BEYOND MERCURY

HOW THE **FINE PRINT** OF THE **BUSH ADMINISTRATION PLAN** MEANS

MORE ARSENIC DIOXIN LEAD

AND OTHER TOXIC AIR POLLUTION

CLEAR THE AIR

Acknowledgements

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INTRODUCTION

Even though the Bush administration is not reducing mercury emissions as quickly or completely as the Clean Air Act requires, it can still claim that it is at least doing something. The same can not be said for lead, arsenic, dioxin, chromium and dozens of other dangerous air toxics – many of which are emitted at levels that dwarf power plant mercury emissions (Figure 1).

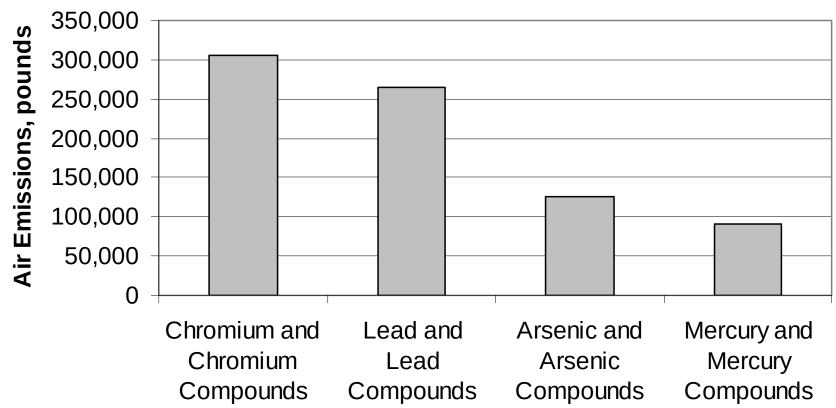
For example, lead poses many of the same types of public health concerns as mercury. But lead and lead compound air emissions in 2002 were over 265,000 pounds compared to 90,380 pounds of mercury and mercury compounds. Chromium and chromium compound emissions in 2002 were over 306,000 pounds.[1]

Eleven states – California, Connecticut, Maine, Massachusetts, New Jersey, New Hampshire, New Mexico, New York, Pennsylvania, Vermont, Wisconsin – agree that there is cause for concern, as do state and local pollution control officials, all of whom submitted comments on the mercury rulemaking. The states told the administration that the Clean Air Act "requires EPA to promulgate emission standards for all HAPs [hazardous air pollutants] emitted…The [Clean Air Act] does not authorize EPA to pick and choose which HAPs it will regulate."[2]

When it comes to power plant air toxics, the Bush administration is seriously shortchanging public health. Although data from the U.S. Environmental Protection Agency (EPA) show that coal-fired power plants emit more than 60 toxic air pollutants, the agency is promoting a weak plan to address mercury alone. This plan not only delays and weakens reductions of mercury promised in current law,[3] but it completely ignores more than 60 other power plant air toxics that threaten public health.

EPA's proposal would relieve the power sector of any obligation to control lead, arsenic, chromium, dioxin, acid gases, and organic compounds, among others. Utilities are the largest emitter of acid gases, arsenic and chromium air pollution and are the second largest source of lead and dioxin air pollution. However, the Bush administration's "mercury plan" allows power plants to emit unlimited quantities of these pollutants. These highly toxic emissions pose serious public health threats and should be reduced to the fullest extent possible.

Figure 1: Air Emissions of Select Toxic Metals from Coal- and Oil-fired Power Plants, 2002



OVERVIEW

The Bush administration's mercury rule affects many more pollutants than just mercury. In a sweeping measure buried in legalese and kept out of EPA press releases, the rule actually performs a tricky slight-of-hand with how mercury is considered under the Clean Air Act. EPA essentially proposes that mercury from power plants be controlled less stringently than has historically been the case for toxic pollutants[4] – and in so doing, lets power plants off the hook for controlling dozens of other toxic air pollutants, including lead, arsenic, dioxin, acid gases, chromium, and organic compounds.

The Debate Over Mercury

From the day it was introduced, the Bush plan for addressing mercury from power plants has been the subject of a vigorous national debate. This shouldn't be surprising: mercury is a potent neurotoxin. One of every six women of childbearing age already has enough mercury in her bloodstream to put her child at risk for developmental defects[5] and power plants are the largest uncontrolled source of mercury emissions.

The Bush administration's mercury plan was first leaked to the press in early December 2003 and formally released by EPA later that month.[6] Though the Bush administration heavily promoted the plan as the "first ever proposed rule to regulate mercury emissions from coal-burning power plants,"[7] news reports painted a murkier picture. It became clear that EPA had ignored its own stringent findings and also scuttled the recommendations of a years-long expert task force comprised of industry, environmentalists, and state officials.[8] Then reports surfaced that utility industry lawyers had literally written portions of the rule that would affect their own clients – with passages lifted word-for-word from industry memos.[9] Throughout it all, clean air and public health advocates criticized the plan for allowing power plants to emit more toxic mercury into the air, for up to a decade longer, than if the current Clean Air Act was simply enforced as written.[10]

The debate over regulating mercury pollution continues, with serious questions raised on Capitol Hill and in the press about how the rule was crafted by the administration and industry. On May 14, 2004 the EPA Office of Inspector General officially launched a formal investigation into EPA's conduct in developing the rule.[11] Until now, however, the full story of the toxic threat from power plants, and the true extent of the inadequacy of the Bush administration's plan, has remained untold.

The Debate Beyond Mercury

Mercury is a serious threat, but it is also just the tip of the iceberg. According to EPA's own data, mercury is only one of many toxic air pollutants produced by coal-fired power plants.

EPA examined toxic air emissions from coal-fired power plants in the late 1990s. In 2000, the agency determined that power plants are a source of emissions of more than 60 toxic air pollutants, including mercury. EPA's determination found that it was "appropriate and necessary" to require maximum achievable reductions in power plant air toxics and officially labeled power plants a "source category" for air toxics. Because of these findings, the Clean Air Act (CAA) requires that EPA regulate mercury *and all the other air toxics* from power plants and control each and every one of those pollutants to the maximum extent possible.[12]

The Bush administration mercury rule repeals this previous EPA determination. It does so by overturning the "appropriate and necessary" finding and by "de-listing" electric utilities as a "source category" under section 112. Appendix II includes a full discussion of this complex legal maneuvering, but in short, there is a devil in these details: the Bush rule lets these other air toxics off the hook.

Ironically, many of these same toxics were recently determined by EPA to pose serious threats to public health. Earlier this year EPA issued a new regulation on hazardous air pollutants (HAPs) from another source category, called "industrial, commercial, institutional boilers and process heaters," also known as the IB MACT rule.[13] Among the HAPs regulated in that rule are: arsenic, cadmium, chromium, hydrogen chloride, hydrogen fluoride and various organic HAPs, which are the same HAPs that EPA concluded in its mercury proposal posed no public health hazard.

Issuing emission limits for these air toxics would have been a major step for clean air and public health. Instead, the Bush administration is trying to cook the books, reversing EPA's determination that power plant toxic air pollutants – even mercury – should be regulated under section 112 of the Clean Air Act. The result is that power plants will be allowed to indefinitely release unlimited amounts of all of their toxic air emissions besides mercury.

This report looks at:

- **Emissions Data.** The Toxics Release Inventory (TRI) is the nation's premier database of how much toxic pollution is released by various industries. The TRI for 2002, the most recent year for which information is available, shows that electric utilities were once again the biggest toxic air polluter in the U.S.[14] They are the largest emitter of arsenic, chromium, and acid gas air pollution, and are the second largest source of dioxin and lead air pollution.

- **Health Impacts.** The vast majority of air toxics from power plants have serious health impacts, from the well-known dangers of arsenic and lead to the newly-understood impacts of dioxin, one of the most potent carcinogens known. This report attempts to provide an overview of what this pollution means for public health.

- **The Power to Clean Up.** Analysis of the TRI data finds that currently-available control technologies could reduce much of the toxic air emissions by over 90 percent. Many power plants are already using these control technologies today – but if the Bush plan goes through, toxic emissions will continue unabated and could even increase.

The Bush administration's attempt to ignore the toxic threats beyond mercury could have serious consequences: unlimited quantities of some of the most dangerous chemicals ever known, emitted indefinitely. That is too high a price to pay for the sake of the administration's industry friends. Americans deserve a standard that gets the maximum achievable reductions of all toxic air pollution.

EMISSIONS DATA FOR POWER PLANT AIR TOXICS

In the United States, the electric power industry is the biggest toxic air polluter, and coal, which generates more than half of our electricity, is the dirtiest fuel. Impurities present in coal are released to the environment when it is burned by power plants. Although coal is mostly carbon, and some coal is "cleaner" in that it has fewer impurities, all coal contains impurities that create a variety of chemical substances when burned. Many of these substances end up as toxic air pollutants.

More than 900 million tons of coal is burned in the U.S. each year by approximately 426 power plants[15] that submit reporting data to the Toxic Release Inventory,[16] resulting in the release of more than 700 million pounds of chemicals into our air.[17]

About TRI

Industrial facilities engaged in manufacturing have been required to report their annual toxic releases to the environment since 1987. In 1991, TRI was expanded to require data on pounds of on-site recycling, energy recovery, and treatment activities at facilities. In 1995, the number of substances reportable to TRI nearly doubled.

Although it is a reporting program and does not set emission limits, TRI has been responsible for huge reductions in emissions and discharges from industrial facilities. Simply having to report the amount of pollution being released and subsequently having that information available to the public has caused facilities to examine their processes and reduce releases to the environment.[18]

Since 1988, the year EPA uses as its TRI baseline, reported releases to air, water, and land, and injections into deep wells have decreased by more than 50 percent among the manufacturing sector facilities that report.[19] For many companies, assembling their 1987 TRI numbers was a big surprise. They had never examined their emissions as a whole, and the totals were extremely high. The numbers were an even bigger surprise to communities and citizen's groups that had never previously had access to the information.

TRI and Power Plants

The numbers have turned out to be no less surprising for the more than 400 coal-burning power plants that report to TRI. 1998 marked the first year that electric utilities were required to report, and in 1999 EPA set tighter reporting thresholds for certain chemicals. The 2002 data includes detailed information on persistent, bioaccumulative toxic chemicals (PBTs) such as dioxin, lead and lead compounds.

The following tables can be found in Appendix I:

- **Table 1** shows how toxic air emissions from power plants dwarf other industries, releasing more than 42 percent of all toxic air emissions reported to TRI.[20] More than half of all Americans – over 156 million people – live within 30 miles of a coal–fired power plant.[21]

  Even before the TRI toxic air pollution data became available, electric power plants were known to be the largest industrial source of air pollutants such as smog-forming nitrogen oxides, soot-forming sulfur dioxide, and carbon dioxide, a greenhouse gas.[22] The vast majority of this pollution comes from older coal-fired power plants.[23] The TRI data confirm that these power plants are not only the largest industrial source of conventional air pollutants, but they are also by far the largest source of most toxic air pollutants.

- **Table 2** shows the range and quantity of toxic pollutants reported by power plants for 2002. Although the top three toxic air emissions – hydrochloric acid, sulfuric acid, and hydrogen fluoride – account for nearly 98 percent of emissions by weight, the nature of many of the other pollutants means they are extremely dangerous even in small doses.

- **Tables 3 through 8** rank the states by the amount of some of the most dangerous toxic air pollution: lead, arsenic, dioxin, acid gases, chromium, and organic compounds.

- **Tables 9 through 14** list the top ten individual power plants, nationwide, for those same pollutants.

Finally, in addition to mercury, which is addressed by the Bush plan, many of the other toxic air emissions released by power plants are metals, which never degrade in the environment. Based on the 2001 TRI emissions, and conservatively assuming that the pollution controls in place in 2001 have always been in place, it is possible to estimate both how many tons of certain metals have been released to the air from coal-fired power plants every year since 1949, the first year for which data are available, as well as the cumulative total.

The figures on the following page illustrate this point:

- **Figure 2** shows how the amount of these toxic metals released each year has only increased.[24]

- **Figure 3** shows the dramatic increase in cumulative toxic metals in the environment.

These figures graphically illustrate that non-mercury air toxic emissions from power plants are increasing and accumulating and need to be controlled.

Figure 2: Annual Air Emissions of Toxic Metals from Coal-Fired Power Plants, 1949-2001

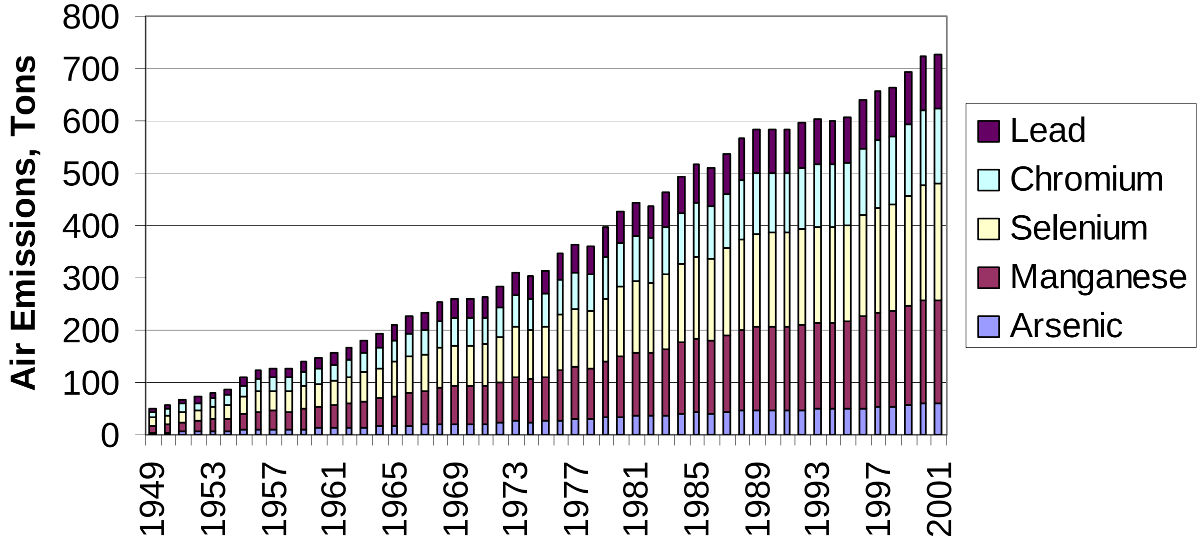
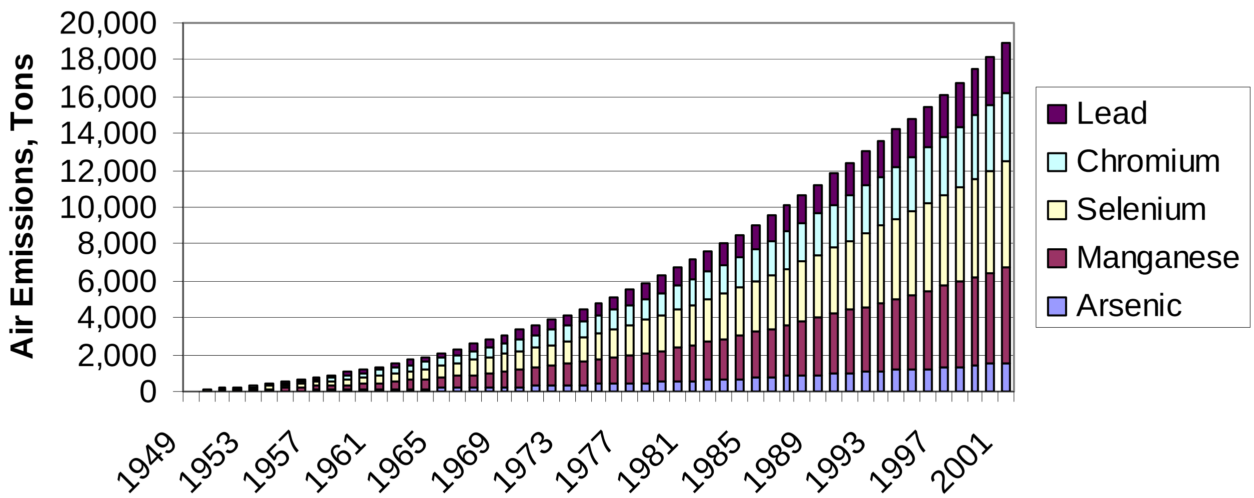


Figure 3: Cumulative Air Emissions of Toxic Metals from Coal-Fired Power Plants, 1949-2001



HEALTH EFFECTS OF POWER PLANT TOXIC AIR POLLUTION

The more than 60 air toxics emitted by power plants when coal is burned comprise a large group of diverse pollutants, with a number of health and environmental effects.[25] Direct inhalation of some air toxics can result in acute respiratory effects such as asthma attacks, respiratory infections, or changes in lung function. However, except for highly reactive pollutants, most air toxics are absorbed and distributed in the body and therefore may produce effects far beyond the lungs – including impacts on the brain, heart, liver, and kidneys. Some of these pollutants are known to cause cancer, while others impair reproduction and the normal development of children. Still others damage the nervous and immune systems.

People who may be more sensitive to chemical exposures include infants and children, the elderly, pregnant women and nursing mothers, and people with chronic diseases such as asthma. Children are not only more sensitive because they are at critical stages of physical and mental development, but also because their lower body weight and higher breathing rate mean they receive a relatively higher pollutant dose compared to adults. People who tend to eat locally-grown produce and locally-caught fish may also receive higher than average exposure to power plant toxics if they live close to a power plant.

How People Are Affected

The health risk from exposure to power plant air toxics depends on three factors: (1) how much of the pollutant a person is exposed to and over what period of time; (2) the exposure pathway; and (3) whether the person is especially sensitive to the pollutant and the toxicity of the pollutant.

In addition to direct inhalation, exposure to air toxics also occurs from "indirect exposure." Indirect exposure is the ingestion of meat, dairy products, and fish, as well as water, soil, and vegetation that become contaminated by air emissions that have been deposited to earth and accumulated in the food chain. Arsenic, dioxins, lead, and cadmium all have serious impacts through indirect exposure. Absorption of some power plant air toxics through the skin may also occur, especially from direct contact with contaminated water or soil. An important exposure pathway for children is the ingestion of contaminated soil during play.

Environmental Toxins and Children's Health

The potential effects of exposure to neurotoxins or developmental toxins are learning disabilities, attention deficits, loss of IQ points, or other disorders depending on the severity of exposure. The National Academy of Sciences (NAS) has concluded that as many as three percent of known developmental and neurological deficits in children are caused by exposure to known toxic substances, including developmental and neurological toxins. The NAS also concluded that 25 percent of these deficits may result from environmental and genetic factors working in combination and that toxic substances may play a significant but as yet undetermined role.[26]

Using this estimate, the National Environmental Trust calculated that 360,000 children – or 1 in 200 children – suffer from developmental or neurological defects caused by exposure to known toxic substances including developmental and neurological toxins.[27] This is probably an underestimate, however, because the NAS only considered known developmental and neurological defects and referred only to well-recognized and clinically diagnosed mental and physical disabilities, ignoring subtle mental and physical deficits that are difficult to diagnose.

Many power plant toxics belong to a class of chemicals called persistent, bioaccumulative, toxic (PBT) chemicals. These pollutants either do not break down at all in the environment (e.g., all metals) or they break down very slowly (e.g., over decades, like dioxin), and therefore have serious impacts even at relatively low levels. In 2000, EPA lowered the reporting threshold for many of these chemicals since they are toxic in minute amounts. Electric utilities released more than 300,000 pounds of PBT chemicals to the air in 2002.[28]

Even small releases of PBTs are a concern because they tend to accumulate and reach high concentrations in the food web. This process, called bioaccumulation, leads to human and wildlife exposure when contaminated food is eaten. Some PBT pollutants accumulate in animal tissues to levels hundreds, or even thousands, of times higher than levels found in the environment.

Both short- and long-term (including lifetime) exposure to toxics from power plants is known to be important. In general, however, it is difficult to determine exactly how any one person may be affected by power plant emissions. There is also limited information on exposure to low levels of toxics and on exposure to the mixture of pollutants emitted from power plants.

What is Bioaccumulation?

Some toxics, such as dioxin, lead and mercury, bioaccumulate in the environment. Bioaccumulation is the process by which organisms (including humans) can take up contaminants more rapidly than their bodies can eliminate them. Thus, the amount of a persistent bioaccumulative toxin (PBT) in the body increases over time. If, for a period of time, an organism does not ingest a PBT, its body burden will decline. If, however, an organism continually ingests a PBT, its body burden can reach toxic levels. The rate of increase or decline in body burden is specific to each organism.

The Health Impacts of Select Air Toxics

- **Arsenic.** Intense short-term inhalation exposure to arsenic can result in gastrointestinal effects such as nausea, diarrhea and abdominal pain, and may result in central and peripheral nervous system disorders. Long-term inhalation exposure can irritate the skin and mucous membranes, and ultimately may cause lung cancer. Chronic ingestion of arsenic can cause gastrointestinal effects, anemia, and liver and kidney damage, among other possible effects. Arsenic ingestion also may cause cancer of the skin, bladder, liver, or lung.[29]

- **Dioxins.** Dioxin and dioxin-like compounds are chlorinated chemicals that cause toxic effects at very low levels compared to other environmental toxins. Prenatal dioxin exposure is known to affect immune system function, learning behavior, and the reproductive system. Postnatal dioxin exposure can also affect the immune system and may cause certain types of cancer. A well-known effect of dioxin is chloracne, a severe acne-like condition that develops within months of an exposure to high levels of dioxin. Dioxin-like compounds are one of the most well-known endocrine disruptors, potentially lowering human and animal fertility.[30]

  Airborne emissions of dioxin can travel long distances and deposit far from the source. Because they are extremely stable under most environmental conditions, dioxin and dioxin-like compounds persist in the environment for decades.[31] They have been found throughout the world in air, soil, water, sediment, fish, shellfish, meat, and dairy products. Dietary intake is thought to be the main pathway of human exposure. Though some dioxin-like compounds are more toxic than others, it is unfortunately not possible to get a breakdown of the relative amounts of dioxin and each of the dioxin-like compounds from the TRI data.[32]

- **Acid Gases.** Acid gases such as hydrochloric acid, sulfuric acid, and hydrofluoric acid can cause damage to the respiratory tract. They are corrosive and

Major Questions about Dioxin Emissions from Power Plants

While many of the toxic air pollutants emitted by power plants are well known and well studied, one of the most dangerous, dioxin, is one of the least studied. Though dioxin is one of the most toxic substances known, only eight power plants have ever been tested for dioxin emissions. EPA has identified dioxin emission testing as a research need. To date, no research on this issue has been done.

can cause acute respiratory problems, as well as aggravate chronic respiratory ailments such as asthma and emphysema. Emerging evidence shows that breathing small concentrations of acid gases over time inhibits childhood lung development. Additionally, acid gases may cause tooth erosion, severe eye irritation, corrosion of the mucous membranes, esophagus, and stomach, and may potentially cause an increase in cancer of the larynx or other cancers.[33]

Finally, acid gases play a key role in atmospheric chemistry, making other emissions more dangerous. They help determine how long mercury remains in the atmosphere before being deposited to earth, and later, absorbed into the food chain.[34] EPA has determined that they affect acid rain formation and contribute to the formation of fine particles, which cause dramatic health impacts throughout the nation. Similar acid aerosol emissions from other industries are regulated and controlled.

- **Lead.** Lead is a very toxic element, causing a variety of effects even at low doses. Brain damage, kidney damage, and gastrointestinal distress can result from short-term exposure to high levels of lead in humans. Reproductive effects, such as decreased sperm count in men and spontaneous abortions in women, have also been associated with high lead exposure. Long-term exposure to lead in humans results in effects on the blood, central nervous system, blood pressure, and kidneys. Children are particularly sensitive to the chronic effects of lead, with slowed cognitive development, reduced growth and other effects reported. The developing fetus is at particular risk from maternal lead exposure, with low birth weight and slowed postnatal neurobehavioral development noted.[35]

- **Chromium.** Certain forms of chromium can be very toxic to the respiratory tract. Short-term exposure may result in shortness of breath, coughing, and wheezing. Long-term exposure may have more serious effects such as perforations and ulcerations of the septum, bronchitis, decreased pulmonary function and pneumonia. Inhalation of the toxic form of chromium may cause lung cancer.[36]

- **Organic Chemicals.** Organic chemicals released by power plants include a wide variety of substances. **Polycyclic aromatic hydrocarbons (PAHs)** can damage the immune system and cause developmental and reproductive effects; many are known carcinogens in animals, and studies indicate a risk for people as well. **n-Hexane** can cause polyneuropathy with numbness in the extremities, muscular weakness, blurred vision, headache, and fatigue observed. **Formaldehyde** can result in respiratory symptoms and eye, nose, and throat irritation; limited human studies have reported an association with lung and nasopharyngeal cancer.[37] Long-term exposure to **trimethylbenzene** can affect the blood's clotting ability and may cause bronchitis.[38]

Figure 4 summarizes the health impacts from these six leading power plant toxic air emissions.

The Debate Over Pollution Impacts

The Edison Electric Institute (EEI), a trade association representing the electric power industry, has seized on the inherent uncertainty regarding health impacts, claiming that potential effects from exposure to power plant air toxics are negligible. EEI bases its position on a 1998 EPA study of hazardous air pollutant emissions

Figure 4: Selected Health Risks from Toxic Air Emissions[39]

Chemical Name	Digestive System	Respiratory System	Circulatory System	Brain, Nervous System	Immune System	Kidney	Liver	Skin	Hormone System	Birth Defects/Developmental Delays	Male or Female Reproductive System	Cancer
Arsenic	X	X	X	X				X		X		X
Dioxin				X	X				X	X	X	X
Acid Gases	X	X						X				
Lead				X	X				X	X	X	X
Organic Chemicals- PAHs					X				X	X	X	X
Chromium		X			X	X	X			X		X

from power plants.[40] However, the EPA report found that some power plant emissions are a public health concern and called for further study.

In 2000, the Agency made a regulatory finding that some pollutants from power plants are indeed a public health concern, and that in addition to the threat from mercury, "arsenic and a few other metals (e.g., chromium, nickel, cadmium) are of potential concern" for causing cancer, and that the risk was not low enough "to eliminate those metals as a potential concern for public health." The report further noted, "Dioxins, hydrogen chloride [hydrochloric acid] and hydrogen fluoride [hydrofluoric acid] are three additional [hazardous air pollutants] that are of potential concern and may be evaluated further during the regulatory process…Due to data gaps and uncertainties it is possible that future data collection efforts or analysis may identify other [hazardous air pollutants] of potential concern."[41]

EPA's 1998 study concluded that the high levels of acid gas emissions from power plants do not pose a public health risk. However, critics charged that EPA used severely limited assumptions in its modeling of acid gas emissions and failed to analyze sensitive populations such as children and the elderly.[42] Also, as discussed above, acid gas emissions are a key component of fine particulate pollution that forms in the atmosphere in combination with other emissions.[43] EPA's consultants have found that this pollution causes tens of thousands of deaths every year.[44] Finally, acid gas emissions emitted by other industries besides power plants are regulated as air toxics under the Clean Air Act.[45]

Finally, past official determinations by EPA reveal that many of the toxic air pollutants that EPA is attempting to NOT regulate do pose public health threats. Most recently, EPA issued a new regulation on hazardous air pollutants (HAPs) from another source category, called "industrial, commercial, institutional boilers and process heaters," also known as the IB MACT rule.[46] Among the HAPs regulated in that rule are: arsenic, cadmium, chromium, hydrogen chloride, hydrogen fluoride and various organic HAPs, which are the same HAPs that EPA concluded in its mercury proposal posed no public health hazard.

In its adoption of the IB MACT rule, EPA stated that: "Exposure to high levels of these HAPs is associated with a variety of adverse health effects. These adverse health effects include chronic health disorders (e.g., irritation of the lung, skin, and mucus membranes, effects on the central nervous system, and damage to the kidneys), and acute health disorders (e.g., lung irritation and congestion, alimentary effects such as nausea and vomiting, and effects on the kidney and central nervous system).[47]

Although EPA concluded in the preamble to its mercury proposal that there were uncertainties "so great that regulation of such [non-mercury] pollutants do not pose a hazard to public health that warrants regulation," this decision directly contradicted EPA's determination in the IB MACT rule that arsenic is a "human carcinogen," cadmium is a "probable human carcinogen" and chromium is a "human carcinogen."[48] EPA also concluded in the IB MACT rule that chronic effects occur as a result of exposure to hydrogen chloride and hydrogen fluoride.[49] Of note, the emissions of these non-mercury HAPs are much larger from coal-fired power plants than from industrial, commercial, and institutional boilers and process heaters.

In light of the scientifically accepted chronic and acute health effects caused by exposure to non-mercury HAPs emitted by power plants, EPA's own statements and conclusions in the IB MACT rule, and the requirements of section 112 of the CAA, EPA should revise its proposed determination that the regulation of these HAPs is both inappropriate and unnecessary, and should adopt maximum achievable emission standards under section 112(d) for these and any other HAPs emitted by coal-fired power plants.

The Power to Clean Up Toxic Air Emissions

Some power plants already do a good job of controlling their toxic air emissions, releasing fewer pounds of pollutants per megawatt-hour of electricity generated. An examination of the 2001 TRI and Energy Information Administration (EIA) data for power plants shows that coal-fired plants can control more than 90 percent of their toxic air pollution with existing control technology such as fabric filters or baghouses, electrostatic precipitators, and sulfur dioxide scrubbers.[50]

The Clean Air Act requires EPA to set "maximum achievable" control standards for sources of hazardous air pollutants based on the average control achieved by the top 12 percent of best performers in a source category. Analysis of the TRI data shows that the best-performing power plants are already using technology that could reduce total air toxics emissions by more than 620 million pounds. If applied to all U.S. coal-fired power plants, installation and optimization of fabric filters (baghouses), electrostatic precipitators, and sulfur dioxide scrubbers could result in a 94 percent reduction of non-mercury metals, a 96 percent reduction of acid gases, and a 99 percent reduction of organic compounds. These controls would also significantly reduce emissions of particulates and acid rain forming sulfur dioxide (SO_2).

The point of this analysis is not to state definitively the exact level of control possible at each and every plant. However, it is important to note that the top performing 12 percent of plants for each of the three pollutant categories reflect the range of coal types and generation capacities seen in the larger population of coal-burning power plants. It appears that power plants with larger and smaller capacities burning bituminous, subbituminous, and lignite coal can indeed achieve significant control of air emissions of toxic chemicals, and many of them are already doing so.

Please refer to Appendix III.C for a detailed discussion of the methodology employed for calculating the potential impact of existing controls on reducing power plant toxic air emissions.

Figure 5: Potential Impact of Existing Controls on Reducing Power Plant Toxic Air Emissions[51]

Substances	Number of Power Plants Reporting Non-Zero Emissions	Total Air Emissions from These Plants (pounds)	Average Emission Rate for Best 12% of These Plants (lb/MwH)	Reduction in Air Emissions Possible with Controls (pounds)	Percent Reduction Achievable with Controls	Control Equipment Reported by Best Performers
Non-mercury Metals	420	4,347,614	0.00014	4,105,265	**94**	Fabric Filters, Electrostatic Precipitators
Organic Compounds	212	22,210	2.7E-07	21,910	**99**	Wet SO_2 Scrubbers
Acid Gases	405	642,613,902	0.015	616,691,637	**96**	SO_2 Scrubbers (various types)

Conclusion

Toxic air pollution from power plants includes some of the most dangerous substances known, but today power plants are allowed to emit unlimited amounts of these chemicals. The Bush administration tiptoed up to the edge of taking responsible action; all it had to do was faithfully implement the Clean Air Act, carry out EPA's past determinations and the recommendations of its own task force. Instead, the White House chose to back away from its obligation to protect public health and hid its retreat in the guise of a bureaucratic reclassification.

EPA has received a record outpouring of comments against their attempt to shortchange public health, as well as negative editorial opinion from one end of the country to the other. Almost all of this opposition has to do with the fact that, when it comes to mercury, the rule does far too little, far too late.

However, until now, the public outcry has concerned toxic emissions that the White House at least pretends to be doing something about. The same can't be said for lead, arsenic, dioxin, chromium and dozens of other dangerous air toxics. The problem is even worse than people know.

The Bush administration's rule is not yet final. The American people still have time to make their voices heard. They still have time to demand real controls for *all* power plant air toxics – controls that must go well beyond mercury.

APPENDIX I
Tables

Table 1:
Toxic Chemical Air Emissions by Industry for 2002[52]

Rank	Industry[53]	Air Emissions (Pounds)
1	Electric Utilities	722,565,248
2	Chemicals and Allied Products	244,947,710
3	Paper and Allied Products	166,408,999
4	Rubber and Miscellaneous Plastics Products	71,067,991
5	Transportation Equipment	68,335,432
6	Food and Kindred Products	56,724,101
7	Primary Metal Industries	56,656,376
8	Petroleum Refining and Related Industries	53,922,015
9	Fabricated Metal Products	40,690,545
10	Stone, Clay, Glass, and Concrete Products	39,739,122
11	Lumber and Wood Products, Except Furniture	29,929,736
12	Printing, Publishing, and Allied Industries	17,198,757
13	Electronic and Other Electric Equipment	12,061,952
14	Instruments and Related Products	8,157,575
15	Furniture and Fixtures	7,898,856
16	Machinery, Except Electrical	7,692,514
17	Textile Mill Products	6,047,757
18	Miscellaneous Manufacturing Industries	5,607,295
19	Petroleum Terminals	3,291,068
20	Metal Mining, except Iron Ores and Uranium	3,226,741
21	Tobacco Manufacturers	2,391,749
22	National Security and International Affairs	2,125,732
23	Chemical Distributors	1,149,594
24	Leather and Leather Products	1,135,102
25	Other Industries	1,077,708
26	Coal Mining, except Extraction Activities	688,738
27	Haz. Waste Treatment, Disposal, or Recycling	488,707
28	Apparel and Other Finished Fabric Products	477,701
29	Solvent Recyclers	223,456

Table 2:
Toxic Chemical Air Emissions from Coal and Oil-fired Power Plants by Chemical for 2002

Rank	Chemical Name	Air Emissions (pounds)
1	Hydrochloric Acid	544,468,799
2	Sulfuric Acid	109,767,711
3	Hydrogen Fluoride	57,828,631
4	Ammonia	3,721,827
5	Barium Compounds[54]	1,542,531
6	Zinc Compounds	1,225,523
7	Vanadium Compounds	724,736
8	Nickel Compounds	638,693
9	Selenium Compounds	443,280
10	Manganese Compounds	425,664
11	Chromium Compounds	305,918
12	Chlorine	288,109
13	Lead Compounds	257,480
14	Copper Compounds	216,321
15	Arsenic Compounds	125,014
16	Mercury Compounds	86,025
17	N-Hexane	79,915
18	Formaldehyde	77,879
19	Barium	76,071
20	Molybdenum Trioxide	61,790
21	Vanadium	59,465
22	Cobalt Compounds	44,701
23	Polycyclic Aromatic Compounds	18,605
24	Xylene (Mixed Isomers)	13,914
25	Lead	8,190
26	1,2,4-Trimethylbenzene	6,020
27	Zinc (Fume or Dust)	5,678
28	Beryllium Compounds	5,467
29	Selenium	5,178
30	Antimony Compounds	4,490
31	Thallium Compounds	4,389
32	Mercury	4,355
33	Silver Compounds	2,981
34	Methanol	2,869
35	Manganese	2,762
36	Benzene	2,485
37	Acetaldehyde	2,045
38	Toluene	1,774
39	Nickel	1,286
40	Propylene	1,112
41	Ethylene	958

42	Methyl Ethyl Ketone	728
43	Copper	705
44	Naphthalene	503
45	Acrolein	470
46	Fluorine	387
47	Chromium	361
48	Benzo(G,H,I)Perylene	356
49	Ozone	250
50	Cadmium Compounds	250
51	Arsenic	132
52	Formic Acid	115
53	Hexachlorobenzene	84
54	Phenol	65
55	Pentachlorobenzene	63
56	Aluminum (Fume or Dust)	41
57	Cobalt	38
58	Phenanthrene	28
59	Polychlorinated Biphenyls	20
60	Hydrazine	5
60	Nitric Acid	5
62	Dioxin and Dioxin-Like Compounds	2
63	Certain Glycol Ethers	1

Table 3:
Air Emissions of Arsenic and Arsenic Compounds from Coal and Oil-fired Electric Power Plants, by State, for 2002

Rank	State	Arsenic and Arsenic Compounds (pounds)
1	Pennsylvania	18,826
2	West Virginia	13,146
3	Virginia	12,905
4	Ohio	8,482
5	Indiana	8,363
6	Kentucky	8,199
7	Iowa	6,472
8	North Dakota	6,368
9	North Carolina	6,061
10	Georgia	5,353
11	Alabama	5,172
12	Florida	4,267
13	South Carolina	3,374
14	Wyoming	3,200
15	Tennessee	2,770
16	Nevada	2,695
17	Illinois	2,651
18	Maryland	1,814
19	Louisiana	1,405
20	Texas	1,264
21	New York	588
22	Michigan	575
23	Montana	350
24	New Jersey	255
24	Utah	255
26	New Mexico	170
27	Wisconsin	100
28	Nebraska	38
29	Oklahoma	17
30	Arizona	10
31	Washington	2

Note: The following states have arsenic or arsenic compound emissions of zero: Alaska, Arkansas, California, Colorado, Connecticut, Delaware, District of Columbia, Hawaii, Idaho, Kansas, Maine, Massachusetts, Minnesota, Mississippi, Missouri, New Hampshire, Oregon, Rhode Island, South Dakota, and Vermont.

Table 4:
Air Emissions of Dioxin and Dioxin-like Compounds from Coal and Oil-fired Electric Power Plants, by State, for 2002

Rank	State	Dioxin and Dioxin-like Compounds (grams)
1	Virginia	245.420
2	Pennsylvania	204.140
3	Iowa	134.500
4	North Carolina	54.360
5	Florida	51.250
6	Wisconsin	27.110
7	Kentucky	20.630
8	Ohio	19.950
9	Illinois	19.240
10	New York	15.190
11	Montana	14.810
12	Texas	13.850
13	Missouri	13.790
14	Michigan	13.140
15	Alabama	13.000
16	Indiana	12.910
17	Tennessee	12.760
18	Arizona	11.750
19	Kansas	10.910
20	Massachusetts	10.310
21	West Virginia	8.680
22	Nevada	7.910
23	Utah	7.310
24	Wyoming	6.650
25	Maryland	6.260
26	Georgia	5.360
27	North Dakota	5.200
28	Hawaii	5.060
29	Connecticut	4.870
30	South Carolina	4.640
31	Colorado	4.520
32	New Jersey	3.960
33	Oklahoma	3.850
34	Oregon	3.190
35	Minnesota	3.000
36	California	2.600
37	Mississippi	2.310
38	New Mexico	2.120

39	Washington	2.030
40	Louisiana	1.490
41	Nebraska	1.430
42	Delaware	1.260
43	Arkansas	1.250
44	New Hampshire	0.850
45	South Dakota	0.460
46	Maine	0.400
47	District of Columbia	0.170

Note: The following states have dioxin or dioxin-like compound emissions of zero: Alaska, Idaho, Rhode Island, and Vermont.

Table 5:
Air Emissions of Acid Gases from Coal and Oil-fired Electric Power Plants, by State, for 2002

Rank	State	Acid Gases (Hydrochloric acid, Hydrogen fluoride, Sulfuric acid)
1	Ohio	83,600,495
2	Pennsylvania	62,183,131
3	North Carolina	61,197,922
4	West Virginia	60,035,581
5	Georgia	59,971,358
6	Florida	52,168,158
7	Indiana	39,378,184
8	Kentucky	34,724,272
9	Tennessee	33,520,105
10	Alabama	29,951,049
11	Michigan	27,953,407
12	Maryland	27,621,512
13	Virginia	18,894,359
14	Illinois	17,135,710
15	South Carolina	16,769,185
16	New York	12,578,712
17	Mississippi	7,510,654
18	New Jersey	6,678,016
19	Texas	6,590,415
20	Missouri	6,458,098
21	Wisconsin	6,147,088
22	Iowa	4,217,508
23	Delaware	3,486,131
24	Nebraska	3,419,225
25	New Hampshire	3,209,000
26	Massachusetts	3,002,181
27	Kansas	2,484,135
28	Hawaii	1,948,832
29	Arizona	1,568,472
30	Utah	1,499,353
31	Oklahoma	1,269,296
32	Colorado	1,127,042
33	North Dakota	1,056,870
34	Louisiana	1,035,919
35	Nevada	705,236
36	Minnesota	659,168
37	Wyoming	623,036
38	Montana	582,725
39	Connecticut	409,096

40	California	406,507
41	New Mexico	372,228
42	South Dakota	137,000
43	Arkansas	112,177
44	Oregon	105,000
45	District of Columbia	59,546
46	Washington	50,821

Note: The following states have acid gas emissions of zero: Alaska, Idaho, Maine, Rhode Island, and Vermont.

Table 6:
Air Emissions of Lead and Lead Compounds from Coal and Oil-fired Electric Power Plants, by State, for 2002

Rank	State	Lead and Lead Compounds (pounds)
1	Nevada[55]	56,075.6
2	Virginia	20,006.2
3	Pennsylvania	14,146.2
4	Indiana	12,914.5
5	Florida	12,790.0
6	West Virginia	11,511.3
7	Kentucky	10,226.1
8	Missouri	8,974.6
9	Illinois	8,943.2
10	Ohio	8,214.1
11	Iowa	8,192.5
12	North Carolina	7,153.8
13	North Dakota	6,628.4
14	Georgia	5,723.2
15	New York	5,277.0
16	Wyoming	4,863.6
17	Alabama	4,687.4
18	Hawaii	4,553.0
19	Arkansas	4,549.4
20	Kansas	4,076.9
21	Texas	3,944.5
22	Mississippi	3,884.9
23	Maryland	3,689.2
24	Michigan	3,687.8
25	South Carolina	3,566.6
26	Tennessee	3,350.4
27	Minnesota	3,050.0
28	Wisconsin	2,686.8
29	Oklahoma	2,570.8
30	Louisiana	2,120.0
31	Delaware	1,931.8
32	Montana	1,818.0
33	Alaska	1,727.4
34	Utah	822.6
35	New Jersey	809.0
36	New Mexico	785.0
37	Arizona	726.8
38	Colorado	605.1
39	Connecticut	525.2
40	Massachusetts	421.7
41	Oregon	215.0

42	Nebraska	199.1
43	South Dakota	125.5
44	New Hampshire	94.3
45	California	16.6
46	Washington	6.0

Note: The following states have lead and lead compounds emissions of zero: the District of Columbia, Idaho, Maine, Rhode Island and Vermont

Table 7:
Air Emissions of Chromium and Chromium Compounds from Coal and Oil-fired Electric Power Plants, by State, for 2002

Rank	State	Chromium and Chromium Compounds (pounds)
1	Virginia	74,768
2	West Virginia	51,284
3	Pennsylvania	41,750
4	Indiana	15,384
5	Ohio	11,789
6	Michigan	10,247
7	Kentucky	8,761
8	Texas	8,466
9	North Carolina	7,877
10	Georgia	7,189
11	Alabama	5,404
12	Illinois	5,356
13	Florida	5,237
14	Tennessee	4,715
15	Iowa	4,482
16	North Dakota	4,462
17	Wyoming	3,991
18	Missouri	3,768
19	South Carolina	3,638
20	Nevada	3,593
21	Kansas	3,414
22	Maryland	2,933
23	Minnesota	2,021
24	Oklahoma	1,840
25	Delaware	1,708
26	Wisconsin	1,617
27	New Jersey	1,500
28	Louisiana	1,476
29	New York	1,321
30	Utah	1,179
31	Arizona	1,077
32	Massachusetts	878
33	Connecticut	811
34	Montana	760
35	New Mexico	519
36	Washington	306

37	Colorado	275
38	South Dakota	179
39	Nebraska	70
40	California	46
41	New Hampshire	12

Note: The following states have chromium and chromium compound emissions of zero: Alaska, Arkansas, District of Columbia, Hawaii, Idaho, Maine, Mississippi, Oregon, Rhode Island, and Vermont.

Table 8:
Air Emissions of Organic Chemicals from Coal and Oil-fired Electric Power Plants, by State, for 2002

Rank	State	Organic Chemicals (pounds)
1	Florida	88,193.0
2	Illinois	45,527.7
3	Massachusetts	14,957.2
4	New Hampshire	13,467.8
5	Pennsylvania	13,233.7
6	South Carolina	7,317.0
7	Tennessee	6,179.7
8	New Jersey	5,222.0
9	Iowa	2,162.2
10	Alabama	2,139.3
11	Kentucky	2,101.2
12	Hawaii	1,126.1
13	Wyoming	1,119.3
14	South Dakota	1,109.0
15	Virginia	889.1
16	New York	642.2
17	Nebraska	358.0
18	Rhode Island	281.2
19	California	244.9
20	Michigan	194.6
21	Montana	165.9
22	North Carolina	160.1
23	Utah	138.4
24	Kansas	121.2
25	Wisconsin	120.6
26	Indiana	118.6
27	Texas	92.9
28	Washington	77.0
29	Ohio	58.8
30	North Dakota	55.4
31	Nevada	54.5
32	Delaware	44.2
33	Colorado	36.0
34	Maryland	26.3
35	West Virginia	23.4
36	Minnesota	16.5
37	Arizona	12.2
38	Louisiana	11.2
39	New Mexico	11.1
40	Arkansas	5.8
41	Oklahoma	5.4
42	Missouri	5.2
43	Connecticut	5.1

44	Maine	0.6
45	Georgia	0.5
46	District of Columbia	0.4
47	Mississippi	0.1

Note: The following states have organic chemical emissions of zero: Alaska, Idaho, Oregon and Vermont.

Table 9:
Top 10 Individual Power Plants Nationwide for Arsenic Air Emissions in 2002

Rank	Facility	City	State	Parent Company	Arsenic and Arsenic Compounds (pounds)
1	MT. STORM POWER STATION	MOUNT STORM	WV	DOMINION RESOURCES INC.	9,700
2	CHESTERFIELD POWER STATION	CHESTER	VA	DOMINION RESOURCES INC.	8,600
3	ALLEGHENY ENERGY INC. HATFIELD POWER STATION	MASONTOWN	PA	ALLEGHENY ENERGY INC.	3,904
4	CHESAPEAKE ENERGY CENTER	CHESAPEAKE	VA	DOMINION RESOURCES INC.	3,600
5	BASIN ELECTRIC POWER CO-OP. LARAMIE RIVER STATION	WHEATLAND	WY	BASIN ELECTRIC POWER CO-OP.	3,200
6	GEORGIA POWER BOWEN STEAM ELECTRIC GENERATING PLANT	CARTERSVILLE	GA	SOUTHERN CO.	2,663
7	EDISON MOHAVE GENERATING STATION	LAUGHLIN	NV	EDISON INTL.	2,573
8	EME HOMER CITY GENERATION L.P.	HOMER CITY	PA	EDISON INTL.	2,500
9	BASIN ELECTRIC POWER CO-OP. ANTELOPE VALLEY STATION	BEULAH	ND	BASIN ELECTRIC POWER CO-OP.	2,201
10	ALABAMA POWER CO. GASTON STEAM PLANT	WILSONVILLE	AL	SOUTHERN CO.	2,020

Table 10:
Top 10 Individual Power Plants Nationwide for Dioxin Air Emissions in 2002

Rank	Facility	City	State	Parent Company	Dioxin and Dioxin-like Compounds (grams)
1	CAMBRIA COGEN CO.[56]	EBENSBURG	PA	EL PASO CORP.	167.600
2	DOSWELL ENERGY CENTER	ASHLAND	VA	DOSWELL L.P.	165.000
3	FAIR STATION	MUSCATINE	IA	CENTRAL IOWA POWER CO-OP.	114.760
4	COGENTRIX OF RICHMOND INC.	RICHMOND	VA	COGENTRIX ENERGY INC.	74.300
5	COGENTRIX OF ROCKY MOUNT	BATTLEBORO	NC	COGENTRIX ENERGY INC.	44.300
6	COLSTRIP STEAM ELECTRIC STATION	COLSTRIP	MT	PPL MONTANA LLC	13.500
7	COLUMBIA ENERGY CENTER	PARDEEVILLE	WI	ALLIANT ENERGY CORP.	6.350
8	TAMPA ELECTRIC CO. BIG BEND STATION	APOLLO BEACH	FL	TECO ENERGY INC.	6.070
9	XCEL ENERGY - WISCONSIN (FRENCH ISLAND)	LA CROSSE	WI	XCEL ENERGY	5.760
10	PPL BRUNNER ISLAND STEAM ELECTRIC STATION	YORK HAVEN	PA	PPL CORP.	5.480

Table 11:
Top 10 Individual Power Plants Nationwide for Acid Gas Air Emissions in 2002

Rank	Facility	City	State	Parent Company	Acid Gases (Hydrochloric acid, Hydrogen fluoride, Sulfuric acid) (pounds)
1	GEORGIA POWER BOWEN STEAM ELECTRIC GENERATING PLANT	CARTERSVILLE	GA	SOUTHERN CO.	20,393,708
2	AMERICAN ELECTRIC POWER AMOS PLANT	WINFIELD	WV	AMERICAN ELECTRIC POWER	17,730,000
3	RELIANT ENERGY KEYSTONE POWER PLANT	SHELOCTA	PA	RELIANT RESOURCES	16,170,015
4	U.S. TVA JOHNSONVILLE FOSSIL PLANT	NEW JOHNSONVILLE	TN	U.S. TENNESSEE VALLEY AUTHORITY	16,130,015
5	GEORGIA POWER SCHERER STEAM ELECTRIC GENERATING PLANT	JULIETTE	GA	(OWNED BY MANY UTILITIES)	15,194,964
6	DUKE ENERGY BELEWS CREEK STEAM STATION	BELEWS CREEK	NC	DUKE ENERGY CORP.	13,670,000
7	W. H. SAMMIS PLANT	STRATTON	OH	FIRSTENERGY CORP.	13,110,000
8	CP&L ROXBORO STEAM ELECTRIC PLANT	SEMORA	NC	PROGRESS ENERGY	12,120,000
9	PROGRESS ENERGY CRYSTAL RIVER ENERGY COMPLEX	CRYSTAL RIVER	FL	PROGRESS ENERGY	11,920,015
10	DUKE ENERGY MARSHALL STEAM STATION	TERRELL	NC	DUKE ENERGY CORP.	11,460,000

Table 12:
Top 10 Individual Power Plants Nationwide for Lead Air Emissions in 2002

Rank	Facility	City	State	Parent Company	Lead and Lead Compounds (pounds)
1	EDISON MOHAVE GENERATING STATION[57]	LAUGHLIN	NV	EDISON INTL.	55,116
2	MT. STORM POWER STATION	MOUNT STORM	WV	DOMINION RESOURCES INC.	8,900
3	CHESTERFIELD POWER STATION	CHESTER	VA	DOMINION RESOURCES INC.	6,300
4	CLOVER POWER STATION	CLOVER	VA	DOMINION RESOURCES INC.	4,800
5	ENTERGY WHITE BLUFF GENERATING PLANT	REDFIELD	AR	ENTERGY CORP.	4,419
6	ASBURY GENERATING STATION	ASBURY	MO	EMPIRE DISTRICT ELECTRIC CO.	3,866
7	CHESAPEAKE ENERGY CENTER	CHESAPEAKE	VA	DOMINION RESOURCES INC.	3,300
7	BASIN ELECTRIC POWER CO-OP. LARAMIE RIVER STATION	WHEATLAND	WY	BASIN ELECTRIC POWER CO-OP.	3,300
9	PROGRESS ENERGY FLORIDA ANCLOTE POWER PLANT	HOLIDAY	FL	PROGRESS ENERGY	2,601
10	GEORGIA POWER BOWEN STEAM ELECTRIC GENERATING PLANT	CARTERSVILLE	GA	SOUTHERN CO.	2,551

Table 13:
Top 10 Individual Power Plants Nationwide for Chromium Air Emissions in 2002

Rank	Facility	City	State	Parent Company	Chromium and Chromium Compounds (pounds)
1	MT. STORM POWER STATION	MOUNT STORM	WV	DOMINION RESOURCES INC.	46,000
2	CHESTERFIELD POWER STATION	CHESTER	VA	DOMINION RESOURCES INC.	33,000
3	SUNBURY GENERATION L.L.C.	SHAMOKIN DAM	PA	WPS RESOURCES CORP.	20,008
4	CHESAPEAKE ENERGY CENTER	CHESAPEAKE	VA	DOMINION RESOURCES INC.	17,000
5	WPS WESTWOOD GENERATION L.L.C.	TREMONT	PA	WPS RESOURCES CORP.	9,802
6	POSSUM POINT POWER STATION	DUMFRIES	VA	DOMINION RESOURCES INC.	8,700
7	DOMINION RESOURCES INC. YORKTOWN POWER STATION	YORKTOWN	VA	DOMINION RESOURCES INC.	8,000
8	BREMO POWER STATION	BREMO BLUFF	VA	DOMINION RESOURCES INC.	6,800
9	J. H. CAMPBELL GENERATING PLANT	WEST OLIVE	MI	CMS ENERGY CORP.	6,708
10	EDISON MOHAVE GENERATING STATION	LAUGHLIN	NV	EDISON INTL.	3,593

Table 14:
Top 10 Individual Power Plants Nationwide for Organic Compound Air Emissions in 2002

Rank	Facility	City	State	Parent Company	TRI Organic Chemicals (pounds)
1	CITY OF VERO BEACH MUNICIPAL UTILITIES	VERO BEACH	FL	CITY OF VERO BEACH MUNICIPAL UTILITIES	86,312
2	COLLINS GENERATING STATION	MORRIS	IL	EDISON INTL.	43,000
3	MYSTIC STATION	CHARLESTOWN	MA	EXELON CORP.	14,098
4	CONED NEWINGTON POWER FACILITY	NEWINGTON	NH	CONSOLIDATED EDISON INC.	13,465
5	EME HOMER CITY GENERATION L.P.	HOMER CITY	PA	EDISON INTL.	13,005
6	MEADWESTVACO NORTH CHARLESTON OPS.	NORTH CHARLESTON	SC	MEADWESTWACO CORP.	7,304
7	EAGLE POINT COGENERATION PARTN ERSHIP (EPCP)	WESTVILLE	NJ	EAGLE POINT COGENERATION PARTNERSHIP (EPCP)	4,572
8	ADM COGEN DECATUR	DECATUR	IL	ARCHER DANIELS MIDLAND CO.	2,417
9	ADM CORN PROCESSING	CEDAR RAPIDS	IA	ARCHER DANIELS MIDLAND CO.	2,150
10	BLACK HILLS CORP. - NEIL SIMPSON COMPLEX	GILLETTE	WY	BLACK HILLS CORP.	1,113

Appendix II
The Devil in the Details: EPA's Legal Evasions

There are four major flaws with EPA's attempt to evade the Clean Air Act's requirement that all air toxics from coal-fired power plants must be regulated to maximum achievable (MACT) levels:

- The Clean Air Act clearly requires regulation of all air toxics. Recent attempts by EPA to avoid regulating *all* toxics from a particular source category have been soundly rejected by the United States Court of Appeals for the District of Columbia (our nation's second highest court);[58]

- Recently issued MACT standards for industrial boilers serve as precedent. The Industrial boiler rule conforms with the Clean Air Act and binding court decisions and controls to maximum levels many of the exact toxic air pollutants that EPA is seeking to avoid regulating for power plants;[59]

- The precise toxic air pollutants (i.e., HAPs) that EPA is seeking NOT to regulate have been formally determined by EPA to pose public health threats. In the recent industrial boiler MACT rule EPA found: "Exposure to high levels of these HAPs [arsenic, cadmium, chromium, hydrogen chloride, hydrogen fluoride, and various organic HAPs] is associated with a variety of adverse health effects. These adverse health effects include chronic health disorders (e.g., irritation of the lungs, skin, and mucus membranes, effects on the central nervous system, and damage to the kidneys), and acute health disorders (e.g., lung irritation and congestion, alimentary effects such as nausea and vomiting, and effects on the kidney and central nervous system);[60] and, finally

- The Clean Air Act establishes a rigorous legal process for avoiding the regulation of *all* air toxics from power plants.[61] EPA has not made any attempt to satisfy the legal requirements necessary to regulate only mercury from power plants, and it is clear that it can not do so.[62]

The language and history of the Clean Air Act, as well as subsequent judicial interpretations, make clear that listing Electric Generating Units (EGUs)(i.e., power plants) as a source category under section 112(c) automatically triggers the duty to regulate major sources in that category under section 112(d), which the U.S. Court of Appeals for the District of Columbia has declared includes a "clear statutory obligation to set emissions standards for each . . . HAP [listed in CAA §112(b)]."[63]

Once EPA found it was "appropriate and necessary" to regulate power plant toxics (also known as HAPs or hazardous air pollutants) under section 112 and exercised its discretion to list EGUs as a "source category" in its December 2000 "Regulatory Finding and Decision to List Electric Generating Units Under Section 112(c)," the agency was not faced with any additional "decision" about what toxic pollutants to regulate or whether or not to issue maximum achievable control technology (MACT) standards for all toxics emitted by the source category. Once a source category is listed it is the Administrator's mandatory duty to promulgate MACT standards for each of the hazardous air pollutants listed in section 112(b)(1) and emitted by that source category.

EPA's proposal to only regulate one (mercury) of the more than 60 toxics emitted by coal-fired power plants (Appendix I, Table 2) violates the express wording of the Act as well as court decisions addressing this precise question.[64]

In 1998, EPA completed the health hazards study concerning HAPs emissions from EGUs as mandated by Congress in section 112(n) of the CAA.[65] Congress, as part of the 1999 EPA appropriations process, further directed the Agency to fund the National Academy of Sciences (NAS) to complete an independent study specific to the toxicological effects of one utility HAP, mercury, and prepare recommendations on the establishment of a safe methylmercury exposure reference dose.[66]

Relying on the section 112(n) utility health hazards study, the additional study released by the NAS, subsequent peer review analyses, and other available information including public comment, EPA determined in 2000 that regulation of HAP emissions from EGUs under section 112 of the Act is appropriate and necessary.[67] EPA found that regulation of HAP emissions from EGUs is appropriate because EGUs "emit a significant number of the 188 HAP included on the section 112(b) list."[68] The agency further found that "a number of control options . . . will effectively reduce HAP emissions from" EGUs, and that the regulation of EGU HAP emissions is necessary "because the implementation of other requirements under the CAA will not adequately address the serious public health and environmental hazards arising from [EGU HAP] emissions. . ." The EPA at the same time added EGUs to the list of source categories under section 112(c) of the Act, for which MACT regulations must be developed.[69]

The plain language of CAA section 112(c)(2) states that the EPA Administrator "shall establish emissions standards under subsection [112](d)" for each of the listed source categories.[70] CAA section 112(d)(2) in turn states that the emissions standards to be promulgated must be MACT standards: EPA "shall require the maximum degree of reduction in emissions of the hazardous air pollutants subject to this section . . .that the Administrator . . . determines is achievable . . . ."[71]

Therefore, once a "source category" is listed, under the express terms of the Act it is the Administrator's mandatory duty to promulgate MACT standards for each of the hazardous air pollutants listed in section 112(b)(1) and emitted by that source category.[72] The Agency is not faced with any additional "decision" about which pollutants should be regulated or whether or not to issue MACT standards for the source category. The Federal Advisory Committee advising EPA on the development of the utility MACT rule debated this precise question.[73]

EPA's regulatory determination was not, and indeed could not possibly have been, a decision about which HAPs would be regulated. First, the determination includes only EPA's decision to list EGUs as a category for regulation under §112(c) *and* the Agency's finding that regulation of HAPs (not some subset of pollutants) emitted by coal-fired EGUs is "appropriate and necessary." Second, once that finding is made, section 112(n) mandates that EPA must regulate the EGU source category "under this section" – namely section 112.

The statute is clear that the "appropriate and necessary" finding and listing decision concern the *source category*, not the *pollutants* to be regulated.[74] EPA's Regulatory Finding and Listing Decision reflect this.[75]

Finally, to the extent that EPA wishes to reverse the "listing" decision and "necessary and appropriate" determination, the Clean Air Act establishes a detailed legal process for doing so. EPA has not even attempted to satisfy these legal requirements.[76]

Appendix III
Data and Methodology

A. TRI Data

Except where explicitly noted (e.g., discussions III.B & III.C below), data in this report come from the 2002 Toxics Release Inventory database. Facilities designated as electric utilities reported SIC code 4911, 4931, or 4939 as their primary SIC code. In most cases, no other SIC code was reported, although some facilities designated as electric utilities may have other subsidiary operations on site.

- **New Substances and Lowered Reported Thresholds.** The 2000 Toxics Release Inventory data contained new substances, all persistent bioaccumulative toxic (PBT) chemicals. These substances persist in the environment for at least two months without degrading and concentrate in body tissue. The impact of persistence and bioaccumulation is to increase potential exposure. The new substances reported for 2000 include dioxin and dioxin-like compounds.

  All substances designated as PBTs by EPA, both the new substances and substances already on the TRI reporting list were also assigned lower reporting thresholds. This means that the 2000 data contain information not previously reported, even though these facilities may have submitted other TRI data in the past. Lead and lead compounds were added to the PBT list for the 2001 reporting year.

- **The TRI Reporting Threshold – Old and New.** Facilities report to TRI based on total annual throughput, not on the amount released to the environment. Throughput is defined as the amount of a chemical brought on site plus the amount produced on site during the year, plus the difference in inventory at the beginning and end of the year. It is essentially the amount of a chemical that passes through the facility on an annual basis. Even if a facility has zero releases to the environment, it still must submit a TRI form for each substance meeting the throughput threshold. On the other hand, even if a facility's entire throughput is released to the environment, the facility will not have to report to TRI if the throughput does not meet the threshold.

  Originally, the TRI throughput threshold was 25,000 pounds for chemicals manufactured or processed on site – including some impurities in raw materials, such as mercury contained in coal burned by electric power plants – and 10,000 pounds for substances "otherwise used" such as solvents and catalysts.[77] Virtually no electric power plants had 25,000 pounds of throughput of mercury, even though most of the mercury in coal burned at power plants ends up released to the environment, so very little data on mercury emissions from power plants was available from TRI.

  In 2000, thresholds for substances designated as PBTs were lowered to 10 or 100 pounds, depending on the substances' chemical properties. The threshold for dioxin and dioxin-like compounds was set at 0.1 grams, reflecting their acute toxicity and the extremely small amounts of these substances generated by facilities. Lead and lead compounds were designated as PBTs in 2001 with a 100 pound reporting threshold.

- **Dioxin and Dioxin-Like Compounds.** Unlike metals and metal compounds, dioxin and dioxin-like compounds are included in a single TRI substance category, meaning that the total throughput of these compounds is added together and compared against the 0.1 gram threshold (as opposed to one calculation for dioxin and another for dioxin-like compounds). This approach yields a single number, but that number is difficult to interpret, because one dioxin-like compound can be radically different from another in terms of toxicity. Typically, all dioxin-like compounds are assigned a toxicity weighting factor that indicates each compound's potency compared to dioxin. That weighting factor is then multiplied by the weight of each compound to give its equivalent toxicity, and the equivalent toxicities of the compounds are added together to give a total "weight" of dioxin based on toxicity. EPA chose not to take this approach in reporting on dioxin-like compounds for many reasons, among them: (1) toxicity weighting factors can change based on new information, and (2) identifying each dioxin-like compound could be time-consuming and costly for facilities.

- **How Power Plants Estimate Their Emissions.** Facilities reporting to TRI are not required to measure their emissions but to use the best available information. If measurement data are available, facilities will use them to report to TRI.[78] Facilities measure some of their emissions because of permitting requirements under other environmental statutes, such as the Clean Air Act or Clean Water Act. However, since electric utilities do not have permits for toxic chemical releases, they generally don't measure emissions for these. Only nine percent of power plant toxic chemical air emissions reported to TRI were measured in 2001.

  The vast majority of electric utility toxic chemical releases are estimated by emission factors. An emission factor is essentially a multiplier used with known variables such as fuel consumption or amount of electricity generated. These variables combine to yield emission estimates for various chemicals. Some emission factors can be extremely accurate. For instance, if a facility monitors the amount of various impurities in coal burned, these data can be used to develop emission factors that paint an accurate picture of the quantity of those impurities emitted to the air. In some cases, these emission factors are as accurate, or even more accurate, as measurement for purposes of estimating annual emissions. They do not reflect variability in operating conditions, however, and cannot be used for setting emissions standards or regulatory compliance.

B. Estimating Release of Toxic Metals from Currently-Existing Coal-Fired Power Plants, 1949 To Present

The purpose of this analysis was to estimate the tonnage of metals already released by coal-fired power plants (1949 to present). The focus was on coal-fired power plants which currently exist (or existed in the past).

The analysis focused on five metals – arsenic, chromium, lead, and manganese, selenium. All are present in coal and are released when coal is burned.

The source of data for releases of these metals from the power plant sector is the 2001 Toxics Release Inventory (TRI).[79] This inventory does not include all power plants (some are not included because of either the size of the facility or the amount of the release). As a result, this analysis is likely to underestimate somewhat the amount of toxic releases.

- **Estimating Past Coal Generation.** Total estimated electricity generation from coal was taken from the Energy Information Administration report *Annual Energy Review – 2000*. This report provided the total U.S. coal-fired generation from 1949 to 2000. The coal-fired generation was divided up by state based on the Energy Information Administration report *Electric Power Annual*. This report is published annually and provides a great deal of detail about electricity production and sales for the year. *Electric Power Annuals* were available for 1993 through 2000. These were used to determine the state shares for these years.

  Electric Power Annuals were not available for the years prior to 1993. As a result, it was not possible to directly determine the state share of coal-fired generation for the years before 1993. Instead, the shares calculated for 1993 were used for each of the years back to 1949.

- **Metal Releases.** Emission rates in pounds per megawatt hour (Lb./MWH) for each of the metals of interest were developed by dividing the total release from the power plant sector of each metal by the total MWH generated by coal-fired utilities. The emission rates were then multiplied by the estimated historical and projected coal generation. The source of the emissions data was the 2000 Toxics Release Inventory, which contains emission estimates for 1999. As discussed earlier, the TRI is not complete, so it is likely that the emission factors and total releases are somewhat underestimated.

  The TRI totals for 1999 for each of the five toxic metals were calculated and divided into three endpoints – air, water, and land. Using the *Electric Power Annual 2000* value for coal-fired generation in 2000, a set of 24 release factors was calculated, one for each metal and for each of the three endpoints. These factors were then applied to the estimated historical and projected future coal-fired generation. The result was a set of tables by metal that specify the annual release of each metal and the total historical and projected releases to each endpoint.

C. Calculating Potential Impact of Existing Controls on Reducing Power Plant Toxic Air Emissions

The Clean Air Act requires EPA to set "maximum achievable" control standards for sources of hazardous air pollutants based on the average control achieved by the top 12 percent of best performers in a source category.

This report makes those calculations for power plants reporting 2001 TRI emissions data and EIA data for electric generation. A total of 426 power plants that reported generating at least 90 percent of their electricity from coal combustion also reported TRI emissions data.[80] Most of these facilities also reported the types of coal burned and provided EIA with narrative descriptions of treatment or control processes at power plants.

We first calculated each power plant's emission rate – pounds of pollution released per megawatt hour of electricity generated. We then ordered this normalized emissions data from lowest emission rate to highest for three chemical categories: non-mercury metals, organic compounds (including dioxins and polycyclic aromatic hydrocarbons), and acid gases (sulfuric, hydrochloric, and hydrofluoric acids). We selected the top performing (lowest emission rate) 12 percent of power plants with non-zero emissions and calculated the average emission rate for those 12 percent.[81] This average emission rate was then applied to the 426 power plants to calculate the amount of air pollutants that could be avoided and the average percent control. We also examined the control systems information submitted by the top 12 percent to determine which, if any, control systems could be responsible for the lower emission rates.[82] The results, summarized in Figure 5, show that properly optimized control systems provide significant control of power plant air emissions.

Analysis of the TRI data shows that the best-performing power plants are already using technology that could reduce total air toxics emissions by more than 620 million pounds. If applied to all U.S. coal-fired power plants, installation and optimization of fabric filters (baghouses), electrostatic precipitators, and sulfur dioxide scrubbers could result in a 94 percent reduction of non-mercury metals, a 96 percent reduction of acid gases, and a 99 percent reduction of organic compounds. These controls would also significantly reduce emissions of particulates and acid rain forming sulfur dioxide (SO_2).

ENDNOTES

[1] *See* Table 2 for additional utility toxic air pollution totals.
[2] On June 28, 2004 eleven states (CA, NM, NJ, NY, PA, WI, CT, VT, ME, MA, NH) submitted comments to EPA asserting that EPA's failure to regulate ALL air toxics from utilities is a clear violation of the federal Clean Air Act. See: www.nj.gov/oag/newsreleases04/state-mercury-comments.pdf . (Chapter IX). The State and Territorial Association of Pollution Prevention Agencies (STAPPA), the Association of Local Air Pollution Control Officials (ALAPCO), and the Northeast States for Coordinated Air Use Management (NESCAUM), among others, also submitted similar comments. Excerpts from these groups' comments, and others, to the EPA rulemaking docket addressing this precise question can be obtained at: http://www.cleartheair.org/documents/mercury_docket_excerpts.pdf
[3] For a chart comparing Clean Air Act mercury control requirements and the EPA's regulatory approach go to: http://cta.policy.net/documents/bush_legregcaa.pdf
[4] In addition to mercury from coal-fired power plants, the proposed rule also seeks to regulate nickel emissions from oil-fired power plants.
[5] Mahaffey, K.R., R.P. Clickner and C.C. Bodurow, 2004. Blood organic mercury and dietary mercury intake: National Health and Nutrition Examination Survey, 1999 and 2000. *Environmental Health Perspectives*, Vol. 112, No. 5, April, 2004.
[6] "U.S. Proposes Easing Rules On Emissions Of Mercury," *The New York Times*, December 3, 2003.
[7] U.S. EPA, Clean Air Proposals Promise Sharp Power Plant Pollution Reductions. http://yosemite.epa.gov/opa/admpress.nsf/b1ab9f485b098972852562e7004dc686/b8860b2d46c43fa385256dfd007870df
[8] "EPA Led Mercury Policy Shift; Agency Scuttled Task Force That Advised Tough Approach," *The Washington Post*, December 30, 2003, p. A17.
[9] "Proposed Mercury Rules Bear Industry Mark; EPA Language Similar to That in Memos From Law Firm Representing Utilities," *The Washington Post*, January 31, 2004. *See also*, http://leahy.senate.gov/issues/environment/mercury/EPA_IG_mercury_letter.html
[10] For a chart comparing Clean Air Act mercury control requirements and the EPA's regulatory approach go to: http://cta.policy.net/documents/bush_legregcaa.pdf For a detailed discussion of the Bush Administration's plan to reduce mercury emissions from coal-fired power plants go to: http://cta.policy.net/proactive/newsroom/release.vtml?id=24640
[11] Correspondence from J. Rick Beusse, EPA Office of Inspector General to Jeffrey Holmstead, EPA Assistant Administrator for Air & Radiation, May 14, 2004.
[12] *See* Eleven states' comments on mercury rulemaking, Endnote 2, *supra*, p. 74. http://www.nj.gov/oag/newsreleases04/state-mercury-comments.pdf.
[13] *See* U.S. EPA, National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, Institutional Boilers and Process Heaters or "IB MACT rule," OAR-2002-0058 (February 26, 2004) www.epa.gov/airlinks/boilersfinalrule.pdf
[14] For past analysis of 2000 and 2001 EPA TRI data for coal-fired power plants, see *Toxic Power* and *Toxic Neighbors* at: www.cleartheair.org
[15] This number only includes plants that generate at least 90 percent of their electricity from coal combustion.
[16] The TRI program (§313) is administered by EPA under the Federal Emergency Planning and Community Right-to-Know Act (EPCRA), 42 U.S.C. §11001 *et seq.*
[17] In total there are more than 500 power plants that report significant air emissions. For a detailed discussion of these plants and their emissions, *see* Lethal Legacy www.cta.policy.net/proactive/newsroom/release.vtml?id=25021
[18] For an analysis of TRI's impact on emissions reduction, see A. Fung and D. O'Rourke, "Reinventing Environmental Regulation from the Grassroots Up: Explaining and Expanding the Success of the Toxics Release Inventory." *Environmental Management.,* Vol. 25, No. 2, pp. 115-127 (2000)
[19] This figure includes only facilities in the manufacturing sector and includes only the core set of chemicals that has been reported continuously since 1988. It does not include the electric power industry.
[20] See Appendix III.A of this report for a detailed discussion of TRI data and methodology.
[21] U.S. Census, 2000. Data compiled by MSB Energy Associates.
[22] Nationally, annual power plant emissions are approximately responsible for 36 percent of carbon dioxide (2 billion tons), 64 percent of sulfur dioxide (13 million tons), 26 percent of nitrogen oxides (6 million tons) and 52 tons of mercury (note that this is not the mercury data submitted to TRI, but an EPA estimate from other data collection efforts). U.S. EPA, *National Air Quality and Emission Trends Report, 1997* (December 1998), Tables A-4 and A-8, pp. 114, 117. Available online at: www.epa.gov/oar.

[23] Among power plants, older coal-fired facilities produce the most pollution. Fifty-six percent of power plant boilers in operation in the U.S. are fueled by coal. However, they account for over 93 percent of nitrogen oxides, over 96 percent of sulfur dioxide, over 88 percent of carbon dioxide, and 99 percent of mercury emissions for the entire electric industry. U.S. EPA, Acid Rain Program, *National Summary Percent Contribution by Unit Fuel Type.* Available online at www.epa.gov/acidrain/emissions/us_sum.html

[24] See Appendix III.B of this report for a detailed discussion of data and methodology.

[25] U.S. EPA, "Study of hazardous air pollutant emissions from electric utility steam generating units – final report to Congress." February, 1998a, 453/R-98-004a.

[26] National Academy of Sciences (NAS), Scientific Frontiers in Developmental Toxicology and Risk Assessment. National Academy Press, June 2000. http://www.nap.edu/books/0309070864/html/

[27] National Environmental Trust (NET), et al., Polluting Our Future: Chemical Pollution in the U.S. that Affects Child Development and Learning (2000). www.environet.org The Census Bureau estimates that nearly 12 million U.S. children under 18 (17 percent of children) suffer from one or more developmental, learning, or behavioral disabilities. If, according to the National Academy of Sciences, known toxic exposures are directly implicated in approximately 3 percent of these disabilities, then 360,000 U.S. children – or 1 in every 200 – suffer from developmental or neurological defects caused by exposure to known toxic substances, including developmental and neurological toxins. For additional discussion of power plant pollution threats to children, see *Children at Risk*, Clear The Air, May 2002, www.cleartheair.org

[28] For a discussion of PCBs, mercury, and other endocrine disruptors, see Colburn et. al., *Our Stolen Future: Are We Threatening Our Fertility, Intelligence, and Survival?* New York: Dutton, 1996.

[29] U.S. EPA: Health Effects Notebook for Hazardous Air Pollutants- Arsenic Compounds. www.epa.gov/ttn/atw/hlthef/arsenic.html

[30] Agency for Toxic Substances and Disease Registry- ToxFAQs www.atsdr.cdc.gov/tfacts104.html .

[31] Persistence is a measure of how long a chemical remains in the environment and is typically measured by half-life: the amount of time it takes for half of the original amount of a chemical to degrade into another substance. TRI data must be reported at lower thresholds for bioaccumulative chemicals that have half-lives of two months or more.

[32] Facilities report the total amount of releases of dioxin and dioxin-like compounds all together. They may also report the weight fraction of each of the 17 compounds reportable to TRI if they have that information readily available. However, the facility can report the breakout for its largest emission or for total emissions; it is not possible to determine which one the breakout applies to. Some industry associations have provided blanket estimates of the breakdown for their industries; however, these estimates are not necessarily representative of individual facilities.

[33] Agency for Toxic Substances and Disease Registry- ToxFAQs www.atsdr.cdc.gov/tfacts117.html, U.S. EPA: Health Effects Notebook for Hazardous Air Pollutants - Hydrochloric Acid www.epa.gov/ttn/atw/hlthef/hydrochl.html, U.S. EPA: Health Effects Notebook for Hazardous Air Pollutants - Hydrofluoric Acid www.epa.gov/ttn/atw/hlthef/hydrogen.html.

[34] Raizenne, M., et. al., "Air Pollution Exposure and Children's Health," Canadian Journal of Public Health (1998), 89: S 43-48; and U.S. EPA: Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units - Final Report to Congress. Volume 2: Appendices. 453/R-98-004b. February 1998.

[35] U.S. EPA: Health Effects Notebook for Hazardous Air Pollutants - Lead Compounds www.epa.gov/ttn/atw/hlthef/lead.html

[36] U.S. EPA: Health Effects Notebook for Hazardous Air Pollutants - Chromium Compounds www.epa.gov/ttn/atw/hlthef/chromium.html

[37] U.S. EPA: Health Effects Notebook for Hazardous Air Pollutants – Formaldehyde www.epa.gov/ttn/atw/hlthef/formalde.html

[38] New Jersey Department of Health and Human Services: Right to Know Hazardous Substance Fact Sheets - Trimethylbenzene www.state.nj.us/health/eoh/rtkweb/1929.pdf

[39] Chart includes both the impacts of acute and chronic exposure. Source: Agency for Toxic Substances and Disease Registry, U.S. Department of Health and Human Services. Toxicological Profiles for Lead, Arsenic, Chromium, Sulfuric Acid, PAHs and Dioxin, available at www.atsdr.cdc.gov/toxpro2.html. United States Environmental Protection Agency, Integrated Risk Information System. Information for Hydrochloric Acid, available at: www.epa.gov/iris/index.html. Please note, different federal agencies ascribe different adverse health affects to different air toxics. We have made no attempt to reconcile those disparities in this report.

[40] U.S. EPA: *Study of Hazardous Air Pollutant Emissions from electric utility Steam Generating Units –Final Report to Congress*. Volume 2: Appendices. 453/R-98-004b. February 1998.

[41] EPA Federal Register notice 6560-50P, December 14, 2000. See www.epa.gov/ttn/atw/combust/utilitox/utilfind.pdf.

[42] While falling short of implicating average emissions of acid gases, the 1998 EPA study did point out that hydrochloric acid emissions have detrimental environmental effects. These emissions significantly enhance the acidity of cloud water and thus can indirectly affect acid rain (by interacting with sulfur dioxide in the atmosphere). It also contributes to the formation of fine particles. According to EPA, hydrochloric acid in the atmosphere can affect the atmospheric chemistry of mercury, which may affect how long mercury remains in the atmosphere before being deposited to earth.

[43] U.S. EPA, Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units –Final Report to Congress. Volume 2. 453/R-98-004b. February 1998.

[44] Abt Associates, The Particle-related Health Benefits of Reducing Power Plant Emissions, October 2000. http://www.clnatf.org/resources/reports/Abt_PM_report.pdf

[45] For a discussion of this disparate treatment, see the June 28, 2004 "mercury rule" comments submitted by eleven states (e.g. CA, NM, NJ, NY, PA, WI, CT, VT, ME, MA, NH) asserting that EPA's failure to regulate ALL air toxics, including acid gases, from utilities is a clear violation of the federal Clean Air Act. www.nj.gov/oag/newsreleases04/state-mercury-comments.pdf

[46] *See* U.S. EPA, National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, Institutional Boilers and Process Heaters or "IB MACT rule," OAR-2002-0058 (February 26, 2004) www.epa.gov/airlinks/boilersfinalrule.pdf

[47] IB MACT rule at p. 14.

[48] *Ibid.,* at pp. 16, 17, 18.

[49] *Ibid*., at pp. 19-20.

[50] 2002 EIA data were not available to combine with 2002 TRI data. Therefore, this analysis uses 2001 data for the potential impact of a MACT standard.

[51] Power plants generating at least 90% of electricity from coal.

[52] Does not include dioxin or dioxin-like compounds.

[53] Industry indicated by facilities' primary SIC code as reported to TRI.

[54] Metals and metal compounds are reported separately to TRI, and are usually added for comparison purposes. The reporting for metal compounds includes only the weight of the metal of interest, and not the other elements.

[55] One Nevada power plant reported significantly higher air emissions of lead and lead compounds than any other power plant in the U.S. This report contains data as reported to EPA, and was not verified with individual reporting facilities.

[56] This is the figure that was reported to EPA. The facility operators have indicated that a revision has been filed, but it was not incorporated into the 2002 data released by EPA. This report uses the 2002 data released to the public on June 23, 2004.

[57] This one Nevada power plant reported significantly higher air emissions of lead and lead compounds than any other power plant in the U.S. This report contains data as reported to EPA, and was not verified with individual reporting facilities.

[58] As a listed source category, the CAA requires EPA to promulgate emission standards for all HAPs emitted in significant amounts. *See* 42 U.S.C.A. §7412(c)(2); *see also National Lime Ass'n v. EPA*, 233 F.3d 625, 634 (D.C. Cir. 2000).

[59] *See* National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, Institutional Boilers and Process Heaters or "IB MACT rule," OAR-2002-0058 (February 26, 2004). www.epa.gov/airlinks/boilersfinalrule.pdf Among the HAPs regulated in that rule are: arsenic, cadmium, chromium, hydrogen chloride, hydrogen fluoride and various organic HAPs, which are the same HAPs that EPA concluded in the preamble to the mercury proposal posed no public health hazard.

[60] *See* National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, Institutional Boilers and Process Heaters or "IB MACT rule," OAR-2002-0058 (February 26, 2004), at pg. 14.

[61] CAA §112(b)(9)(B)(ii).

[62] *See* Eleven states' comments on mercury rulemaking, pgs. 17-19. www.nj.gov/oag/newsreleases04/state-mercury-comments.pdf

[63] *National Lime Ass'n v. EPA*, 233 F.3d 625, 634 (D.C. Cir. 2000).

[64] As indicated above, eleven states and several state and local air pollution control associations all take the position that EPA has a legal obligation to regulate each and every toxic air pollutant emitted by coal-fired power plants.

[65] U.S. EPA, Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units–Final Report to Congress, EPA-453/R-98-004a (Feb. 1998).

[66] Committee on the Toxicological Effects of Methylmercury, National Research Council, *Toxicological Effects of Methylmercury, "* Executive Summary" at 2 (2000) ("NRC Study").

[67] *See* 65 Fed. Reg. at 79,830.

[68] *Ibid.,* at 79,829.

[69] *Ibid.,* at 79,826 and 79,830.

[70] CAA § 112(c)(2), 42 U.S.C. § 7412(c)(2); *see also* CAA § 112 (c)(5), 42 U.S.C. § 7412(c)(5) (EPA Administrator "shall promulgate" emissions standards under section 112(d) for source categories added to the section 112(c) list after 1991).

[71] CAA § 112(d)(2), 42 U.S.C. § 7412(d)(2).

[72] U.S.C. §§ 7412(c) & (d), 7607(d)(1)-(3), (5).

[73] The full record of this aspect of the proceedings can be obtained at http://leahy.senate.gov/issues/environment/mercury/EPA_IG_mercury_letter.html

[74] *See* CAA §§112(n)(1), 112(c).

[75] 65 Fed. Reg. at 79,830 ("[t]herefore, the EPA is adding coal- and oil- fired electric utility steam generating units to the list of source categories under section 112(c) of the CAA").

[76] For a detailed discussion of EPA's inadequacies in this regard, refer to Section IX of the comments by California, New York, Wisconsin, New Jersey, Pennsylvania and others in opposition to the rule, *see* Endnote 2, *supra*.

[77] Although mercury is present as an impurity in coal, EPA determined that electric utilities would have to report mercury emissions because various new mercury compounds are formed during the coal combustion process.

[78] "Measurement" does not necessarily mean continuous or even frequent measurement. A facility can take a few measurements during the year and extrapolate for the entire year as long as the facility operators believe that these data are representative of the year's operations. Obviously, this is not always the case.

[79] www.epa.gov/tri

[80] Note that this calculation differs from the official MACT process in two ways: First, the MACT process applies to individual boiler units, not entire power plants; second, the Clean Air Act also requires MACT emissions data to be measured, not estimated by other means. TRI data are reported for the entire power plant, and although they may be measured, facility operators are required only to use the best available information to report data.

[81] The composite TRI data used to create this analysis did not distinguish between the two potential reasons for zero emissions reports: Power plants operators could indeed have reported zero emissions, or they could have not submitted reports for particular substances because they did not meet the reporting thresholds. Either instance provided a zero for the purposes of calculation, therefore all zeros were excluded. This effectively raises the average emission rate because legitimate zero reports were excluded. Thus, this estimate is relatively conservative, and power plants may be able to control pollutants even more effectively.

[82] Control data were not available for all of the top 12 percent of performers, and no attempt was made to determine if particular control systems were more prevalent among the best performers than among the rest of the power plants.

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