epidemiological studies of populations exposed primarily through fish consumption are considered far more relevant to the regulatory issues at stake here and abroad. Two of those epidemiological studies—one conducted in New Zealand and the second conducted on the Faroe Islands—found significant neurologi-

cal effects at low doses.⁵⁴ As mentioned earlier, a third, carried out by a team headed by Dr. Gary Myers at the University of Rochester, found that with similar exposures, Seychelles Islanders experienced no discernible effects.⁵⁵

Although it concluded that all three studies were “well-designed and carefully conducted,” the NAS panel ultimately concluded that the Faroe Islands study was “the most appropriate” for deriving an RfD, in part because it was verified by the New Zealand study and in part because the Seychelles study contradicted the remaining body of evidence documenting MeHg’s hazards.⁵⁶

Despite the NAS analysis of the relative merits of the three epidemiological studies, conservatives argue that the Seychelles study, standing alone, is definitive evidence that MeHg in fish is not a public health threat.⁵⁷ This claim was fueled by the publication of an article in 2003 reporting that the team of scientists had returned to the Seychelles to conduct follow-up work with the same group of children covered by their earlier work, who were then nine years old.⁵⁸ Once again, they found “no detectable adverse effects in a population consuming large quantities of a wide variety of ocean fish.”⁵⁹ The authors of the 2003 report, published in the prominent British medical journal the *Lancet*, were careful to note that a variety of explanations could account for the differences in results between their work and the conclusions reached by the other two studies.⁶⁰ But champions of their work, and the one of the authors’ own public statements about it, soon rode roughshod over these learned qualifications.

Here is Dr. Myers, lead author on the Seychelles study, touting the significance of his work in testimony before the U.S. Senate Environment and Public Works Committee: “We do not believe that *there is presently good scientific evidence* that moderate fish consumption is harmful to the fetus.”⁶¹ In this simplistic sound bite, Dr. Myers did not limit himself to the results of the Seychelles study; nor did he ac-

54. *Id.* at 4-10, 250-70 (discussing the three reports).

55. *Id.*

56. *Id.* at 5-6:

Differences in the study designs and in the characteristics of the study populations might explain the differences in findings between the Faroe and the Seychelles studies. . . . When taking the New Zealand Study into account, however, those differences in study characteristics do not appear to explain the differences in the findings [because] the New Zealand study used a research design and entailed a pattern of exposure similar to the Seychelles study but it reported associations with Hg that were similar to those found in the Faroe Islands.

57. *See, e.g.,* STRAIGHT TALK, *supra* note 32.

58. 2003 *Seychelles Follow-Up Study*, *supra* note 26.

59. *Id.* at 1692.

60. For example, the authors acknowledged that the fact that they used maternal hair samples to detect levels of exposure, rather than the more sensitive umbilical cord blood samples used in the Faroe Islands study, could have produced different results, and they also acknowledged that they had used a different battery of tests for evaluating neurological effects. *Id.* at 1691. Both of these discrepancies were also observed by the NAS panel, and of course did not change between the earlier and later iterations of the Seychelles study. 2000 NAS REPORT, *supra* note 3, at 5-7.

61. *Hearing on Climate History and Mercury Emissions Before the U.S. Senate Comm. on Env't and Public Works* (July 29, 2003) (statement of Dr. Gary Myers, Professor of Neurology and Pediatrics, Department of Neurology, University of Rochester Medical Center) (emphasis added).

49. *Id.*

50. *Id.*

51. Thomas O. McGarity, *Proposal for Linking Culpability and Causation to Ensure Corporate Accountability for Toxic Risks*, 26 WM. & MARY ENVTL. L. & POL'Y REV. 1, 19 (2001).

52. Treasury and General Appropriations Act for Fiscal Year 2001, Pub. L. No. 106, §515 (2001). For a list of Information Quality Act challenges filed thus far, see <http://www.ombwatch.org/article/archive/171/>.

53. 2000 NAS REPORT, *supra* note 3, at 4.

knowledge the existence of contrary scientific evidence. Rather, he spoke as if he had searched high and low throughout the world and had never found any “good” evidence that MeHg is a human health problem.

Not surprisingly, on the basis of this statement, Dr. Myers became the hero and centerpiece of *Reality Check: Straight Talk About MERCURY*, published by the Chamber of Commerce, which concludes that “contemplated legislative and regulatory actions are premature and ill-advised.”⁶² In an effort to boost Dr. Myers’ credibility, the Chamber of Commerce notes in the same executive summary that reaches this conclusion that Dr. Myers’ work was funded by the U.S. National Institutes of Health, the Food and Drug Administration, and the U.S. Department of Health and Human Services.⁶³ It neglects to mention that Dr. Myers and his team also received \$486,000 in funding from the Electric Power Research Institute, as well as \$10,000 from the National Tuna Foundation, and \$5,000 from the National Fisheries Institute.⁶⁴ This disclosure was similarly omitted from the 2003 article in *Lancet* that fueled the new round of controversy over MeHg controls, despite a 2001 policy adopted by prominent medical journals including *Lancet* requiring the disclosure of funding sources of this importance.⁶⁵

In highlighting the failure of conservative groups and the *Lancet* to disclose the industry origins of some of Dr. Myers’ funding, our point is not that such funding in and of itself undercuts the credibility of the science. Rather, the effort to hide this particular ball is hypocritical and duplicitous given the Chamber of Commerce’s misleading effort to enhance the credibility of Dr. Myers’ work by boasting that it was funded by the government.

Far more important, however, are the high stakes implicated by the general effort to undermine the weight of scientific evidence approach to decisionmaking. As conservatives escalate efforts to use Information Quality Act challenges to knock out individual pieces of science, the likelihood emerges that science will become a factor as heavily politicized as any other, with the power of money, as opposed to its intrinsic merits, determining how research is used. This element of the perfect storm will have been turned inland, heading straight for the places where people live.

A Global Problem?

However complex the science underlying MeHg’s implications for public health, it is at least equaled by intense debate over the fate and transport of mercury through the environment. Millions of dollars have been spent on studies of the various facets of this puzzle: how much and what species of mercury are emitted by global sources, either natural or

anthropogenic; what is the breakdown between global, national, regional, and local sources; how far and how fast do air emissions travel before they are deposited on the land; how does air deposition become methylated, entering the food chain and threatening public health; which specific categories of sources contribute the species of mercury most likely to become methylated; and—given the uncertainty that plagues the monitoring and modeling necessary to answer these questions—will regulation do any good?⁶⁶ After all, if the MeHg in the large-mouth bass a subsistence fisherman catches for his family’s dinner is primarily contaminated by sources thousands of miles and dozens of political jurisdictions away, a local regulatory strategy may not solve the problem. Conversely, if local deposition is a substantial source of the contamination, and it is not feasible to persuade foreign sources to reduce their air emissions any time soon, our choices would appear to boil down to stringent local controls or eliminating affected fish from our diet.

EPA has responded to growing evidence that local controls do help by promulgating major rules controlling mercury air emissions from hospital and municipal waste incinerators.⁶⁷ The electric utility rule was to be its next, long-delayed effort to address a primary source of domestic, anthropogenic deposition.

As noted earlier, the 2000 NAS decision to uphold EPA’s RfD brought electric utilities to the rulemaking table to a greater degree than ever before. Gradually, however, it began to dawn on utility executives that the Bush Administration’s support for their industry, manifested in a variety of other formats, presented a new opportunity to rejoin the sound science debate that their conservative allies had never really abandoned. Adopting the same corpuscular tactics that seemed to serve them so well in the public health context, conservative commentators and industry scientists have mounted an unrelenting challenge to EPA and state efforts to document U.S. power plants’ contribution to the mercury problem.

There is no dispute that American power plants are far cleaner than sources abroad. As mentioned earlier, in 1996, EPA reported to Congress that total global mercury air emissions are about 5,000 to 5,500 TPY, with the United States contributing only 158 tons, or about 3% of that amount.⁶⁸ This discrepancy infuriates conservative commentators:

The United States, with about 25[%] of the world’s total economic activity, should logically emit about 1,000 of these megagrams. But we only throw out, according to the EPA, 144 megagrams, or 3.6[%] of the world’s total. That’s a pretty good bang for your mercury buck. . . . All of this means that there are plenty of densely populated places on earth . . . that are exposed to one heck of a lot more mercury from power production and other economic activity. Where are the bodies? Where are the sick millions? We Americans pay our environmental

62. STRAIGHT TALK, *supra* note 32.

63. *Id.*

64. JOINT INSTITUTE FOR FOOD SAFETY AND APPLIED NUTRITION (JIFSAN), ANNUAL REPORT 1998-1999, available at <http://web.archive.org/web/20020616124945/http://jifsan/um.edu/Rev99AnRep.htm> (“JIFSAN played a crucial role in bringing together the resources to continue [the Seychelles Child Development Study] on the developmental effects of mercury. Funding for the project was provided by the FDA . . . , the Electric Power Research Institute (present funding \$486,000), the National Tuna Foundation (\$10,000), and the National Fisheries Institute (\$5,000).”).

65. Editorial: *Sponsorship, Authorship, and Accountability*, 345 NEW ENG. J. MED. 825 (2001).

66. The best sources that give a flavor of these complexities are the 1997 EPA MERCURY REPORT, *supra* note 9, and FLORIDA DEP’T OF ENVTL. PROTECTION (FDEP), INTEGRATING ATMOSPHERIC MERCURY DEPOSITION WITH AQUATIC CYCLING IN SOUTH FLORIDA (2002, rev. 2003), available at <http://www.floridadep.org/labs/mercury/docs/flmercury.htm> [hereinafter 2003 FLORIDA MERCURY STUDY].

67. See, e.g., 40 C.F.R. pt. 60, subpts. Ce, Ec (hospital waste incinerators); *id.* subpts. Cb, Eb (large municipal waste combusters).

68. 1997 EPA MERCURY REPORT, *supra* note 9, at 0-1.

lobby billions of dollars per year to find them. They aren't there.⁶⁹

At one level, this argument is grounded in a form of economic rough justice: so long as the United States is relatively clean and mercury levels here are declining, we are justified in refusing to take action to curb pollution until dirtier countries go first. Of course, as discussed above, conservatives do not concede that mercury poses a public health risk, making this kind of syllogism easier to advocate. Even so, we find ourselves revisited by the consistency hobgoblin. If we are justified in failing to take action because we contribute only a small portion of total global air emissions, then should we be compelled to take action when we contribute the lion's share of emissions, as we do in the global climate change arena?

Whatever the logical implications of the "stay dirty until others clean up" argument, it has technical aspects that must also be considered. The argument assumes that since MeHg in American fish largely derives from the global mercury cycle, it is pointless to impose large costs on the owners of any American facilities until their international counterparts go first.⁷⁰ However, this rationale is directly refuted by EPA's finding, undisputed by mainstream industry scientists, that "roughly 60[%] of the total mercury deposited in the [United States] comes from U.S. anthropogenic air emission sources; the percentage is estimated to be even higher in certain regions (e.g., [Northeast United States])."⁷¹

One final point of global equity deserves mention: EPA models indicate that each year American sources contribute more to the global mercury cycle—107 tons—than the country gets back in deposition from the global cycle—35 tons.⁷² We may be relatively clean, but we are nevertheless exporting the pollution we generate at higher levels than other countries are sending their pollution to us.

Undeterred by these inconvenient statistics, conservative commentators and industry scientists delve deeper into the details of domestic deposition. They do not dispute that coal-fired electric utility boilers are among the largest, unregulated sources of mercury in the country, contributing 30% of domestic anthropogenic air emissions.⁷³ However, they argue, EPA has not yet demonstrated that the precise species of mercury produced by coal-fired power plants is in fact the same mercury that, when methylated, contaminates fish.⁷⁴ In its *2000 Regulatory Finding*, EPA dismissed this "waste fingerprinting" argument, concluding that it "is not necessary to quantify the amount of mercury in fish due to electric utility steam-generating unit emissions relative to other sources" in order to begin a rulemaking on the subject.⁷⁵

69. *Shoot First*, *supra* note 33.

70. WHITE PAPER, *supra* note 35, at 4.

71. 2000 EPA Regulatory Finding, *supra* note 14, at 79827 (emphasis added). In a relatively careful piece of technical writing that cited experts working for the industry-sponsored Electric Power Research Institute, Carola Hanisch explained the scientific uncertainties of mercury deposition without challenging these figures. Carola Hanisch, *Where Is Mercury Deposition Coming From?*, ENVTL. SCI. & TECH., Apr. 1, 1998, available at <http://pubs.acs.org/hotartcl/est/98/apr/mer.html> [hereinafter *Mercury Deposition*].

72. 1997 EPA MERCURY REPORT, *supra* note 9, at 0-1 to 0-2.

73. 2000 EPA Regulatory Finding, *supra* note 14, at 79827.

74. *Mercury Deposition*, *supra* note 71 ("Only Hg²⁺ readily deposits locally. The fraction of Hg²⁺ that occurs in mercury emitted from sources such as coal fired power plants is not well established.")

75. 2000 EPA Regulatory Finding, *supra* note 14, at 79827.

A study conducted by the Florida Department of Environmental Protection (FDEP) provides significant support for that determination.⁷⁶ On November 6, 2003, then-FDEP Secretary David Struhs, a political appointee of President George W. Bush's brother, Gov. Jeb Bush (R-Fla.), announced that "[p]ollution controls introduced two decades ago to limit mercury air emissions are delivering dramatic results in our lifetime—similar to the environmental gains made with the elimination of lead in gasoline."⁷⁷

The motivation for the Florida study was the need to calculate a total maximum daily load (TMDL) under the Clean Water Act for mercury contamination in two million acres of the South Florida Everglades, an imperative confronting states throughout the country as TMDL deadlines come due.⁷⁸ Florida had already imposed stringent controls on municipal and medical waste incinerators, producing significant declines in local mercury air deposition sources.⁷⁹ The question confronting regulators was what other measures would be necessary to combat levels of contamination that had led to fish advisories throughout the area.

Since air deposition plays such a significant role in mercury contamination of water bodies throughout the country, EPA funded the Florida pilot project to integrate models of atmospheric mercury deposition and aquatic cycling so that the TMDL could take into account all of the most significant sources. The modeling was carefully calibrated to extensive air and water quality monitoring, as well as monitoring of MeHg bioaccumulation in large-mouth bass. The scientists participating in the study were careful to point out that "mercury issues within the Everglades are extremely difficult to assess due to the size and heterogeneity of the Everglades."⁸⁰ They added that, even if all atmospheric deposition was eliminated, fish would still be contaminated by a "small residual mercury concentration" that results from "legacy mercury, deposited historically and now lying deep within the sediments."⁸¹ Nevertheless, the monitoring and modeling results provided by the study provide extensive evidence that the mercury concentrations in large-mouth bass (and, for good measure, great egret feathers) have declined 75% from the mid-1990s to the year 2002.⁸² The model "predicts a linear relationship between atmospheric mercury deposition and mercury concentration in large-mouth bass," the study concludes.⁸³ These results were sufficiently convincing that the Florida Electric Power Coordinating Group was compelled to acknowledge that the fundamental hypothesis of the study, i.e., changes in local mercury emissions are the reason for lower levels of mercury in fish, "cannot be rejected."⁸⁴

The Florida utilities' reaction did not convince industry scientists at the national level to accept regulation, however. A statement issued by the Electric Power Research Institute

76. 2003 FLORIDA MERCURY STUDY, *supra* note 66.

77. Press Release, FDEP, Florida Everglades Study Reveals Decline in Mercury Levels, Nov. 6, 2003, available at <http://www.dep.state.fl.us/secretary/comm/2003/nov/1106.htm> [hereinafter Struhs Press Release].

78. This requirement is contained in 42 U.S.C. §1313(d).

79. Struhs Press Release, *supra* note 77.

80. 2003 FLORIDA MERCURY STUDY, *supra* note 66, at 5.

81. *Id.* at 67-68, 40-41.

82. *Id.* at 56.

83. *Id.* at 67.

84. *Id.* at 57.

(EPRI) argued: (1) mercury emissions released by municipal and medical waste incinerators are different from those released by power plants; (2) the Florida Everglades is a “unique” ecological system and results there cannot be extrapolated to other waterways; (3) despite extensive calibration of the models, the Florida report does not consider extensively enough the contribution of global sources; and (4) ergo, regulating power plants would not help reduce levels of contamination in fish.⁸⁵

There are two grains of truth lurking in this counterattack, which will undoubtedly evolve into an epic battle of the experts in court no matter what EPA’s final decision on mercury from power plants. The first is that, according to EPA estimates, incinerators contain about 20% more of the reactive mercury that is most easily methylated than do coal-fired power plants.⁸⁶ Further, as the Florida scientists acknowledge, the Everglades, like every web of natural systems, have their own unique characteristics.⁸⁷ But the point made by the utility industry and its conservative allies is not that some uncertainties exist in this, as in any complex scientific analysis. Rather, they are demanding that regulators meet such an extraordinarily high burden of proof that we are unlikely to assemble science that meets their stringent threshold for decades—long after most edible fish are contaminated to the point that it will take decades’ more effort to reverse these effects. Hidden beneath all the scientific complexification are decisions that most policymakers, much less the American people, have no idea is being made. We turn next to the law on air pollution, as a prelude to discussing and critiquing the Administration’s mercury policies from a legal perspective.

The Law on Mercury

In addressing mercury emissions from electric utility steam-generating units⁸⁸ and mercury cell chlor-alkali plants, EPA faced a legally straightforward task. Section 112 of the CAA lists mercury as a hazardous air pollutant subject to regulation,⁸⁹ and EPA had previously concluded that both power plants and chlor-alkali plants should be regulated as sources of mercury emissions.⁹⁰ Under the clear language of §112, listing of mercury and of these categories of sources led to an obligation on the part of EPA to regulate mercury emissions by prescribing the maximum achievable control technology (MACT) and requiring its installation. None of these steps is controversial under the settled understanding of §112, and each is a familiar part of EPA’s day-to-day regulatory work.

But in the ninth inning, after years of wringing its hands about the appropriate MACT, things went terribly wrong. With respect to power plants, sometime in the months before the Agency was set to issue its proposal to regulate mercury,

Jeffrey Holmstead, the head of EPA’s air office, got the idea that it would be better to reduce mercury by allowing industrywide emissions trading instead of plant-specific pollutions controls. This about-face was such a drastic departure from the course the Agency had been on since 1990 that EPA officials did not have the courage to take it to its logical extreme and announce trading as the only approach EPA would pursue. Instead, the Agency’s *Federal Register* notice soliciting comments on Holmstead’s ideas preserved the possibility that EPA might still pursue MACT controls. As a result, EPA’s preamble reads like an early white paper on the various policy alternatives to reduce mercury emissions from power plants, not like the formal agency proposal it purports to be. The Agency ties itself in knots trying to explain how the law allows it to promulgate either of these diametrically opposed options. Indeed, EPA acknowledges that it has not even offered a proposal for the design of the cap-and-trade program it favors, promising that its ideas will be forthcoming in not just one, but two, future supplemental notices.⁹¹

At this rate, regulation of mercury emissions from power plants is going nowhere fast, and EPA is obviously in no special hurry to move things along. So deep are the legal flaws in EPA’s alternatives that there is virtually no hope that its final rule will survive judicial review. One thing is guaranteed, however: it will take years before these issues are resolved and, in the meantime, mercury emissions from power plants will remain uncontrolled or inadequately controlled. Unlike the Administration’s ill-advised “reforms” of the new source review program, which displaced an existing regulatory structure in favor of legally wobbly deregulation so that when it was stayed by the U.S. Court of Appeals for the District of Columbia (D.C.) Circuit⁹² the regulatory program came back into force, the mercury proposals do not displace any program and even early action by a court of appeals will not bring regulation of mercury into being. One need not be a hopeless cynic to wonder whether this Administration, foe of environmental regulation and friend of the energy industry, thinks this legal uncertainty, with its attendant delay, is just fine.

For mercury cell chlor-alkali plants, the problems took a different form. In that instance, EPA did not root around outside §112 for legal authority to avoid strict regulation. Instead, it simply undermined §112 itself, by so narrowly classifying the categories subject to regulation that the Agency could, in effect, grandfather the most antiquated chlor-alkali plants in the country.

We start with a primer on §112, and then turn to separate analyses of the power plant and chlor-alkali proposals.

Mercury and MACT

In the 1990 CAA Amendments, Congress revamped the §112 program for hazardous air pollutants in two large ways. First, rather than wait any longer for EPA to list hazardous pollutants as a precondition to regulating them (it had taken EPA 20 years to list just eight pollutants),⁹³ Congress itself took the bull by the horns and listed some 188

85. EPRI, *The Florida Mercury Report—Putting It in Perspective* (undated), available at http://www.epri.com/corporate/discover_epri/news/HotTopics/env_FloridaMercuryRpt.pdf.

86. 2003 FLORIDA MERCURY STUDY, *supra* note 66, at 24, tbl. 6.

87. *Id.* at 5.

88. Referred to throughout as “power plants” for ease of exposition.

89. 42 U.S.C. §112(b)(1).

90. 2000 EPA Regulatory Finding, *supra* note 14; for chlor-alkali plants, see Initial List of Categories of Sources Under Section 112(c)(1) of the Clean Air Act Amendments of 1990, 57 Fed. Reg. 31576 (July 16, 1992).

91. 69 Fed. Reg. at 4703 (describing planned supplemental notices for model trading program for states and for determining unit allocations for existing sources under program).

92. *New York v. EPA*, 2003 U.S. App. LEXIS 26520 (D.C. Cir. 2003).

93. *Sierra Club v. EPA*, 2004 U.S. App. LEXIS 348 (D.C. Cir. 2004).

pollutants to be regulated by the Agency.⁹⁴ Second, Congress moved from the former health-based framework of §112 to a performance-based framework. No longer did Congress instruct EPA to set §112 limits based on what would protect public health with an ample margin of safety. Instead, Congress instructed EPA to set these limits based on the absolutely best available technological methods for controlling the hazardous air pollutants at issue.⁹⁵

Even after these amendments, however, EPA still had some listing to do. Before regulating a particular source under §112, EPA was required to list categories or subcategories of the sources of the air pollutants on the §112 list.⁹⁶ Once EPA had listed a category or subcategory, it could delete the category from its §112 list only if the Agency made a health-based determination that the category no longer belonged on the list.⁹⁷

Upon listing a category or subcategory of sources under §112, EPA became obligated to prescribe MACT under the stringent provisions of §112(d)⁹⁸:

Emissions standards . . . shall require the maximum degree of reduction in emissions of the hazardous air pollutants . . . (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 in [that] category or subcategory⁹⁹

Not only does the language “maximum degree of reduction in emissions” signal congressional intent that the standards be strict (most similar provisions settle for simply the “best” control measures), it also specified exactly how good the control measures must be. Section 112(d)(3) requires new sources to achieve at least the emissions control achieved by the “best controlled similar source.”¹⁰⁰ Existing sources are required to achieve the emissions control achieved by the best performing 12% of existing sources (or the best performing 5 sources if the category has fewer than 30 sources).¹⁰¹ Section 112(d)(2) further provides a virtual smorgasbord of emission control measures that might be regarded as MACT, ranging from the total elimination of a hazardous air pollutant to requirements for operator training or certification. As for deadlines, the standards were to be met within three years of the standards’ promulgation¹⁰² unless a one-year extension were granted by EPA.¹⁰³ With their high aspirations and tight deadlines, the MACT standards

under §112 are among the most stringent of the regulatory programs contemplated by the CAA.

Congress listed mercury as one of the hazardous air pollutants in 1990. However, it added a special twist for power plants in general, and for mercury from power plants in particular, instructing EPA to do a report on the health hazards posed by emissions of hazardous air pollutants from power plants and the alternative control strategies available to control them. On the basis of those findings, EPA was told to regulate these emissions if “appropriate and necessary.” EPA prepared the required report in 1998, concluding that mercury was the most worrisome of the hazardous air pollutants emitted by power plants.¹⁰⁴ In December 2000, the Agency announced that regulation of mercury from power plants was “appropriate and necessary” within the meaning of §112(n)(1)(A).¹⁰⁵ In a settlement agreement with the Natural Resources Defense Council, Inc. (NRDC), the Agency promised a §112 standard for mercury from power plants by December 2003.¹⁰⁶

Power Play

Until EPA’s formal proposal to regulate mercury under §112 of the CAA was made public, everyone had assumed that mercury from utility units would be regulated under §112. And with good reason. Not only had EPA reported to Congress, in 1997 and 1998, that mercury from power plants posed a serious health hazard warranting regulation under §112,¹⁰⁷ and not only had the Agency found, in December 2000, that regulation of utility units was necessary and appropriate under §112,¹⁰⁸ but the Agency had settled a lawsuit with the NRDC by agreeing to issue a proposal to regulate mercury under §112 by December 2003.¹⁰⁹ What is more, the meetings of a working group of experts, formed to advise EPA on the appropriate standard, proceeded under the assumption that regulation would take the form of a MACT standard under §112.¹¹⁰

What few people outside the government knew at the time was that, in the months leading to the December 2003 proposal, Holmstead was quietly working to develop a plan to go forward with regulation under §111 instead of §112, and to base regulation on an emissions trading program rather than on the more restrictive approach of §112.¹¹¹

94. 42 U.S.C. §7412(b) (listing pollutants).

95. *Id.* §7412(d).

96. *Id.* §7412(c)(1).

97. For sources emitting carcinogens, EPA had to find that no source in the relevant category posed a greater than one in one million risk to the most exposed individual in the relevant population, and for non-carcinogens, EPA had to find that no source emitted the hazardous pollutants in quantities that would be inadequate to protect public health with an ample margin of safety nor cause an adverse environmental effect. *Id.* §7412(c)(9)(B).

98. *Id.* §7412(c)(2).

99. *Id.* §7412(d)(2).

100. *Id.* §7412(d)(3).

101. *Id.* §7412(d)(3)(B).

102. *Id.* §7412(i)(3)(A).

103. *Id.* §7412(i)(3)(B).

104. 1997 EPA MERCURY REPORT, *supra* note 9.

105. 2000 EPA Regulatory Finding, *supra* note 14.

106. The agreement settled the case of Natural Resources Defense Council v. EPA, No. 92-1415 (D.C. Cir. Nov. 17, 1998).

107. 2000 EPA Regulatory Finding, *supra* note 14; U.S. EPA, STUDY OF HAZARDOUS AIR POLLUTANT EMISSIONS FROM ELECTRIC UTILITY STEAM-GENERATING UNITS—FINAL REPORT TO CONGRESS (1998) (EPA 453-R-98-004a) [hereinafter 1998 EPA HAZARDOUS AIR POLLUTANT STUDY].

108. 2000 EPA Regulatory Finding, *supra* note 14.

109. *See supra* note 106.

110. Indeed, the charge to the working group from EPA made clear that advising EPA as to an appropriate §112 MACT standard was the group’s sole task, and indeed that “revisiting the rationale for, and background of, the finding [that regulation was appropriate and necessary under §112] is not a topic of discussion for the working group.” U.S. EPA, ELECTRIC UTILITY STEAM-GENERATING UNITS MACT RULEMAKING WORKING GROUP, CHARGE AND PROCESS (2001). This document, and others related to the working group, are available at <http://www.epa.gov/ttn/atw/combust/utiltox/utxpgp.html#CAAAC>.

111. Eric Pianin, *EPA Led Mercury Policy Shift*, WASH. POST, Dec. 20, 2003.

The public health implications of EPA's turnabout are significant. Section 112-based proposals floated by EPA several years ago (before the "Clear Skies Initiative" became the Administration's catch-all solution to air pollution) projected that implementation of a MACT standard for mercury would reduce mercury emissions from power plants from approximately 48 TPY to as little as 5 TPY in 2008.¹¹² Compare this to EPA's trading proposal to limit mercury to 34 TPY in 2010, and 15 TPY in 2018.

EPA's proposal is, to put it most charitably, inchoate. Indeed, it is more accurate to refer to EPA's proposal in the plural rather than the singular. EPA has not decided which approach—trading or MACT—it should adopt, although its clear preference is for trading. It also has not decided which provision of the CAA—§111 or §112—it should use in developing a trading program, although its clear preference is for §111. (A trading program under §111 would be run by the states as a state implementation plan (SIP)-like program, while a trading program under §112 would be run by EPA.) It has not decided whether to undo its December 2000 finding that regulation of mercury is appropriate and necessary under §112 of the Act, although it is obviously sorely tempted to do so. It has not decided which specific part of §112—subsection (d) or subsection (n)—would justify the creation of an emissions trading program. It has not decided what the contours of the trading program will be, leaving even such threshold questions as whether the Agency or the states will run the program to another day, to be dealt with in a supplemental notice. Charged in 1990 with studying the need to regulate mercury from power plants, EPA, over 13 years later, has little to show for its time and efforts other than an ill-conceived last-minute reversal of an emerging position that had occupied the Agency for many years.

EPA's proposals for regulating mercury from power plants suffer from numerous legal flaws. Indeed, the sheer numerousness of EPA's suggestions seems to us to belie a deep insecurity on the Agency's part about the legality of its actions. In several places, the Agency simply throws out a statutory section that might—just might!—provide a legal basis for its proposals, and asks for public comment on whether the section flies as a statutory grounding for the Agency's ideas. Especially in a post-*Chevron, U.S.A., Inc. v. Natural Resources Defense Council* world, in which judicial deference to agencies' statutory interpretation is premised in part on agencies' expertise regarding the statutes they administer, this hunt-and-peck method of statutory interpretation is highly dubious.¹¹³

In any event, even EPA's full-scale statutory discussions fall flat. We do not attempt here to discuss all of the problems with EPA's analysis, nor do we venture beyond the problems EPA's analysis poses for its proposals with respect to mercury from power plants.¹¹⁴ In addition, although there are good reasons to suspect that EPA's proposed MACT standard for mercury is much too lenient, we will not en-

deavor here to address the technically complex question of what MACT for mercury should be.¹¹⁵

Still, we find we have plenty to say.

Because we are convinced that Holmstead, with the full backing of his Administration superiors, intends to pursue trading in the final analysis, our discussion centers on EPA's attempt to evade §112's MACT requirements and to embrace instead a trading program under either §111 or §112. Here are the fundamental problems with this part of EPA's proposal, from a legal perspective:

EPA has not justified deleting power plants from §112's list of regulated sources.

Because EPA has not done so, it must regulate mercury from power plants under §112 of the Act.

Neither §112(d) nor §112(n) authorizes EPA to create a trading program in toxic pollutants.

Even if a court could be persuaded to allow EPA to sidestep §112, the Agency is not authorized to employ trading under §111.

Delisting

First of all, EPA has not made the findings required by §112(c)(9) of the Act as a predicate for delisting. EPA found in December 2000 that mercury from power plants should be regulated under §112 of the Act, and listed this category of sources under this section.¹¹⁶ Section 112(c)(9) allows EPA to delete a category from §112's list only if it finds: (1) in the case of carcinogens, that emissions from any one source from the category will not pose a risk of greater than one in one million or more to the most exposed individual in the relevant population; or (2) in the case of other hazardous air pollutants, that the emissions level from any one source will be low enough adequately to protect the public health with an ample margin of safety and to avoid an adverse environmental effect.¹¹⁷ EPA has made neither of these findings in its proposal to regulate mercury, and has offered no evidence that would allow it to make these findings. EPA may not delete power plants from §112's list without making the required factual, health-based findings.

Instead of satisfying these statutory predicates, EPA concludes that delisting is appropriate because the Agency has suddenly discovered—decades after the provision's initial enactment—that §111 provides the authority to regulate mercury emissions from power plants. EPA nods in the direction of §112(c)(9)'s requirements, but argues that they apply only where the original listing of a source category

112. *Testimony of David Hawkins, Hearings on S. 485, Clear Skies Act of 2003, U.S. Senate Committee on Env't and Public Works, Subcommittee on Clean Air, Climate Change, and Nuclear Safety* (Apr. 8, 2003).

113. 467 U.S. 837, 14 ELR 20507 (1984).

114. We do not, for example, take on EPA's proposals with respect to emissions of nickel from power plants, nor do we analyze EPA's argument that it need not regulate other hazardous air pollutants from power plants, beyond mercury and nickel, even once it has listed power plants as a source category under §112.

115. Potentially problematic aspects of EPA's MACT proposal include the agency's decision to slice up the coal-fired power industry into tiny little segments depending on the precise type of coal used, see 69 Fed. Reg. at 4666, and its adjustment, based on "variability," to the average emissions rate of the best-performing sources in each category, which led to an emissions rate for bituminous coal plants that is 17 times the average achieved by the best performers, and a rate for sub-bituminous coal plants that is 8 times the average achieved by the best performers in that category. M.J. Bradley et al., *Standards for Power Plant Mercury and Nickel Emissions: Delay Is the Only Certainty*, ENVTL. ENERGY INSIGHTS, Nov./Dec. 2003, at 3. In addition, EPA's quite dismissive handling of precombustion techniques that would reduce mercury emissions, 69 Fed. Reg. at 4668-69, and of the possibility of requiring reductions beyond MACT, *id.* at 4675-77, may not withstand the arbitrary and capricious standard of review.

116. 2000 EPA Regulatory Finding, *supra* note 14.

117. 42 U.S.C. §7412(c)(9).

was consistent with the “statutory listing criteria,” and that “[t]he failure to fully recognize the scope of existing statutory authority in December 2000, is analogous to those situations where EPA has listed a source category under [§]112(c)(1) and later determined that it lacked a factual predicate for such listing and, therefore, delisted the source category without following the criteria of [§]112(c)(9).”¹¹⁸

But an incorrect factual predicate for a listing decision is an altogether different matter from EPA’s conclusion in this instance.

There are two large problems with evading §112(c)(9)’s requirements based on this kind of analysis. First, if EPA is correct that §111 gives it the authority to regulate mercury from power plants quite apart from the requirements of §112, then EPA would have had the authority, even after the 1990 Amendments to the Act, to go ahead and regulate mercury from power plants before conducting the study and writing the reports required by §112(n). Under that interpretation, EPA need not have bothered with the 1998 report and the 2000 finding; it could have simply regulated under §111 in the first instance. Yet no one, to our knowledge, has made this argument—least of all EPA—in debating the specifics of regulating mercury from power plants.

A second problem with EPA’s attempt to avoid the requirements of §112(c)(9) is that the Agency’s change of heart with respect to listing power plants under §112 has nothing to do with facts. It is therefore not analogous to the mistaken factual predicates at issue in previous delisting decisions. Throughout its preamble, EPA assiduously avoids any specific examination of the health benefits offered by regulation under §112 as compared to §111—even though the Agency frequently concedes that it must show that regulation under §111 adequately addresses the emissions of mercury from power plants. What we have here is a political change of heart, not a factual error, and §112(c)(9) makes clear that a political change of heart does not justify taking a source category off the §112 list.

Not only has EPA failed to make the health-based findings required by §112(c)(9) for delisting a source category, it has also failed to satisfy its own standard for substituting regulation under §111 for regulation under §112. In numerous places in its discussion of its decision to choose §111 over §112, EPA concedes that it must show that health effects from mercury will be adequately addressed by §111.¹¹⁹ Emphasizing this point, the draft preamble EPA sent to the White House Office of Information and Regulatory Affairs (OIRA) in November 2003 specifically left room for a whole section to be written, explaining how the §111 standard could meet EPA’s self-stated requirement when the deadline of §112 was stricter than that of §111.¹²⁰ Notably,

no such explanation appears in the proposal issued on January 30, 2004. Nowhere does EPA explain how §111 adequately addresses public health effects in light of the fact that both the deadline and the emissions requirements of §112 are stricter, if applied correctly, than those of §111.

EPA recognizes that its proposal may leave health effects unaddressed. Thus, it offers to revisit the health consequences of mercury emissions from power plants after 2010 and 2018, the years that begin the two phases of its proposed mercury trading program.¹²¹ One might observe that this was exactly the sort of analysis EPA undertook six years ago, when it reported to Congress in 1998 that mercury was the most harmful of the hazardous air pollutants emitted by power plants. Once again, delay, not protection of the public health, appears to be what EPA is after.

Regulation Under §112

Section 112(c)(2) provides that once EPA has listed a category or subcategory under §112, the Agency “shall establish emissions standards under subsection (d) of this section”¹²² Nothing could be plainer: EPA’s December 2000 listing of power plants under §112 triggered an obligation to regulate their emissions under §112.

Here, too, EPA’s arguments to the contrary are exceedingly weak. EPA states: “There is nothing in [§]112(n)(1)(A) that requires an ‘appropriate and necessary’ finding to result in . . . regulation under [§]112(d).” Apparently, however, EPA missed the first part of the last sentence of §112(n)(1)(A), which provides: “The Administrator *shall* regulate electric utility steam-generating units under this section,” upon making a finding that such regulation is appropriate and necessary.¹²³ EPA is quite right that §112(n)(1)(A) directs EPA to study “the hazards to public health reasonably anticipated to occur as a result of emissions by electric utility steam-generating units of pollutants listed under subsection (b) of this section after imposition of the requirements of this chapter.”¹²⁴ It is also correct that §112(d)’s MACT standards do not in the first instance turn on separate EPA findings of hazards to public health.¹²⁵ However, these observations do not support EPA’s conclusion that §112(n) has ruled out MACT-based standards under §112(d) for mercury from power plants. Instead, §112(n) merely requires EPA to make more specific than usual findings regarding hazards to public health before pursuing regulation of mercury from power plants under the rest of §112(d).

Even flimsier is EPA’s claim that §112(n)’s requirement that EPA study “alternative control strategies” means that §112(d) standards do not apply in the present circumstances.¹²⁶ Nothing in §112(n) suggests that Congress meant to direct EPA to do anything more than consider different ways of reducing mercury from power plants under §112(d). More important, this instruction to develop and consider alternatives does not suggest that Congress meant, through such subtle and indirect language, wholly to wipe out EPA’s

118. 69 Fed. Reg. at 4689.

119. *Id.* at 4684, 4687, 4689.

120. Draft—Deliberative Document, Proposed Revision of Regulatory Finding on the Emissions of Hazardous Air Pollutants From Electric Utility [Steam]-Generating Units and Proposed Standards of Performance for Mercury and Nickel From New Stationary Sources and Emission Guidelines for Control of Mercury and Nickel From Existing Sources: Electric Utility Steam-Generating Units; Proposed Rule (Nov. 26, 2003), available on EPA’s online docket, in docket number OAR-2002-0056. The note in the draft document stated: “Insert text explaining why regulation under [§]111 adequately addresses the confirmed hazards to public health associated with Hg and Ni emissions the environmental effects of HG when the [§]111 standards will be implemented somewhat later than the compliance date for the MACT standards.”

121. 69 Fed. Reg. at 4686-87.

122. 42 U.S.C. §7412(c)(2).

123. *Id.* §7412(n)(1)(A) (emphasis added).

124. *Id.*

125. 69 Fed. Reg. at 4662.

126. *Id.* at 4661-62.

obligation to regulate under §112(d) once it found regulation “appropriate and necessary” under §112(n).

Trading Under §112

Even if EPA were correct that §112(n) sets up its own regulatory framework for mercury emissions from power plants, EPA nevertheless would not be allowed to set up a trading program for mercury under §112(n). As noted above, §112(n)’s references to “hazards to public health” and to “alternative control strategies” cannot reasonably be read to take EPA outside the MACT framework set up by §112(d). Moreover, just because, as EPA suggests, an emissions trading program for mercury might “dovetail[] well” with the interstate air quality rule, does not mean that a cap-and-trade program is allowed under §112(n). EPA also emphasizes §112(n)’s reference to the requirements of other parts of the CAA. The relevant passage in §112(n), however, makes clear that other requirements of the Act are relevant only insofar as they affected the public health hazards EPA was directed to study in its 1998 report to Congress:

The Administrator shall perform a study of the hazards to public health reasonably anticipated to occur as a result of emissions by electric utility steam-generating units of pollutants listed under subsection (b) of this section after imposition of the requirements of this chapter.¹²⁷

The reference to public health is not, nor can it be read to be, a roving authority to install any kind of regulatory program for mercury EPA likes so long as it fits conveniently with the Agency’s other policy priorities.

Seemingly as an afterthought, EPA also suggests that perhaps it is not necessary, after all, to undo its finding that regulation of mercury is appropriate and necessary under §112(n), because perhaps an emissions trading program would be authorized by §112(d) itself.¹²⁸ The Agency cites no legal authority to support this proposition, and there is none. As the classically command-and-control language of §112 makes clear, and as its legislative history attests,¹²⁹ §112 creates a technology-based regime. Nothing in the language or history of the section even remotely suggests that emissions trading is one of the options contemplated by §112. Indeed, §112(d)(2)’s fulsome catalogue of the kinds of emission controls embraced by §112 is notable for its failure to include emissions trading as one of the regulatory options, despite the fact that at the same time Congress was writing this language it was also enacting the nation’s first-ever emissions trading program, to combat acid rain.

Trading Under §111

EPA’s third and final statutory source for an emissions trading program is §111, which establishes performance standards for new and existing sources of harmful air pollution. EPA argues that the language of §111(a)(1), which refers to the “best system of emissions reduction,” gives it the power to adopt a cap-and-trade program for mercury emissions from power plants.¹³⁰ EPA is mistaken.

Most notably, although §111 was amended in 1990 to omit the requirement that §111 limits reflect technological systems of emissions reduction, not a peep was heard from Congress about the possibility that a trading regime could be installed under §111. This silence, again, is significant in light of the fact that Congress was at that very time enacting our first trading program, in Title IV of the Act.

Section 111 clearly contemplates individualized, performance-based standards for sources covered by the provision. The provision is structured exactly like other performance-based limits found throughout the environmental laws. Sources are divided into categories and subcategories—something that would make little sense if emissions trading were contemplated, since subdivision could reduce the efficiencies associated with trading. As with other performance-based systems, moreover, existing sources are subject to §111’s requirements only when they make a physical change to their operations that results in emissions increases—again, a qualification that makes little sense where trading is the governing framework.

In addition, §111(h) recognizes the performance-based nature of the §111 standards by providing a contingency plan in the event performance-based measures are “not feasible” to implement. In that case, §111(h) gives EPA the authority to “promulgate a design, equipment, work practice, or operational standards, or combination thereof, which reflects the best technological system of continue emissions reduction which . . . the Administrator determines has been adequately demonstrated.”¹³¹ One of the ways a performance standard might prove “not feasible” is if “a pollutant or pollutants cannot be emitted through a conveyance designed and constructed to emit or capture such pollutant”¹³² Clearly, Congress thought the most likely scenario under §111 was for pollutants to be “emitted through a conveyance designed and constructed to emit or capture such pollutant[s]”—an assumption at odds with EPA’s assertion of authority to construct a trading program under §111.

Section 111 also provides good evidence that it is not even a good source for hazardous air pollutant regulation, let alone a source for hazardous air pollutant regulation through a cap-and-trade program. Existing sources are controlled by §111(d), which requires EPA to set up a SIP-like process for states to reduce pollution from sources in listed categories. Before 1990, this provision required each state to submit to EPA a plan which “establishes standards of performance for any existing source for any air pollutant (i) for which air quality criteria have not been issued or which is not included on a list published under [§]108(a) of this title or [§]112(b)(1)(A) of this title but (ii) to which a standard of performance under this section would apply if such existing source were a new source. . . .”¹³³

In 1990, Congress decided to alter the italicized language. Unfortunately, however, the U.S. House of Representatives and Senate did not agree about what the change should look like. In the House version, the italicized language was changed to “or emitted from a source category which is regulated under [§]112 of this title.”¹³⁴ In the Sen-

127. 42 U.S.C. §7412(n)(1)(A); 1998 EPA HAZARDOUS AIR POLLUTANT STUDY, *supra* note 107.

128. 69 Fed. Reg. at 4667.

129. *Sierra Club v. EPA*, 2004 U.S. App. LEXIS 348 (D.C. Cir. 2004).

130. 69 Fed. Reg. at 4686.

131. 42 U.S.C. §7411(h)(1).

132. *Id.* §7411(h)(2)(A).

133. *Id.* §7411(d)(1) (emphasis added).

134. Pub. L. No. 101-549, §108(g).

ate version, the language was changed—in what the Senate deemed a “conforming amendment,” meaning it was not intended to amend the substance of the provision—to “or 112(b) of this title.”¹³⁵ The U.S. Code contains the House version of the amendment. When it came time to print the law in the Statutes at Large, however, the codifier reported that this operation “could not be executed” because of the two conflicting amendments. Thus, the Statutes at Large contains both versions of the amendment, embraced by parentheses, as follows: states are to submit plans to EPA which establish “standards of performance for any existing source for any air pollutant . . . which is not included on a list published under [§]7408(a) of this title (*or emitted from a source category which is regulated under [§]112 of this title*) (*or [§]112(b)*).”¹³⁶ In this kind of situation, the Statutes at Large constitute the legal evidence of what the laws say¹³⁷—meaning, of course, that what the law says here seems to be a jumble.

The difference in the language of the House and Senate amendments to §111(d) has several possible implications. Since the House did not label its amendment “conforming,” it must have thought it was somehow changing the meaning of the provision—thus inviting an interpretation different from the “conforming” amendment offered by the Senate. One might interpret the House language as precluding regulation under §111(d) only when a source category is actually being regulated under §112. Under that interpretation, EPA’s failure to regulate under §112 would give it the authority to regulate under §111 instead. However, given that the purpose of the passage in question is obviously to restrict application of §111 in deference to regulation under other provisions of the Act, this interpretation seems strained at best. Such an interpretation would allow EPA to choose the more lenient §111 requirements over the requirements of §112 the Act merely by failing to regulate under §112. This interpretation would also directly contradict the Senate version of the §111 amendment, since the Senate’s version provides that §111 does not apply to pollutants listed under §112. Another possibility is that the House version means that if EPA were to regulate a hazardous air pollutant from a source category under §112, that would preclude EPA from regulating even *non*-hazardous air pollutants from that category under §111—leaving a regulatory vacuum that has no apparent purpose under the Act.

It is hard to make precise sense of the language of §111(d)(1), given the differing amendments brought into the provision in 1990. One thing does seem clear, however: the provision appears to contemplate that regulation under §111 will operate as a kind of last resort, after regulation under other provisions of the Act has failed to occur. It would seem most odd, therefore, for EPA to interpret §111 as depriving EPA of authority to regulate under §112 as long as the regulatory possibilities under §111 have not been exhausted. Yet this is precisely how EPA is proposing to interpret §111.

Coddling the Old Dirties

The odyssey of EPA’s abortive efforts to apply the requirements of CAA §112 to nine antiquated mercury cell

chlor-alkali plants is discouraging for several reasons, the most obvious of which is the fact that this small segment of the chemical industry “loses” as much as 65 tons of mercury each year during the manufacturing process.¹³⁸ These 65 missing tons are not counted in the estimate that the United States has 158 TPY in total mercury air emissions.¹³⁹ The companies claim that the missing mercury is safely trapped in their plants’ piping; environmentalists say the mercury is discharged as fugitive air emissions; and EPA acknowledges, without a hint of irony, that as far as it can tell, the fate of these missing tons is an “enigma.”¹⁴⁰ Considering the controversy that erupted over controlling mercury air emissions from power plants, it is truly remarkable that virtually no one noticed when EPA announced on December 19, 2003, that it had decided to coddle these nine “old dirties” to the point that they can continue to operate indefinitely under a system of regulatory “work practices” that are likely to prove unenforceable.¹⁴¹ The effect of those requirements, which have as their centerpiece visual inspections of the cell room, is so uncertain that EPA is unable to set a numerical limit for those fugitive emissions or estimate what amount of reductions the new work practices will achieve.¹⁴²

The nine facilities are so outmoded that a new one has not been built in 30 years.¹⁴³ Yet, given the opportunity to hasten their departure from the field and achieve landmark mercury reductions, EPA ducked, claiming that it had not obtained enough information to even predict the reductions in fugitive emissions expected as a result of its work practice requirements.¹⁴⁴ EPA’s shirking of its affirmative legal responsibility to remove MeHg from the environment may have been motivated “top-down” by senior political appointees or it may have originated “bottom-up” from career staff. Whichever theory of the Agency’s internal machinations one accepts, this episode reveals an EPA so thoroughly dominated by industry resistance to regulation that it cannot act effectively regardless of the urgency of the threat posed to public health.

Unlike power plants, which emit mercury as the inevitable but unintended byproduct of burning coal, mercury cell chlor-alkali facilities deliberately use large amounts of pure

138. In its proposed rule, EPA stated that there were 43 chlor-alkali facilities operating in the country, of which 11 used mercury cell technology. National Emission Standards for Hazardous Air Pollutants: Mercury Emissions From Mercury Cell Chlor-Alkali Plants, Proposed Rule, 67 Fed. Reg. 44672, 44680 (July 3, 2002) [hereinafter Proposed Chlor-Alkali Rule]. In its final rule, the Agency did not repeat this breakdown, although it assumed in one set of figures that nine plants remained in the mercury cell subcategory. Final Chlor-Alkali Rule, *supra* note 2, at 70920 (assuming that if 65 tons of missing mercury was allocated among the operating facilities evenly, each would have “just over 7 tons”).

139. 1997 EPA MERCURY STUDY, *supra* note 9, at 0-1 (estimating annual emissions at 158).

140. Final Chlor-Alkali Rule, *supra* note 2, at 70920.

141. *Id.* at 70928-46 (text of final rule).

142. *Id.* at 70920 (“[D]ata are not available to establish a numerical emission standard for fugitive emissions.”); 70924 (“We are unable to quantify the primary air emission impacts associated with the final work practices standards . . .”).

143. Proposed Chlor-Alkali Rule, *supra* note 138, at 44688 (reporting not only that no mercury cell plants have been built in the United States in 30 years but that EPA has “no indication of any plans for future construction”).

144. *Id.* at 44684. (“Relative to emissions, we firmly believe that although we are unable to actually quantify the reductions expected with the implementation of the beyond-the-floor option, substantial reductions would nonetheless occur.”).

135. *Id.* §302.

136. 69 Fed. Reg. at 4685 (emphasis added).

137. *Id.* (citing 1 U.S.C. §204(a); *United States v. Welden*, 377 U.S. 95, 98 n.4 (1964)).

mercury; as many as 350 tons are onsite at the typical plant.¹⁴⁵ The manufacturing process feeds liquid mercury in a continuous loop through an electrolytic cell and a decomposer, forming an electric charge that precipitates chlorine gas out of saturated salt brine.¹⁴⁶ Mercury use is intended to be “captive” in this process—that is, the mercury is not intentionally added to finished products nor is it consumed as a catalyst.¹⁴⁷ Rather, it is recycled continuously with the goal of reusing all of the virgin materials fed into the system. Nevertheless, as EPA acknowledges, such plants lose significant amounts of mercury all along the way:

Mercury is emitted from two point sources [at such plants]—the end box ventilation system and the by-product hydrogen system. Mercury is also emitted from mercury thermal recovery units, which is [sic] also a point source. In addition there are mercury fugitive emissions from the cell rooms and from the waste recovery areas.¹⁴⁸

Thirty-two of the approximately 43 facilities that manufacture chlorine and caustic use diaphragm or membrane cells, which are significantly more energy efficient and do not use mercury.¹⁴⁹ However, rather than define the “source category” under §112 as all chlor-alkali facilities, making MACT the far cleaner diaphragm and membrane cell technologies, EPA chose to isolate the nine mercury cell facilities into their own subcategory, transforming their outmoded manufacturing process into MACT.¹⁵⁰ As legal justification for this decision, the Agency cited its “broad discretion” to define subcategories under the Act, whenever there are “technical distinctions among classes, types, or sizes of sources” that would “impact setting an appropriate emission limit even when creating the subcategories leads to some with a small number of sources.”¹⁵¹ This permissive approach cannot be what Congress intended when it firmly set the Agency on a different path toward controlling hazardous air pollutants close to 15 years ago.¹⁵² So minimal is the final rule that it will impose “plant-specific annual costs” ranging from \$130,000 to \$260,000, which in turn amount to from 0.01 to 0.22 % of their owners’ annual revenues.¹⁵³

EPA’s final rule sets numerical limitations on emissions from the three point sources identified above—the end-box, hydrogen, and thermal recovery systems—but does not set standards for fugitive emissions from cell rooms or waste recovery areas.¹⁵⁴ Nevertheless, the Agency claims it will reduce mercury air emissions by 3,068 kg—or about three

tons—annually beyond the levels allowed under the 1973 rule.¹⁵⁵ Even if you accept the Agency’s estimate at face value, simple math tells the rest of the tale.

The companies using mercury cell technology bought about 160 TPY of virgin mercury between 1990-1995, but this amount fell to 79 TPY in 2000 and then to 30 TPY in 2001.¹⁵⁶ These fluctuations likely reflect changes in the market for chlorine products and are not dependable from an environmental perspective, although EPA seized on them in justifying its decision, claiming that they reflect an overall “significant decrease from baseline levels.”¹⁵⁷ Whether or not the industry’s productivity grows back to 1995 levels, EPA accepted the argument made by environmental organizations that the 2001 figure of 30 TPY in virgin mercury purchases was so low that it was likely an outlier, instead using the 2000 figure of 79 TPY in explaining its rationale for adopting the final rule.¹⁵⁸ The Agency noted that mercury cell facilities reported toxic release inventory (TRI) numbers totaling 14 tons in 2000, leaving 65 tons “of consumed mercury that is not accounted for in the year 2000.”¹⁵⁹ At its best, then, assuming that work practices are faithfully followed and EPA takes effective enforcement against negligent firms, EPA’s final rule addresses three tons of this total, providing the industry with the windfall opportunity to continue losing at the astounding rate of 62 TPY. In essence, the best bet for public health and the environment threatened by fugitive emissions is either that all the missing mercury is miraculously trapped in its pipes, or that this segment of the industry will prove unprofitable and shut down.

EPA’s struggle to rationalize its way out of this conundrum is both labored and pitiful. In responding to comments as it issued the final rule, the Agency asserted that environmental organization commenters provided “little empirical evidence to support” the conclusion that the missing mercury escapes the system in fugitive emissions.¹⁶⁰ On the other hand, it said, while “industry personnel” claim the mercury “condenses and accumulates in pipes, tanks, and other plant equipment,” the industry “is also unable to fully substantiate their theory.”¹⁶¹ By then thoroughly confused by the lack of reliable information, EPA observed that mercury is a very heavy metal—one gallon weighs 113 pounds.¹⁶² If each of the nine plants is missing seven tons annually, continued the Agency in a classic example of non sequitur reasoning, “124 gallons of mercury would be unaccounted for per plant.”¹⁶³ But, it asserted, “[t]his is a very small percentage (less than 2[%]) of the amount of mercury typically on site at most facilities.”¹⁶⁴ At this inconclusive point, the Agency figuratively throws up its hands, concluding that “the fate of all the mercury consumed at mercury cell chlor-alkali plants *remains something of an enigma.*”¹⁶⁵

There are six companies that still operate mercury cell

145. EPA buries this startling fact in a garbled explanation of why it has no idea what happens to the lost mercury, noting that each of the nine plants lost seven tons of mercury which is “less than 2[%]” of the amount on-site at such facilities. Final Chlor-Alkali Rule, *supra* note 2, at 70920.

146. *Id.* at 70907.

147. *Id.*

148. *Id.*

149. Again, these figures are derived from the preamble to EPA’s proposed rule, and do not conform to the assumption in its final rule that only 9 of the 11 remaining facilities using mercury cells are still in operation. See *supra* note 138 and accompanying text.

150. Final Chlor-Alkali Rule, *supra* note 2, at 70918.

151. *Id.*

152. See *supra* notes 88-137 and accompanying text.

153. Final Chlor-Alkali Rule, *supra* note 2, at 70924-25.

154. Proposed Chlor-Alkali Rule, *supra* note 138, at 44691.

155. Final Chlor-Alkali Rule, *supra* note 2, at 70904.

156. *Id.* at 70920.

157. *Id.*

158. *Id.*

159. *Id.*

160. *Id.*

161. *Id.*

162. *Id.*

163. *Id.*

164. *Id.*

165. *Id.*

chlor-alkali facilities. In a press release issued on December 22, 2003, the NRDC identified them, their plants' location, and the water bodies potentially affected by these emissions as:

Nine Remaining Mercury Cell Chlor-Alkali Plants

Company	Plant Location	Water Bodies
Ashta Chemicals, Inc.	Ashtabula, Ohio	Lake Erie, Ashtabula River
Occidental Chemical Corp.	Muscle Shoals, Ala.	Pond Creek, Tennessee River
Occidental Chemical Corp.	Delaware City, Del.	Red Lion Creek, Delaware River
Olin Corp.	August, Ga.	Savannah River
Olin Corp.	Charleston, Tenn.	Hiwassee River
PPG Industries	Lake Charles, La.	Bayou d'Inde Calcasieu River Estuary
PPG Industries	New Martinsville, W.Va.	Ohio River
Pioneer Americas L.L.C.	Saint Gabriel, La.	Mississippi River
Vulcan Materials Co.	Port Edwards, Wis.	Wisconsin River

Ironically, the mystification expressed by EPA staff in charge of the mercury cell chlor-alkali rule regarding the significance of the nine plants' mercury emissions is not shared by their colleagues in Region 4, leaving one to hope that they will one day speak to each other. In February 2001, EPA Region 4 issued a TMDL for Total Mercury in Fish Tissue Residue in the Middle and Lower Savannah River Watershed.¹⁶⁶ The top four sources included:

Memorandum to Reporters and Editorial Writers from Jon Devine and Linda Greer, NRDC, Chlorine Plant Mercury Pollution: Where Did It Go? (Dec. 22, 2004) (copy on file with authors).

Sources of Mercury Contamination in the Middle and Lower Savannah River Watershed

Source Category	Number of Sources	Total HG Emissions Baseline Period (kg/yr)	% of Total Hg	% of Total Hg Emitted in the RGM Airshed	Total RGM Emissions Baseline	% of Total RGM
Medical Waste Incinerators	36	963	25.65	73	703	39.93
Power Plants	17	866	23.08	30	260	14.76
Chlor-Alkali	1	597	15.92	30	179	10.18
Municipal Waste Combustors	3	589	15.69	60	353	20.08

U.S. EPA, U.S. EPA Region 4, TMDL for Total Mercury in Fish Tissue Residue in the Middle and Lower Savannah River Watershed, at 28 (Feb. 28, 2001).

166. U.S. EPA Region 4, Total Maximum Daily Load (TMDL) for Total Mercury in Fish Tissue Residue in the Middle and Lower Savannah River Watershed (Feb. 28, 2001), available at http://www.epa.gov/Region4/water/tmdl/georgia/final/savannah_hg_final.pdf.

The estimate that the Olin Corporation plant emits 597 kg (about two-thirds of a ton) of mercury annually probably does not take into account fugitive emissions from the facility's cell room, which could have added as much as seven tons more to this estimate. Still, this single facility is identified among the top four contributors to mercury contamination of Savannah River fish.

As for the likelihood that the work practices promulgated by EPA will produce adequate reductions, they are likely to be only as good as the environmental ethic of the company involved or, in the absence of such an ethic, EPA enforcement. As for environmental ethics, two of the nine facilities are already under EPA enforcement orders at the moment. On February 28, 2002, EPA Region 5 announced that the Ashta Chemical facility in Ashtabula, Ohio, paid a fine of \$239,800 for poorly operating air pollution control equipment.¹⁶⁷ And the Occidental Chemical chlor-alkali facility in Delaware City, Delaware, has been cleaning up its site under a Resource Conservation and Recovery Act corrective action order since 1991, the majority of which dealt with mercury contamination of soil, including stormwater drainage channels.¹⁶⁸

167. Press Release, U.S. EPA Region 5, EPA Reaches Agreement With Ashta Chemicals; Includes \$239,800 Penalty, *available at* <http://www.epa.gov/Region5/newsnews02/02opa031.htm>.

168. U.S. EPA Region 3, GPRA Baseline RCRA Corrective Action Facil-

ity, Occidental Chemical Corporation, *at* epa.gov/reg3wcmd/ca/de/pdf/ded003913266.pdf (last modified May 20, 2003).

So, what do we have in the final analysis? The mercury is missing and EPA has no idea where it went. EPA knows that the nine facilities buy, store, and use as much as 70 TPY of pure mercury. Yet the Agency is not motivated to find out what happens to this mercury at the end of the manufacturing process. As a sop to environmentalists, the final rule asks the nine facilities to report the mass of virgin mercury added to cells in the five years preceding the rule's compliance date of December 19, 2006.¹⁶⁹ It makes no promises that it will ever do anything in response to this information.

The Next Wave

Mercury is bad for people, and the law requires that it be strictly regulated. EPA's lenient proposals to regulate mercury from power plants and mercury cell chlor-alkali facilities flout these scientific and legal realities. In the second part of this Article, we consider the economic analysis underlying, and distributional implications of, EPA's mercury policies, and find that the policies fall flat on the grounds of economics and justice as well as on the grounds of science and law.

169. Final Chlor-Alkali Rule, *supra* note 2, at 70921.