

# Lethal Legacy

The Dirty Truth About The Nation's Most  
Polluting Power Plants

By U.S. Public Interest Research Group Education Fund and  
The State PIRGs  
for  
Clear the Air, the National Campaign Against Dirty Power  
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The opinions expressed in this report are those of the author(s) and do not necessarily reflect the views of The Pew Charitable Trusts

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## Executive Summary:

Today, as we begin a new millennium, several hundred older, coal-burning power plants across the nation are still operating with out-of-date or no pollution controls. Pollution from these plants poses grave threats to public health and the environment. Some of the costs of continuing to rely on these old, dirty power plants include:

**Asthma attacks and emergency room visits:** A 1999 study by Abt Associates estimated that in a single ozone season of 1997, smog pollution in the eastern U.S. caused more than 6 million asthma attacks and sent more than 150,000 Americans to hospital emergency rooms.<sup>1</sup> Children whose lungs are still developing are especially vulnerable to these health threats, as are senior citizens and people with asthma or other respiratory disease. Power plants are the largest industrial source of the nitrogen oxide (NOx) pollution that causes smog formation.

**Premature mortality:** The U.S. Environmental Protection Agency (EPA) estimates that "soot," or "fine particulate" air pollution causes more than 40,000 premature deaths each year. Older-coal-burning power plants are the largest source of sulfur dioxide (SO<sub>2</sub>), a primary component of soot.

**Loss of aquatic and forest ecosystems:** Due to acid rain, twenty-five percent of lakes in the Adirondacks cannot support plant or animal life.<sup>2</sup> Similarly alarming, today six percent of Virginia's native brook trout streams are incapable of supporting fish life due to acid rain.<sup>3</sup> Moreover, the acidity of the rain and fog has caused extensive damage to forest ecosystems from the Shenandoahs, through the Adirondacks and on into Canada. Power plants are the largest source of the nitrogen (NOx) and sulfur pollution (SO<sub>2</sub>) that causes acid rain.

**Human developmental and neurological damage:** Mercury pollution has contaminated the fish in thousands of U.S. lakes and streams. Today 40 states have issued warnings against consuming fish due to the risk of methylmercury exposure.<sup>4</sup> When ingested by pregnant or nursing women, methylmercury can cause neurological damage, including delayed development in the fetus and young children. Coal-burning power plants are the largest known domestic industrial source of mercury.

**Global Warming:** The world's leading climate scientists have concluded that man-made carbon emissions are causing a rise in the Earth's temperature.<sup>5</sup> Unless we can reverse this trend, they predict that global warming will have devastating ecological consequences such as sea-level rise, northward spread of insect-borne diseases such as malaria and dengue fever, and increasingly severe and frequent natural disasters such as floods, droughts and hurricanes. Power plants are the largest source of U.S. carbon dioxide (CO<sub>2</sub>) emissions.

Eliminating these threats must be among our nation's top priorities. However, current law is inadequate to the task of cleaning up our electric industry. The Clean Air Act is riddled with loopholes allowing older plants to emit as much as ten times more SO<sub>2</sub> and NOx pollution than new plants, and allowing unlimited emissions of mercury and carbon dioxide from power plants.

This report documents the 1999 emissions of NOx, SO<sub>2</sub> and CO<sub>2</sub> from the dirtiest 594 power plants in the country. Each of the plants included in this report emitted at least 20 tons of "excess" NOx or SO<sub>2</sub>, or put another way, 20 tons of pollution that would not have been permitted if the plant was required to meet modern emission standards for NOx and SO<sub>2</sub>. In addition, the report includes estimates of 1998 mercury emissions from each plant. For each plant where information was available, the report includes the number of vulnerable people, including children under 17, senior citizens over 65, people with asthma, and people with other chronic respiratory disease including bronchitis or emphysema, living in counties falling wholly or partly within 50 miles of each plant.

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<sup>1</sup> Out of Breath, Health Effects from Ozone in the Eastern United States, Prepared by Abt Associates for Clear the Air, October 1999.

<sup>2</sup> National Acid Precipitation Assessment Program (NAPAP), August 1998.

<sup>3</sup> Art Bulger, et al., Acid Rain: Current and Projected Status of Coldwater Fish Communities in the Southeastern US in the Context of Continued Acid Deposition, Trout Unlimited, July 1998.

<sup>4</sup> U.S. EPA, Factsheet, "Update: National Listing of Fish and Wildlife Advisories," EPA 823-F-005 (July, 1999), Available online at [www.epa.gov/ost.fish/epafish.pdf](http://www.epa.gov/ost.fish/epafish.pdf).

<sup>5</sup> Intergovernmental Panel on Climate Change, Second Assessment Report, 1995.

## Summary of Findings:

- Sulfur Dioxide**

Nationwide, these 594 dirty power plants emitted 12.5 million tons of SO<sub>2</sub> in 1999. Of this pollution, 9.4 million tons (75%) was "excess" SO<sub>2</sub>, or would be eliminated if each plant met modern emission standards. The vast bulk of excess pollution came from older, coal-burning plants, with 89% of excess SO<sub>2</sub> emitted by plants primarily powered by coal, and 87% by plants that began operation of at least one unit by or before 1977.

- Nitrogen Oxides:**

Nationwide, these 594 dirty power plants emitted 5.4 million tons of smog-forming NO<sub>x</sub> in 1999. Of this pollution, 3.6 million tons (66%) was "excess" NO<sub>x</sub>, or would be eliminated if each plant was required to meet modern pollution standards for NO<sub>x</sub>. The vast bulk of excess NO<sub>x</sub> pollution came from older, coal-burning plants, with 89% from plants primarily powered by coal, and 81% from plants that began operation of at least one unit by or before 1977.

- Mercury**

Nationwide, older, coal-burning power plants emitted 91,422 pounds of mercury in 1998. The vast bulk of this pollution was emitted by older, coal-burning power plants, with 95% emitted by plants primarily powered by coal, and 77% emitted by plants that began operation of at least one unit by or before 1977.

- Carbon Dioxide:**

Nationwide, these dirty power plants emitted 2.3 billion tons of carbon dioxide (CO<sub>2</sub>) in 1999, 38% of all U.S. CO<sub>2</sub> emissions. The vast bulk of this pollution was emitted by older, coal-burning power plants, with 85% emitted by plants primarily powered by coal, and 74% emitted by plants that began operation of at least one unit by or before 1977.

- Dirtiest Plants:**

For each of the four pollutants under consideration, the report ranks the dirtiest 100 plants according to total tons emitted in 1999 (for SO<sub>2</sub>, NO<sub>x</sub> and CO<sub>2</sub>) and estimated emissions from 1998 for mercury. The highest emitting plants for each pollutant are:

Pollutant	Plant	State	Operating Company	Amount Emitted
SO <sub>2</sub>	Baldwin	Illinois	Illinois Power (Illinova)	245,243 tons
NO <sub>x</sub>	Paradise	Kentucky	TVA	102,412 tons
Mercury	Keystone	Pennsylvania	PECO	1,911 pounds
CO <sub>2</sub>	Scherer	Georgia	Georgia Power (Southern Company)	23,664,019 tons

- Ranking of the States**

For each of the four pollutants under consideration, the report ranks each state according to total tons emitted by in-state plants in 1999 (for SO<sub>2</sub>, NO<sub>x</sub> and CO<sub>2</sub>) and estimated emissions from 1998 for mercury.

The top ten states for each pollutant are:

SO <sub>2</sub>	NO <sub>x</sub>	Mercury	CO <sub>2</sub>
Ohio	Ohio	Pennsylvania	Texas
Pennsylvania	Texas	Texas	Indiana
Indiana	Indiana	Ohio	Ohio
Florida	Kentucky	Illinois	Florida

Illinois	West Virginia	Alabama	Kentucky
Texas	Florida	Indiana	Pennsylvania
West Virginia	Illinois	West Virginia	West Virginia
Kentucky	North Carolina	Kentucky	Illinois
Alabama	Pennsylvania	North Carolina	Alabama
Georgia	Missouri	Michigan	Georgia

- **The Dirty Dozen Holding Companies**

For each of the four pollutants under consideration, the report provides a list of “Dirty Dozen” companies, based on the amount of pollution emitted by plants owned by company in 1999 (for SO<sub>2</sub>, NO<sub>x</sub> and CO<sub>2</sub>) and estimated emissions from 1998 for mercury.<sup>6</sup> For each pollutant, the Dirty Dozen companies are:

SO <sub>2</sub>	NO <sub>x</sub>	Mercury	CO <sub>2</sub>
Southern Company	Southern Company	Southern Company	Southern Company
American Electric Power	Tennessee Valley Authority	American Electric Power	American Electric Power
Tennessee Valley Authority (TVA)	American Electric Power	GPU, Inc.	Tennessee Valley Authority
Cinergy Corp.	Allegheny Power System	Commonwealth Edison	Texas Utilities
Allegheny Power System	Texas Utilities	Tennessee Valley Authority	Allegheny Power System
GPU, Inc.	Cinergy Corp.	Texas Utilities	Cinergy Corp.
Texas Utilities	Dominion Resources	Allegheny Power System	Entergy
Illinova Corp.	PacifiCorp	Dominion Resources	PacifiCorp
Dominion Resources	Entergy	Cinergy Corp.	Central and Southwest Corp.
Carolina Power & Light	Duke Power	Central and Southwest Corp.	Dominion Resources
Ohio Edison Company	Carolina Power & Light	Carolina Power & Light	GPU, Inc.
Duke Power Company	Central and Southwest Corp.	PacifiCorp	Carolina Power & Light

- **Vulnerable Populations Living Near Dirty Power Plants**

In 1997, there were 236.8 million Americans living in counties that fell wholly or partly within a 50 mile radius of one of the 594 dirty power plants. The health impacts of smog and soot pollution fall disproportionately on certain vulnerable populations, including children whose lungs are still undergoing development, seniors, and those who suffer from respiratory illnesses. Of the people living in counties falling wholly or partly within 50 miles of a dirty power plant, 56.3 million are children under 17 years of age, 27.9 million are seniors over 65 years of age, 13.1 million are people who suffer from asthma, and 14.7 million are people who suffer from either chronic emphysema or chronic bronchitis.

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<sup>6</sup> Please note that plant ownership is changing rapidly. These holding companies owned the plants as of January 1, 1999, the latest date when complete plant ownership information was available, but the ownership may have changed since this time.

## **Recommendations:**

Comprehensive, federal legislation will be necessary to adequately abate power plant pollution. At a minimum, Congress should take action to require that:

1. By the year 2005, all power plants meet the same emission standards met by new power plants today.
2. Power plant mercury emissions are reduced by 90% by 2005.
3. Power plant carbon dioxide emissions are reduced to a level consistent with meeting the goals of the international agreement adopted by the U.S. and 37 other nations in Kyoto, Japan in 1997. At a minimum power plant CO<sub>2</sub> should be reduced to 1990 levels by 2005.
4. Investment in energy efficiency and renewable energy are increased.
5. Any federal bill to restructure or deregulate the electric utilities includes these important public health and environmental safeguards.

Several bills are gaining support in the Congress that would accomplish all or most of these objectives, including legislation proposed by Representatives Henry Waxman of California and Sherwood Boehlert of New York (H.R. 2900), Representative Tom Allen of Maine (H.R. 2980), and Senator James Jeffords of Vermont (S. 1369).

## Methodology:

Unit-by-unit SO<sub>2</sub> and CO<sub>2</sub> emissions came from the EPA 1999 Preliminary Acid Rain Continuous Emissions Monitoring (CEM) database. EPA has not yet quality assured these data, which is why we consider these to be preliminary reports. Sources are still allowed to resubmit these data. Final quality assured data may be found in the annual emissions scorecards later in the year.

Unit-by-unit NO<sub>x</sub> emissions were calculated by multiplying the heat input by the NO<sub>x</sub> emission rate for each unit. Both the heat input and the NO<sub>x</sub> rate came from the EPA 1999 Preliminary Acid Rain Continuous Emissions Monitoring (CEM) database.

Plant-by-plant mercury emissions estimates were provided by the Environmental Working Group, and were calculated from 1998 coal consumption data and pollution control data.

Excess NO<sub>x</sub> and Excess SO<sub>2</sub> were derived by comparing total 1999 emissions to the level of emissions that would have been allowed under modern emission standards of .15 pounds/mmBTU for NO<sub>x</sub> and .30 pounds/mmBTU of SO<sub>2</sub>, assuming the same heat input.

For each plant the owner, county, dates of operation and primary fuel came from the Energy Information Administration's Inventory of Electric Utility Power Plants in the United States, 1999.

The data on lung disease was obtained from the American Lung Association Report, "Estimated Prevalence and Incidence of Lung Disease," April 1999. This report provides estimates of various lung disease cases by county. The data on population by age came from U.S. 1990 Census data.

We used a geographical information system (GIS) model to determine which counties were within a fifty mile radius of the power plants in question. Counties which fell within this radius but which extended beyond the circle were included. The data for the included counties was totaled to give the total for the plant in question.

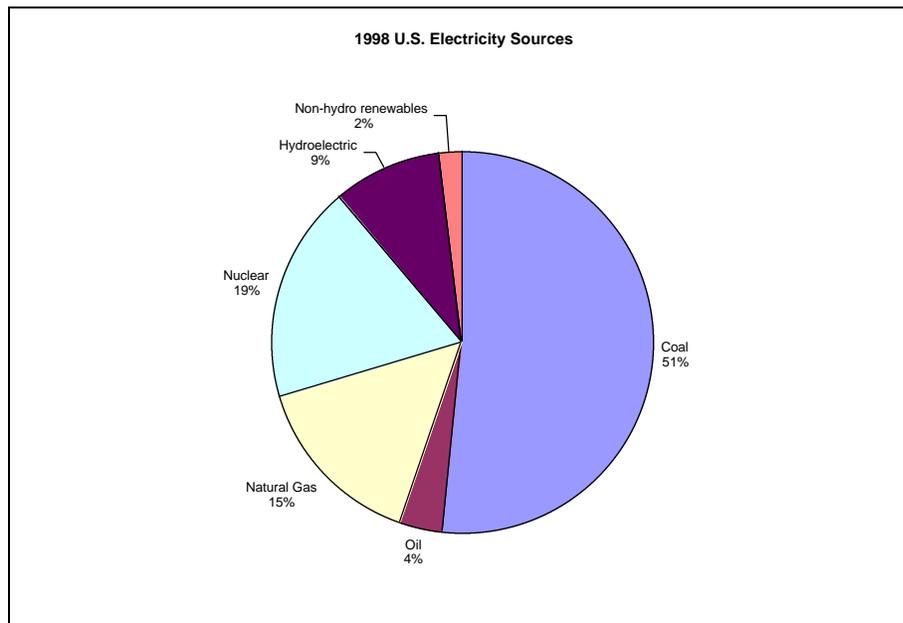
The U.S. Census data has an age breakdown for children under 5, and for children 5-17. These two classifications were added together to get the total number of children. The age category of 65 and older was used to get the number of elderly. The asthma numbers are the total of adult asthma and pediatric asthma from the American Lung Association report. Chronic Obstructive Pulmonary Disease (COPD) is the total of chronic bronchitis and chronic emphysema.

## Introduction: Electricity Generation, Public Health and the Environment

The electric power industry in the U.S. is responsible for many of the most pressing public health and environmental crises we face today. Air pollution, including ground-level ozone and particulate matter, are damaging our respiratory systems, and decreasing life expectancy rates; the fish in thousands of U.S. lakes and streams are unsafe for consumption due to mercury poisoning; acid rain continues to wreak havoc on Eastern forest and aquatic ecosystems; the Chesapeake Bay is choking on excess nitrogen pollution; there is now a threat of major ecological upheaval caused by global warming. These are just some of the major impacts attributable to the older, coal-burning power plants operated by our electric utilities.

Over the last three decades, many innovative, new technologies have been developed which could reduce the public health and environmental impacts of generating power. Energy efficient appliances, motors, lighting, heating, cooling and building techniques are available to dramatically cut the amount of power needed for homes, business, and industry. Moreover, renewable energy, including solar, wind, biomass, and geothermal, produce electricity at costs competitive with traditional power plants, and at costs lower than many nuclear plants, while producing little or no pollution at all. Today, even new natural gas-powered power plants can generate electricity while producing only a fraction of the pollution that older power plants create.

Despite advances in efficiency and the increased availability of clean, affordable ways to produce electricity, the electric power industry continues to rely heavily on coal, the most polluting fuel, for more than half (51%) of the electricity it generates. The remaining electricity comes from nuclear (19%), natural gas (15%), hydroelectric power (9%) and oil (4%). Non-hydroelectric renewable energy accounted for only 2% of our electricity generation in 1998.<sup>7</sup>



<sup>7</sup> Energy Information Administration: [www.eia.doe.gov/cneaf/electricity/page/at\\_a\\_glance/epatab5.html](http://www.eia.doe.gov/cneaf/electricity/page/at_a_glance/epatab5.html)

Throughout its nearly 90-year history as a monopoly provider of electric services, the electric industry has fought for and won a host of state and federal rules that give older generators a competitive advantage. Perverse regulatory incentives, which effectively subsidize existing coal and oil plants have stalled the much-needed shift toward energy efficiency and renewable energy.

One such perverse incentive highlighted in this report has come to be known as the grandfathering of emissions from older power plants. The Clean Air Act of 1970, as amended in 1977 and 1990, exempts coal-burning power plants from new source standards, allowing them to emit between 4 and 10 times the amount of pollution that new plants may emit under the Clean Air Act. In part, this colossal loophole exists because industry lobbyists argued successfully that its older plants would soon retire, and that it would therefore be wasteful to require expensive retrofits to control pollution from these plants. However, more than 30 years later, many of these same plants, built in the 30s, 40s, 50s and 60s, are still operating, largely without modern environmental controls.

This report also shines the spotlight on the failure of federal and state policy makers to regulate CO<sub>2</sub> and mercury emissions from power plants. Despite the body of research documenting the toxic effects of mercury exposure, namely neurological damage causing developmental delays and cognitive deficits, most mercury emissions from power plants currently go unmonitored and unreported, and there are no regulations limiting mercury emissions from power plant smokestacks. The electric industry is the only large remaining unregulated source of mercury in the U.S.

Similarly, there are no regulations limiting emissions of carbon dioxide, the leading cause of global warming. For more than a decade, climate scientists have warned that carbon dioxide emissions, a byproduct of burning fossil fuels such as coal, oil and gas, are causing a global rise in temperature and creating the possibility of catastrophic climate changes, including sea level rise, loss of forests, wetlands, and coastal areas, spread of infectious diseases, and reduced agricultural production. In 1992, in response to these warnings, the Senate ratified and President George Bush signed into law an international treaty committing the U.S. to reducing emissions of pollutants that contribute to global warming back to 1990 levels. Yet today, U.S. greenhouse gas emissions are 15% higher than they were in 1990, according to a draft report released by EPA in February 2000.<sup>8</sup> Meanwhile, we may be seeing the impacts of global warming already. The Goddard Institute for Space Studies at NASA has reported that each of the ten hottest years on record have occurred since 1980. Outbreaks of malaria in seven states, mass die-off of tropical coral reefs, and billions of dollars of damage from ice storms, drought and other extreme weather events are all consistent with scientists predictions about the impacts of global warming.

Power plants must make deep cuts in emissions of NO<sub>x</sub>, SO<sub>2</sub>, mercury and CO<sub>2</sub>. These are critical steps toward making our air safe to breathe, and protecting the environment. Pollution cuts should be accompanied by incentives for investment in clean renewable energy and energy efficiency.

The first section of this report discusses in greater detail the pollutants emitted by these older, coal-burning power plants, and the adverse health and environmental impacts for which they are responsible. Section two summarizes the major findings of this report with respect to emissions from the dirtiest power plants, ranking the 100 dirtiest power plants, ranking each state and ranking the "Dirty Dozen" electricity holding companies, on the basis of total NO<sub>x</sub>, SO<sub>2</sub>, mercury and CO<sub>2</sub> emissions. The Appendix contains more detailed information on each of the 594

power plants that in 1999 each emitted more than 20 tons of any air pollutant over and above what would have been permitted by a newer power plant. For each power plant the Appendix includes population information showing the number of vulnerable people, including children under 17, seniors over 65 years of age, people with asthma and people with either chronic bronchitis or chronic emphysema living in counties falling wholly or partly within 50 miles of the plant. Also included in the Appendix is plant-by-plant information listing the plant owner, age and primary fuel use.

Section three specifies a set of policies that would eliminate the polluters' loopholes and create a fair environmental playing field for all electric providers.

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<sup>8</sup> U.S. EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-1998*, available at: [www.epa.gov/globalwarming/publications/emissions/us2000/index.html](http://www.epa.gov/globalwarming/publications/emissions/us2000/index.html).

## Section 1: Health and Environmental Impacts of Power Plant Pollution

### A. Ground-level Ozone or “Smog”

Power plants are the largest industrial source of the NO<sub>x</sub> pollution that causes formation of ground-level ozone, also known as “smog.” Ozone is our nation’s most prevalent and well-understood air contaminant. Despite reductions in smog levels since the passage of the Clean Air Act in 1970, an estimated 117 million people live in areas where the air is unsafe to breathe due to ozone.<sup>9</sup> In 1999 the ozone health standard adopted by EPA in 1997 was exceeded 7200 times.<sup>10</sup>

Ozone is an invisible, odorless gas, which is formed when nitrogen oxides (NO<sub>x</sub>) mix with volatile organic compounds (VOCs) in the presence of sunlight. Thus, public health is most at risk, during “ozone season” from mid-May to mid-September in most places, when there is plenty of sunlight. When inhaled, ozone at certain concentrations can oxidize or “burn through” lung tissue. Breathing ozone at high concentrations can cause airways in the lungs to become swollen and inflamed. Eventually, this causes scarring, and decreases the amount of oxygen that is delivered to the body through each breath. Outdoor exercise on days when ozone concentrations are high increases the impact on the respiratory system. In addition, the corrosive effect of exposure to ozone in the respiratory system increases susceptibility to bacterial infections.

For vulnerable populations, including children, elderly and people with asthma or chronic obstructive pulmonary disorders (COPD – including chronic bronchitis and chronic emphysema), ozone poses a more serious health threat. A number of studies have linked ozone pollution with more frequent emergency room visits, including one study showing a 26% increase in the number of asthma patients admitted to emergency rooms in New Jersey on summer days when ozone concentrations were high.<sup>11</sup> Another study of 25 hospitals found that high ozone levels were associated with at least a 21% increase in emergency room visits over the average number of daily ER visits for people aged 64 and older.<sup>12</sup> Ozone has also been linked to increased frequency of asthma attacks. On high-smog days, children with asthma are 40 percent more likely to suffer asthma attacks compared to days with average pollution levels.<sup>13</sup> A 1999 Abt Associates study estimated that in the eastern United States more than 6 million asthma attacks and more than 159,000 respiratory emergency room visits were triggered by smog during the high-ozone smog season in 1997.<sup>14</sup>

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<sup>9</sup> American Lung Association, *Lungs At Risk*, December 1997.

<sup>10</sup> Clean Air Network, U.S. Public Interest Research Group, *Danger In the Air*, January, 2000. Based on data from state air pollution officials.

<sup>11</sup> Weisel, CP, Cody, RP, Levy, PJ. “Relationship Between Summertime Ambient Ozone Levels and Emergency Department Visits for Asthma in Central New Jersey.” *Environmental Health Perspectives* 1995; 103: 97-102.

<sup>12</sup> “Effects of Air Pollution on Emergency Room Visits for Respiratory Illnesses in Montreal, Quebec.” Ralph J. Delfino, et al *Am J Respir Crit Care Med*. 1997; 155:568-576.\

<sup>13</sup> American Journal of Respiratory and Critical Care Medicine. American Lung Association. February, 2000.

<sup>14</sup> Out of Breath, Health Effects from Ozone in the Eastern United States, Prepared by Abt Associates for Clear the Air, October 1999.

## Hiking and Hacking:

While most people think of ozone as an urban problem, one cannot avoid the smog by fleeing the city. In 1999, ozone monitors in the national parks recorded exceedances of EPA's 1997 ozone standard on 209 occasions.<sup>15</sup> Particularly hard hit was the Great Smoky Mountains National Park, which had unhealthy smog levels on 52 days, or on one out of every three summer days.<sup>16</sup>

This year is shaping up to be as bad or worse for the Smokies. While the typical smog season begins in early May for most of the nation, on March 8 two air quality monitors in the Great Smoky Mountains National Park (as well as one in Georgia) recorded exceedances of the health standard for smog. The monitors registered smog levels at over 100 parts per billion in contrast with safe air quality standards of 85 parts per billion. Last year's record setting number of ozone alerts in combination with this year's early start continue to threaten the health of plant species, trees, and human respiratory systems.

The Great Smokey Mountains National Park is not the only national park suffering from the smog. Smog levels in the Acadia National Park in 1998 were as bad as those in the urban centers of Boston and Philadelphia.<sup>17</sup> Moreover, in the South, only Atlanta and Charlotte had more high ozone days than the Shenandoah National Park in 1998.<sup>18</sup>

In the same way that ozone can damage human lung tissue, it also can damage plant tissues, damaging forests and crops. By eroding plants' stores of carbon, it leaves trees and crops unable to respond to normal demands of growth and development and abnormal demands caused by bad weather, pests, or nutrient deficiencies. Ozone vegetation impact studies have found that at least ninety plant species in the Great Smoky Mountain National Park exhibit ozone injury.<sup>19</sup> In Virginia alone, twenty-three documented plant, wildflower and tree species are sensitive to ozone.<sup>20</sup> In the Shenandoah National Park 97% of milkweed plants and 85% of white pine trees already exhibit evidence of ozone damage.<sup>21</sup>

## B. Fine Particulate Matter, or "Soot"

Power plants are by far the largest source of sulfur dioxide (SO<sub>2</sub>),<sup>22</sup> which is in turn the largest component of fine particulate pollution or "soot" in the Eastern U.S.<sup>23</sup> Particulate matter is the type of air pollution that you can see in the air, visible particles of ash, dust or acid aerosols. Scientists have discovered over the years that the most dangerous air pollution particles are the tiny, nearly invisible particles that become deeply imbedded in the lungs when inhaled.

<sup>15</sup> Izaak Walton League of America, *Air Pollution in Our National Parks 1999*, available at [www.iwla.org/reports/parkfsac.html](http://www.iwla.org/reports/parkfsac.html).

<sup>16</sup> Jim Renfro, "Great Smoky Mountains Recorded 52 Ozone Days between May 4 and Sept. 27." *National Park Service*, 1999.

<sup>17</sup> Izaak Walton League of America, *Air Pollution in Our National Parks 1999*, available at [www.iwla.org/reports/parkfsac.html](http://www.iwla.org/reports/parkfsac.html).

<sup>18</sup> Id.

<sup>19</sup> James Renfro, National Park Service, *Air Quality Fact Sheet for Great Smokey Mountains National Park*, 1994.

<sup>20</sup> National Parks and Conservation Association, 1999. *Parks In Jeopardy: National Parks and Conservation Association 1999 List of 10 Most Endangered National Parks*. [www.npca.org/readaboutit/tt\\_smokymountains.html](http://www.npca.org/readaboutit/tt_smokymountains.html)

<sup>21</sup> Preliminary Notice of Adverse Impact on Shenandoah National Park, 55 Fed. Reg. 38,403 (1990).

<sup>22</sup> U.S. EPA, *1998 Update of the 1997 Air Quality and Emissions Trends Report, Table A-4 (Sulfur Dioxide Emissions)*. Available online at [www.epa.gov/oar](http://www.epa.gov/oar).

<sup>23</sup> *Natural Resources Defense Council, Breathtaking: Premature Mortality Due to Particulate Air Pollution in 239 American Cities, May 1996*.

Therefore, there are now two particulate air pollution standards, one for coarser particles with a diameter of up to 10 microns, and one for “fine” particles with a diameter of less than 2.5 microns.

As is the case with ozone, fine particulate matter is of most concern to vulnerable populations including young children, the elderly, and those with asthma or other respiratory diseases. These “fine” particles cannot be expelled by coughing, swallowing or sneezing, and as they sit in the lungs they cause varying degrees of irritation which can lead to loss of heart and lung function depending upon their chemical composition. Health consequences range from bronchitis and chronic cough to increased emergency room visits and hospital admissions and death.<sup>24</sup> EPA estimates that tens of thousands of lives are cut short each year in the U.S. due to fine particulate pollution. In the U.S. the metropolitan areas most contaminated with particulate air pollution are: Los Angeles, Chicago, New York, New Jersey, Philadelphia and Detroit.<sup>25</sup>

In addition to threatening respiratory health, particulate air pollution also causes “haze,” making it difficult to see in some of the most beautiful vistas in America. For example, over the last 40 years increased particulate pollution has reduced the distance one can see in the Great Smoky Mountain National Park from over 90 miles to 22 miles.<sup>26</sup> Similarly, in the Shenandoah National Park average visibility in the summertime has been reduced by 75% from its natural range.<sup>27</sup> Studies throughout the southeastern U.S. show a 60% decline in visibility between 1948 and 1983, with an 80% decline during the summer months.<sup>28</sup> Of course, the soot you can see in these parks also poses health risks to those who use the parks for recreation. It is a tragedy that in the most natural pristine areas in our nation, hiking and enjoying our national recreational areas have become risky activities for children, the elderly, and people with weakened respiratory systems.

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<sup>24</sup> See, e.g., Dockery et al. “An Association Between Air Pollution and Mortality in Six U.S. Cities.” *N Engl J Med.* 1993; 329: 1753-9.

<sup>25</sup> *Natural Resources Defense Council, Breathtaking: Premature Mortality Due to Particulate Air Pollution in 239 American Cities, May 1996.*

<sup>26</sup> National Parks and Conservation Association, *Parks In Jeopardy: National Parks and Conservation Association 1999 List of 10 Most Endangered National Parks*, [www.npca.org/readaboutit/tt\\_smokymountains.html](http://www.npca.org/readaboutit/tt_smokymountains.html).

<sup>27</sup> Air Quality Division & Shenandoah National Park, National Park Service, Technical Support Document Regarding Adverse Impact Determination for Shenandoah National Park 8 (1990).

<sup>28</sup> *Preliminary Notice of Adverse Impact on Shenandoah National Park, 55 Fed. Reg. 38,403 (1990).*

### **EPA Works to Cut Power Plant NOx and SO2:**

Two major EPA initiatives could result in significant reductions in power plant emissions of NOx and SO2. First, a rule called the NOx SIP Call, adopted by EPA in 1998 would cut NOx emissions from plants and other major sources in 22 states by more than one million tons per ozone season. The rule was adopted in an effort to address the transport of smog across state boundaries in the eastern U.S. Immediately after the rule was adopted, industry representatives and a few resistant states filed suit in federal court to invalidate the program. On March 3, 2000 the Washington DC Federal Court of Appeals upheld the EPA's rule allowing implementation to proceed.

In addition, the EPA has undertaken a landmark enforcement action against power plants which have violated the Clean Air Act's "New Source Review" (NSR) provision. Under the NSR provision, even an older power plant must meet modern pollution standards if it is significantly modified. EPA filed lawsuits on November 3, 1999 against 7 electric utility companies charging that 32 power plants made significant modifications without installing the appropriate accompanying pollution controls.

These enforcement actions were quickly followed by an industry-backed push for legislation shielding them from liability for Clean Air Act violations. Southern Company, in particular, lobbied to introduce legislation as a "rider" to a must-pass appropriation bills that would have thwarted EPA's attempts to enforce the Clean Air Act. Attempts to introduce such legislation during the Fall 1999 appropriations process failed, but lobbying efforts continue.

The first settlement in the lawsuit process came on February 29, 2000 when Tampa Electric Company settled with the EPA. TECO agreed to pay a \$3.5 million civil penalty, install permanent emissions-control equipment to meet modern power plant standards, give up the use of pollution credits, switch from coal to cleaner-burning natural gas at one plant, and invest in environmentally beneficial projects to lessen the impacts of TECO emissions.

### **C. Acid Rain**

Sulfur dioxides and nitrogen oxides do their damage not only in the form of airborne ozone and particulates, but in the form of acid rain, which threatens entire forest and aquatic ecosystems throughout the eastern U.S. and in some parts of the upper midwest. Once emitted into the air, sulfur and nitrogen oxides form sulfates and nitrates, respectively, which are the principle components of acid rain. At risk to fall victim to the impacts of acid rain are such national treasures as the forest of the Shenandoah and Great Smoky Mountains National Parks, New Jersey's Pine Barrens, and the lakes and forests of the Adirondacks and Southeastern Canada.

Acid in rain, clouds and fog damage trees in two primary ways: 1) Directly damaging the needles and foliage, making them more vulnerable to adverse conditions including cold temperatures, and 2) depleting nutrients from the soils in which the trees grow. Acid clouds and fog generally have higher concentrations of damaging sulfates and nitrates than acid rain. Thus, acid deposition is linked to the decline of red spruce growing at high elevation or in coastal areas which are immersed in acid clouds and fog for long time periods.<sup>29</sup>

Lake and stream ecosystems are also vulnerable to the effects of acid rain. As the acidity of the lakes and streams increases, the number of species that can live therein declines.<sup>30</sup> It is not unusual to see episodic acidification of lakes and streams in western Pennsylvania and Virginia with pH levels below 5.0, in which very few species can survive and nearly none can reproduce.

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<sup>29</sup> A.H.Johnson et al., Synthesis and Conclusions from Epidemiological and Mechanistic Studies of Red Spruce in Decline, *Ecology and Decline of Red Spruce in the Eastern United States* (C. Eater & M.B. Adams eds., 1992).

<sup>30</sup> The U.S. National Acid Precipitation Assessment Program, 1990 Integrated Assessment Report 48 (1991).

The Adirondacks are one of the most severely impacted areas in the country to the effects of acid rain, snow and fog. One study noted that of the 264 ponds in the Adirondack Mountains surveyed, 11,518 acres have a pH lower than most fish can tolerate and 63,000 more are very close to reaching this level of acidity.<sup>31</sup>

Virginia's rate of acid deposition is among the highest in the nation. Due to acid deposition, half of the state's native brook trout streams have decreased abilities to host trout populations and 6% are completely unable to support fish populations.<sup>32</sup> A study sponsored by Trout Unlimited found that if current acid deposition levels continue, the number of streams incapable of supporting fish populations in Virginia is projected to climb to 35% by 2041.<sup>33</sup>

In 1990 Congress amended the Clean Air Act, calling for dramatic reductions in sulfur dioxide emissions to address the acid rain problem. Despite the success of the acid rain program in bringing about significant reductions in SO<sub>2</sub>,<sup>34</sup> eastern lakes have shown little or no improvement. Of 202 monitored lakes in Southeastern Canada, 67 percent have shown no improvement in acidity status.<sup>35</sup> Moreover, forests at high elevations, such as New Hampshire's Mt. Washington, continue to be shrouded in acid clouds, while the stream water "can still pickle the leaves that fall from the trees," in Hanover, N.H.<sup>36</sup> The reason for the program's failure to bring about the recovery of these ecosystems is simple: Congress did not require deep enough cuts in SO<sub>2</sub> or NO<sub>x</sub>.

#### **D. Nitrogen Loading**

Nitrogen oxide emissions from power plants are a major contributing factor to nitrogen loading in water bodies across the United States. Nitrogen oxides released into the air can be carried hundreds of miles by the wind and fall into lakes and rivers. The effects of nitrogen loading can be devastating for the plant and animal life in these water bodies as well as for the public, who depend on these waters for tourism, subsistence living, commercial fishing, and recreational enjoyment.

Atmospheric deposition is threatening the health of the Chesapeake Bay, the Great Lakes, Lake Champlain and other coastal water bodies.<sup>37</sup> Too much nitrogen over-fertilizes water and causes algae blooms, which, when it decays, depletes oxygen and kills marine life. Algae blooms also block light that fish, shellfish, and aquatic vegetation need to survive. Studies show that as much as 27% of the nitrogen that enters the Chesapeake Bay can be attributed to air pollution.<sup>38</sup>

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<sup>31</sup> *The U.S. National Acid Precipitation Assessment Program, August 1998.*

<sup>32</sup> *Art Bulger, et al., Acid Rain: Current and Projected Status of Coldwater Fish Communities in the Southeastern US in the Context of Continued Acid Deposition, Trout Unlimited, July 1998.*

<sup>33</sup> *Id.*

<sup>34</sup> *U.S. EPA, "EPA's Acid Rain Program Overview," May 22, 1999.*

<sup>35</sup> *Driscoll, Charles and R. Van Dreason. Season and Long-Term Temporal Patterns in the Chemistry of the Adirondacks. Water, Air and Soil Pollution 67: 319-344. 1993*

<sup>36</sup> *Marks, Alexandra. "Why N.E. Forests Don't Pass Acid Test," Christian Science Monitor, September 25, 1997.*

<sup>37</sup> *U.S. EPA, "Deposition of Air Pollutants to the Great Water: Second Report to Congress," EPA-453/R-97-011 (1997).*

<sup>38</sup> *U.S. EPA, "Deposition of Air Pollutants to the Great Water: Second Report to Congress," EPA-453/R-97-011 (1997).*

## E. Mercury

Some species of fish in thousands of bodies of water in 40 states contain such high levels of toxic methylmercury that health agencies have warned against eating them.<sup>39</sup> As the largest industrial source of mercury emissions, power plants are a significant contributor to this problem.<sup>40</sup> Mercury is a toxic heavy metal, which, when ingested in its methylated form, can cause serious neurological damage, particularly to developing fetuses, infants and children.<sup>41</sup> The neurotoxic effects of low level exposure to methylmercury are similar to the effects of lead toxicity in children, and include delayed development and deficits in cognition, language, motor function, attention and memory.<sup>42</sup> People most at risk include women of childbearing age, pregnant women and their fetuses, nursing mothers and children, and subsistence fishers. Large predator fish such as largemouth bass, walleye, shark, tuna and swordfish have higher levels of methylmercury in them than species lower in the food web.<sup>43</sup> People who frequently and routinely consume fish (e.g., several servings as week), those who eat fish with higher levels of methylmercury, and those who eat a large amount of fish over a short period of time (e.g. anglers on vacation) are more likely to be exposed to higher levels of mercury.<sup>44</sup>

Mercury's primary entrance into the human diet occurs when mercury is emitted into the air, and undergoes photochemical oxidation forming oxidized mercury. Oxidized mercury is water soluble and is deposited to land, lakes and streams by rain and snow, where it reacts with bacteria to form methylmercury, the form most toxic to humans.<sup>45</sup> Methylmercury bioaccumulates to the greatest extent in the tissue of fish and other aquatic organisms and persists forever in the environment, magnifying its public health impacts. An expert panel on mercury atmospheric processes concluded that if all mercury releases were stopped today it could still take at least 50 years for the methylmercury levels in fish to return to pre-industrial levels.<sup>46</sup>

Based on national emission estimates for 1994-95, the largest stationary sources of mercury emissions are: coal- and oil- burning electric power plants (32.8%), municipal waste incinerators (18.7%), commercial and industrial boilers powered by coal or oil (17.9%), medical waste incinerators (10.1%), and hazardous waste incinerators (4.4%).<sup>47</sup>

Although power plants are the largest industrial source of mercury, until recently they have escaped effective reporting requirements for mercury emissions. Previous reporting levels allowed a reporting exemption for all facilities releasing less than 25,000 pounds of mercury, 12 times more than the annual emissions of the highest emitting plant in the U.S. Utilities were thus exempt from reporting. The reporting threshold has changed for the 2000 reporting year, the results from which will be released in 2002. The new reporting thresholds require that facilities that release 10 pounds or more of mercury must report their releases.

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<sup>39</sup> U.S. EPA, Factsheet, "Update: National Listing of Fish and Wildlife Advisories," EPA 823-F-005 (July, 1999), Available online at [www.epa.gov/ost.fish/epafish.pdf](http://www.epa.gov/ost.fish/epafish.pdf).

<sup>40</sup> U.S. EPA, "Mercury Study Report to Congress," 1997.

<sup>41</sup> U.S. EPA, "Mercury Study Report to Congress," 1997.

<sup>42</sup> U.S. EPA, "Mercury Study, Volume V," December 1997.

<sup>43</sup> U.S. EPA, Mercury Study, Volume 1, December 1997.

<sup>44</sup> U.S. EPA, Mercury Study, Volume VII, December 1997.

<sup>45</sup> U.S. EPA, "Mercury Study Report to Congress," 1997

<sup>46</sup> Mercury Atmospheric Processes: A Synthesis Report. Prepared by: Expert Panel on Mercury Atmospheric Processes. Convened March 16-18, 1994, Tampa, Florida.

<sup>47</sup> U.S. EPA, "Mercury Study Report to Congress," 1997.

Although over the last five years the EPA has issued mercury limits for municipal and medical waste incinerators, has proposed limits for hazardous waste incinerators, and has started developing regulations to control mercury from small solid waste, it has made no move to limit emissions from the largest industrial source of mercury, power plants. This is because Congress prohibited such action in 1990, at the behest of utility lobbyists, until EPA completed a report to Congress assessing the health and environmental threats posed by power plant mercury emissions. When the study was completed in 1998, Congress again acted to prevent regulation by calling for an additional study by the National Academy of Sciences. As part of a settlement with the Natural Resources Defense Council, EPA is under deadline of December 2000 to make a regulatory determination whether or not to regulate power plant mercury.

## F. Carbon Dioxide

The earth's temperature is on the rise, threatening wide-ranging catastrophic climate changes, and the probable cause is the emission of gases from man-made sources. Such was the conclusion of 2500 of the world's leading climate scientists, economists and other experts of the United Nations' Intergovernmental Panel on Climate Change (IPCC) in its fall 1995 report. For years, the IPCC, as well as 104 winners of the Nobel Prize in science, and many highly respected professors from top universities, have warned that if countries and industries do not stabilize greenhouse gases we will see warmer temperatures, loss of coastal regions, the spread of infectious disease and increases in extreme weather events like heat waves, flooding and tornadoes.

The trends are alarming: All 10 of the warmest years on record have occurred since 1980,<sup>48</sup> and this century has been the warmest of the past 600 years. According to the Goddard Institute of Space Studies, the 1990s were warmer than the 1980's, previously the warmest decade on record. A Midwestern heat wave in 1995 caused more than 500 deaths in Chicago. In the summer of 1998, temperatures over 100 degrees for 15 straight days claimed more than 100 lives in the Dallas, TX region. 1998 was not only the hottest year on record -- it was also a record year for extreme weather damage. In 1998, the Federal Emergency Management Agency declared sixty-three weather-related major disasters in thirty-four states. By comparison, the average number of weather-related major disaster declarations per year in the 1980s was 21.7.<sup>49</sup>

Some of the predicted consequences of global warming may already be occurring. For example, last year the first study was released linking extinction directly to climate change.<sup>50</sup> The study told the story of the golden toad and twenty frog and toad species in the Monteverde Cloud Forest in Costa Rica. In recent years, warming ocean temperatures led to decreased moisture in the cloud forest. The frog species, dependent on this moisture, moved up the mountain to find cooler, moister habitat. Ultimately the frogs could not find acceptable habitat even at the mountain's peak and became extinct.

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<sup>48</sup> National Climate Data Center, National Oceanic and Atmospheric Administration. "The Annual Global Anomalies," *The Global Historical Climatology Network Database*, <http://www.ncdc.noaa.gov>.

<sup>49</sup> FEMA data as of April 30, 1999, taken from "Total FEMA Obligations by State of CY 1998 Declarations."

<sup>50</sup> Still, Christopher J., Prudence N. Foster, and Stephen H. Schneider. 1999, *Nature* 398:608-610; Pounds, J. Alan, Michael P. L. Fogden, and John H. Campbell. 1999, *Nature* 398:611-615.

## Section 2: Report Findings

This report documents on a plant-by-plant basis, the amounts of SO<sub>2</sub>, NO<sub>x</sub>, and CO<sub>2</sub> emitted in 1999 by each of 594 “dirty” power plants. For each plant, an estimated 1998 mercury emission total is also included.

In addition to total emissions, for each plant the report calculates the “excess NO<sub>x</sub>” and “excess SO<sub>2</sub>” emissions. It is worth an explanation of these terms. Currently, before a new power plant can begin operating, it must install pollution control technology that either achieves the “lowest achievable emission rate” -- in areas where the air quality does not meet federal health-based standards, or the “best available control technology,” -- in areas where the air quality is meeting federal health-based standards. Although these terms are interpreted slightly differently by each state regulatory agency, it is generally accepted that the “best available control technology” today for new coal plants is selective catalytic reduction (SCR) which will achieve a NO<sub>x</sub> emission rate of 0.15 pounds per mMBTU of coal burned, and scrubbers for SO<sub>2</sub>, which can achieve emission rates of less than 0.3 pounds per mMBTU of coal burned. By contrast, older, coal-burning power plants routinely emit well over 0.5 pounds of NO<sub>x</sub> per mMBTU of coal burned, and some emit as much as 6 pounds of SO<sub>2</sub> per mMBTU burned. “Excess tons” of NO<sub>x</sub> and SO<sub>2</sub> are those tons that would not have been emitted if the plant were meeting a NO<sub>x</sub> emission rate of 0.15 pounds per mMBTU and an SO<sub>2</sub> emission rate of 0.30 pounds per mMBTU. Every power plant in this report had at least 20 tons per year of excess NO<sub>x</sub> or excess SO<sub>2</sub>.

Finally, for each plant, an estimate of the “vulnerable populations,” including children under 17, seniors over 65, people with asthma, and people with other chronic respiratory diseases – living within 50 miles of the plant, is provided.

On the basis of total emissions of each of these four pollutants, the report ranks the 100 dirtiest plants, ranks each state, and provides a “Dirty Dozen” list of electric holding companies.

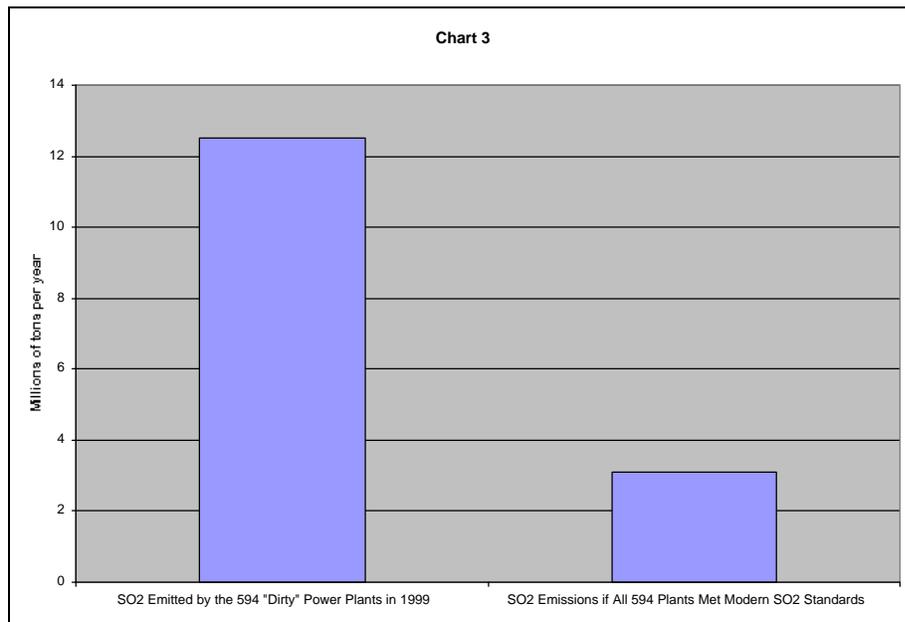
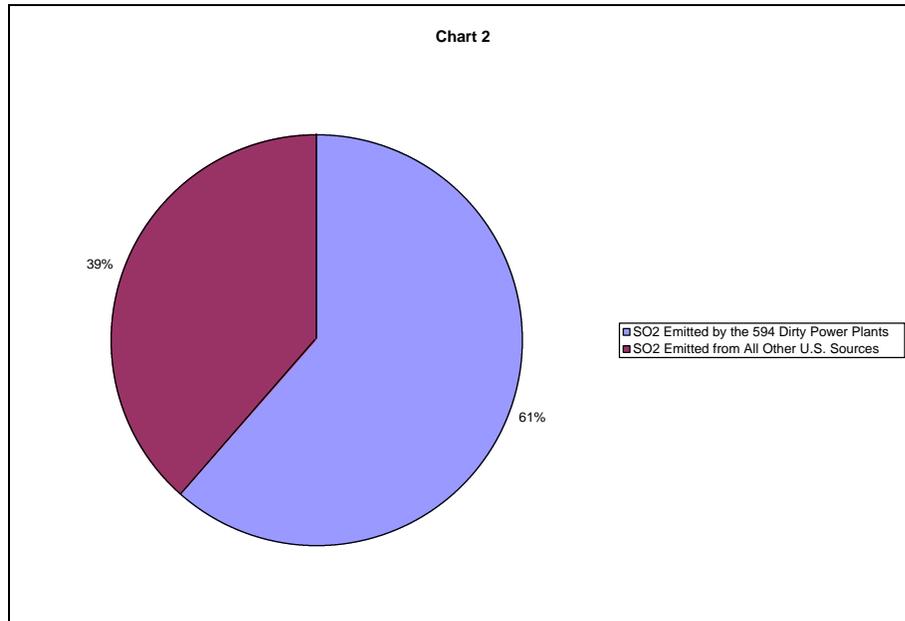
The following summarizes the report findings for each pollutant. The full database is found in Appendix A.

EPA has not yet quality assured the 1999 emissions data, which is why we consider the data to be preliminary. At this time, utility sources are still allowed to resubmit these data. Final quality assured data may be found in the annual emissions scorecards later in the year.

## A. Sulfur Dioxide

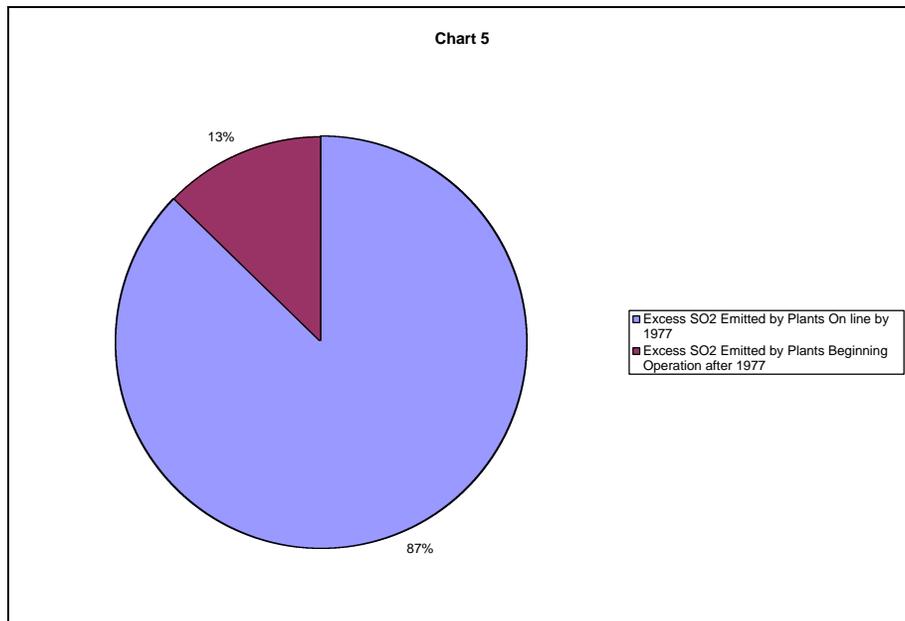
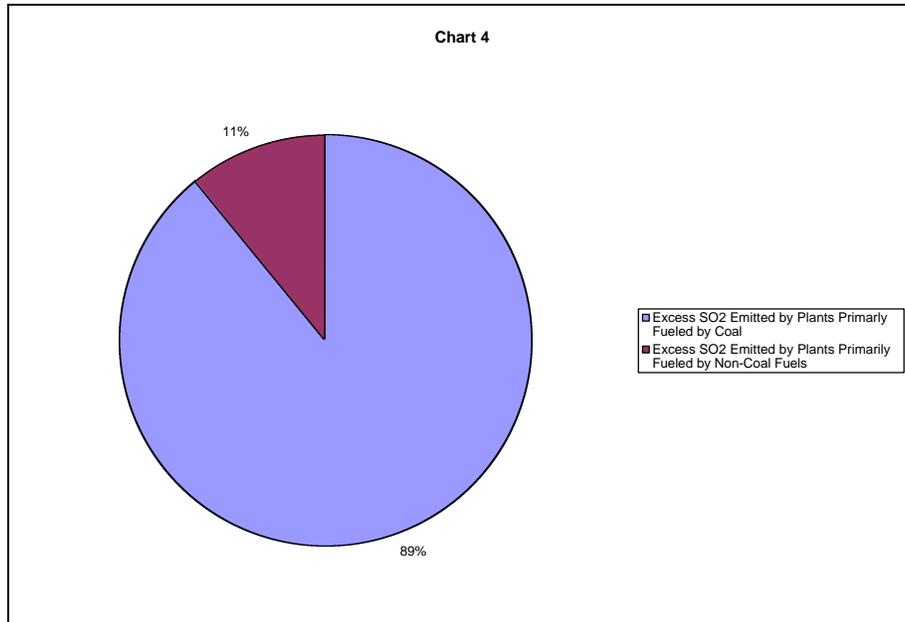
The 594 dirty power plants profiled in this report emitted 12,478,237 tons of SO<sub>2</sub> in 1999. This is approximately 61% of the total U.S. SO<sub>2</sub> emissions from all sources, estimated by EPA to be 20.4 million tons (See Chart 2).<sup>51</sup>

Of the nearly 12.5 million tons of SO<sub>2</sub> emitted by these plants, 9,383,221 tons (75%) was "excess SO<sub>2</sub>." This means that if each of these plants was required to meet current new source emission standards for SO<sub>2</sub>, running at the same capacity as they did in 1999, nearly 9.4 million tons of SO<sub>2</sub> per year would be avoided (See Chart 3).



<sup>51</sup> U.S. EPA, *National Air Quality and Emission Trends Report, 1998 update*, available at [www.epa.gov/oar](http://www.epa.gov/oar).

There is a clear correlation between the most polluting plants, and those that are primarily fueled by coal. In fact, 89% of the excess SO<sub>2</sub> was emitted by plants primarily fueled by coal. Moreover, there is a high correlation between the most polluting plants and those that had at least one unit operating by 1977, with 87% of the excess SO<sub>2</sub> coming from plants that began operating on or before 1977 (See Charts 4&5).



The following three Tables rank the 100 plants emitting the highest quantity of SO<sub>2</sub> in 1999 (Table 1), the states according to most SO<sub>2</sub> emitted from in-state power plants in 1999 (Table 2), and the 12 holding companies whose plants emitted the most SO<sub>2</sub> in 1999 (Table 3). The dirtiest plant was Illinois Power's Baldwin plant, which emitted 245,243 tons of SO<sub>2</sub>. Living in counties falling wholly or partly within a 50 mile radius of this plant are an

estimated 771,259 children under 17 years of age, 397,115 seniors over 65 years of age, 151,250 people with asthma, and 168,848 people with either chronic bronchitis or chronic emphysema. The state with the highest power plant SO<sub>2</sub> pollution in 1999 was Ohio, whose power plants emitted 1.3 million tons of SO<sub>2</sub> in 1999. The Southern Company, based in Atlanta, Georgia, was the holding company with the highest SO<sub>2</sub> emissions in 1999, emitting 1.1 million tons.

**Table 1: 100 Power Plants Emitting the Highest Quantities of Sulfur Dioxide Pollution in 1999**

Rank	State	Operating Company	Name	County	Primary Fuel	1st Year On-Line	1999 SO2 (tons)	Excess SO2	VULNERABLE POP. W/ 50 MILES OF PLANT			
									Children	Seniors	Asthma	PLANT COPD
1	IL	Illinois Power	Baldwin	Randolph	Coal	70/75	245,243	230,718	771,259	397,115	151,250	168,848
2	KY	TVA	Paradise	Muhlenberg	Coal	63/70	181,065	159,040	278,231	126,292	63,066	70,011
3	PA	Pennsylvania Electric Co.	Homer City	Indiana	Coal	69/77	163,462	144,413	687,635	514,172	170,190	201,547
4	PA	Pennsylvania Electric Co.	Keystone	Armstrong	Coal	67/68	162,290	144,273	784,887	588,610	191,011	226,877
5	IN	PSI Energy	Gibson	Gibson	Coal	75/82	158,901	126,333	224,926	133,319	49,774	57,323
6	OH	Ohio Edison Co	W H Sammis	Jefferson	Coal/Oil	59/72	150,133	127,149	1,128,714	778,421	269,117	316,363
7	OH	Columbus Southern Power Co.	Conesville	Coshocton	Coal	57/78	144,933	130,364	663,595	309,519	152,727	170,282
8	PA	West Penn Power Co	Hatfields Ferry Po	Greene	Coal	69/71	141,872	129,012	703,568	531,980	172,240	204,961
9	GA	Georgia Power	Bowen	Bartow	Coal	71/75	140,154	110,672	925,248	324,772	232,545	250,323
10	OH	Ohio Valley Electric Corp.	Kyger Creek	Gallia	Coal	55	135,558	124,644	313,755	174,628	72,084	82,847
11	TN	TVA	Johnsonville	Humphrey's	Coal/Oil	51/75	119,778	107,023	221,478	117,524	54,144	61,119
12	IN	Southern Indiana Gas and Electric Co.	Warrick	Warrick	Coal	70	119,656	110,596	234,983	130,695	51,687	59,060
13	OH	Cleveland Electric Illum. Co	Eastlake	Lake	Coal	53/72	115,387	106,927	998,558	564,361	226,566	259,335
14	OH	Cardinal Operating Co.	Cardinal	Jefferson	Coal	67/77	115,001	101,413	903,242	652,109	217,372	257,164
15	PA	PP&L Resources, Inc.	Montour	Montour	Coal	72/73	113,787	101,516	586,420	413,784	143,854	168,956
16	TX	Texas Utilities Company	Martin Lake	Rusk	Coal	77/79	111,616	82,434	252,557	135,584	53,824	61,301
17	TN	TVA	Kingston	Roane	Coal	54/55	109,194	93,360	350,031	199,581	88,173	101,034
18	WV	Appalachian Power Co	John E Amos	Putnam	Coal	71/73	108,715	82,375	328,944	184,345	73,800	85,010
19	NC	CP&L (Carolina Power and Light)	Roxboro	Person	Coal	66/80	108,673	85,142	452,075	231,619	121,188	135,928
20	WV	VEPCO	Mt Storm	Grant	Coal	65/73	104,604	89,658	246,318	158,437	58,812	68,775
21	WV	Ohio Power Co	Kammer	Marshall	Coal	58/59	104,231	98,273	678,043	497,778	163,535	193,978
22	OH	DPL Co	J M Stuart	Adams	Coal	70/74	101,987	80,449	614,827	285,623	137,690	153,363
23	FL	FL Power	Crystal River	Citrus	Coal	66/84	101,827	78,143	216,501	267,913	66,100	84,401
24	AL	AL Power	E C Gaston	Shelby	Coal	60/74	101,128	82,106	420,061	216,049	96,592	108,969
25	OH	Ohio Power Co	Muskingum River	Morgan	Coal	53/68	100,639	92,003	284,908	153,090	64,216	73,459
26	TX	Texas Utilities Company	Monticello	Titus	Coal	74/78	100,121	76,966	227,340	129,231	49,695	57,133
27	WV	Monongahela Power	Fort Martin	Monongalia	Coal	67/68	99,101	87,545	645,176	493,084	158,525	188,933
28	GA	Georgia Power	Scherer	Monroe	Coal	82/89	98,275	63,679	555,209	183,567	135,181	144,392
29	AL	AL Power	Gorgas	Walker	Coal	51/72	97,834	84,861	356,351	185,261	82,273	92,943
30	FL	TECO	Big Bend	Hillsborough	Coal/Oil	69/85	95,614	80,968	653,292	726,168	184,769	231,115
31	MI	Detroit Edison Co.	Monroe	Monroe	Coal/Oil	69/74	90,470	68,458	1,457,716	664,853	327,620	364,753
32	WA	PacifiCorp	Centralia	Lewis	Coal	72/73	87,756	72,193	690,526	320,377	171,514	189,948
33	TN	TVA	Gallatin	Sumner	Coal/Oil	56/75	84,841	73,279	402,216	185,980	99,866	110,683
34	NC	Duke Power	Belews Creek	Stokes	Coal	74/75	83,850	62,733	443,839	254,590	115,065	131,736
35	TX	Texas Utilities Company	Big Brown	Freestone	Coal	71/72	83,772	72,596	222,133	125,086	50,220	57,360
36	IN	PSI Energy	Cayuga	Vermilion	Coal/Gas	70/93	83,463	74,057	263,172	140,580	62,387	70,287
37	GA	Georgia Power	Wansley	Heard	Coal	76/78	80,707	66,148	765,253	288,041	188,657	204,335
38	OH	American Municipal Power-Ohio Inc.	Richard Gorsuch	Washington	Coal/Oil	88/98	80,296	77,361	249,677	138,598	56,715	65,159
39	KY	KU Co.	Ghent	Caroll	Coal	74/84	80,058	53,559	852,437	398,520	193,789	215,963
40	OH	Cincinnati Gas & Electric	Miami Fort	Hamilton	Coal/Oil	49/78	78,086	63,824	835,131	384,143	186,113	207,334
41	GA	Georgia Power	Harlee Branch	Putnam	Coal	65/69	77,687	66,565	262,259	108,989	61,143	66,956
42	MD	Potomac Electric Power Co	Morgantown	Charles	Coal/Oil	70/71	75,520	64,961	1,122,670	426,015	284,065	309,291
43	NC	CP&L (Carolina Power and Light)	Marshall	Madison	Water	85	74,539	56,707	612,403	304,215	154,043	173,172
44	AL	AL Power	James H Miller Jr	Jefferson	Coal	78/91	74,069	42,832	407,143	212,092	94,304	106,690
45	IL	Central Illinois Light Co.	E D Edwards	Peoria	Coal	60/72	71,995	65,887	320,490	187,121	72,972	83,356
46	IN	PSI Energy	Wabash River	Vigo	Coal/Oil	53/95	71,381	64,161	263,231	143,669	63,082	71,260
47	PA	PP&L Resources, Inc.	Brunner Island	York	Coal/Oil	61/67	71,188	60,515	968,729	539,940	238,085	270,897
48	AL	TVA	Colbert	Colbert	Gas/Oil	72/72	69,573	58,290	197,835	108,116	45,849	52,537
49	OH	Cincinnati Gas & Electric	Walter C Beckjord	Clermont	Coal/Oil	52/72	68,602	55,936	523,581	253,212	115,411	129,432
50	TX	Houston Lighting and Power Co	W a Parish	Fort Bend	Coal/Gas	58/82	67,583	38,414	1,111,128	290,619	247,462	258,569

	State Owner	Name	County	Primary Fuel	1st Year On-Line	1999 SO2 (tons)	Excess SO2	Children	Seniors	Asthma	COPD	
51	KY	Kentucky Power Co.	Big Sandy	Lawrence	Coal	63/69	67,368	56,014	305,901	158,335	67,500	76,843
52	WV	Central Operating Co	Phil Sporn	Mason	Coal	50/60	67,138	58,552	288,675	162,028	65,922	75,867
53	IN	Indian Michigan Power Co.	Rockport	Spencer	Coal	84/89	66,845	38,378	247,444	124,296	53,952	60,767
54	AL	AL Power	Barry	Mobile	Coal/Gas	54/71	66,355	48,841	312,667	134,291	69,443	76,648
55	VA	VA Elec. & Power Co.	Chesterfield	Chesterfield	Coal	52/69	65,953	55,143	366,713	168,300	89,816	99,652
56	TN	TVA	John Sevier	Hawkins	Coal	55/57	61,885	53,303	372,916	221,511	93,665	108,174
57	LA	Cajun Electric Power Coop Inc	Big Cajun 2	Pointe Coupee	Coal	81/83	58,404	39,131	379,346	130,840	77,330	83,138
58	KS	KPL Western Resources	Jeffrey Energy Centr	Pottawatomie	Coal	78/83	58,247	34,673	156,417	79,085	35,775	39,743
59	NY	Niagara Mohawk Power Corp	Dunkirk	Chautauqua	Coal/Oil	50/90	57,908	52,196	467,695	286,056	107,166	123,195
60	MD	Potomac Electric Power Co	Chalk Point	Prince George	Coal/Gas/Oil	67/91	57,630	44,828	1,495,496	632,681	372,844	409,694
61	AL	AL Power	Greene County	Greene	Gas/Oil	95/96	56,951	51,549	155,443	72,905	32,491	36,149
62	WV	Ohio Power Co	Mitchell	Marshall	Coal	71	55,046	42,025	679,816	499,027	163,936	194,452
63	FL	TECO	F J Gannon	Hillsborough	Coal/Oil	57/69	54,496	45,587	653,292	726,168	184,769	231,115
64	MD	Baltimore Gas & Electric Co	Brandon Shores	Anne Arundel	Coal	84/91	54,491	39,294	1,936,658	864,943	480,438	531,521
65	FL	Gulf Power	Lansing Smith	Bay	Coal	65/67	53,885	49,836	103,823	50,390	26,264	29,182
66	MI	Detroit Edison Co.	St Clair	St Clair	Coal/Oil	53/69	53,119	39,849	1,084,161	501,460	244,252	272,760
67	IN	Indiana-Kentucky Electric Corp.	Clifty Creek	Jefferson	Coal	55/56	52,676	39,673	690,185	338,123	154,730	173,646
68	MI	Consumers Energy Co.	J H Campbell	Ottawa	Coal/Oil	62/80	52,029	36,570	449,799	184,878	97,061	106,373
69	PA	Pennsylvania Electric Co.	Shawville	Clearfield	Coal/Oil	54/60	51,786	46,450	271,392	178,411	64,432	74,969
70	IN	Indiana Michigan Power	Tanners Creek	Dearborn	Coal	51/64	50,716	41,557	816,138	375,529	182,156	202,869
71	IN	IPALCO Enterprises	Petersburg	Pike	Coal	67/86	50,196	34,258	244,162	139,902	56,531	64,613
72	ND	Basin Electric Power Coop	Leland Olds	Mercer	Coal	66/75	50,107	42,169	5,045	2,269	1,010	1,124
73	IN	PSI Energy	R Gallagher	Floyd	Coal	50/61	49,877	45,232	404,956	195,162	92,007	103,088
74	ND	Coop Power Assn	Coal Creek	McLean	Coal	79/80	49,743	35,210	53,736	24,125	10,843	12,055
75	OH	Ohio Edison Co	R E Burger	Belmont	Coal/Oil	50/72	49,189	46,324	785,808	574,502	189,569	224,830
76	MA	US Generating Co	Brayton Point	n/a	n/a	n/a	48,909	35,644	1,343,220	811,074	337,252	384,212
77	NY	Niagara Mohawk Power Corp	Huntley Power	n/a	n/a	n/a	48,484	42,825	0	0	0	0
78	IL	Central Illinois Public Service Co.	Coffeen	Montgomery	Coal	65/72	47,611	40,903	740,208	396,188	143,378	161,146
79	MS	MS Power	Jack Watson	Harrison	Gas/Oil	57/73	46,591	38,615	447,691	184,200	94,608	103,692
80	IL	Illinois Power	Hennepin	Putnam	Coal/Gas	53/59	46,342	43,924	411,279	205,207	93,123	103,895
81	AL	TVA	Widows Creek	Jackson	Coal	52/65	45,711	28,997	368,736	185,417	88,386	100,002
82	FL	Gulf Power	Crist	Escambia	Coal/Gas	59/73	45,701	36,324	288,651	130,153	67,031	74,251
83	KY	KU Co.	E W Brown	Mercer	Coal/Gas	57/96	45,567	39,469	424,918	211,503	100,722	113,162
84	KY	LG&E Energy Corporation	Mill Creek	Jefferson	Coal	72/82	45,051	30,571	416,790	203,299	94,863	106,483
85	KY	East Kentucky Power Coop Inc	H L Spurlock	Mason	Coal	77/81	44,986	33,522	679,706	310,631	153,438	170,536
86	WV	Appalachian Power Co	Mountaineer (1301)	Mason	Coal	80	44,676	32,568	288,675	162,028	65,922	75,867
87	IN	IPALCO Enterprises, Inc.	Elmer W Stout	Marion	Oil/Coal/Gas	41/95	44,589	38,282	592,055	275,610	139,375	155,017
88	WV	Monongahela Power	Pleasants	Pleasants	Coal	79/80	44,131	32,213	233,611	139,883	52,862	61,348
89	MO	Union Electric Co	Sioux	St. Charles	Coal	67/68	43,773	35,969	653,575	314,281	146,307	162,944
90	NM	Arizona Public Service Co	Four Corners	San Juan	Coal	63/70	42,521	16,964	113,250	24,785	20,459	20,820
91	IN	NIPSCO Industries, Inc.	R M Schahfer	Jasper	Coal/Gas	76/86	41,669	24,258	1,842,199	882,342	411,319	456,201
92	PA	Duquesne Light Co	Cheswick	Allegheny	Coal	70	41,602	36,703	859,467	640,736	207,753	246,716
93	ND	Minnkota Power Coop Inc	Milton R Young	Oliver	Coal	70/77	41,344	31,936	44,169	20,109	8,727	9,747
94	SC	SC Pub. Serv. Auth	Winyah	Georgetown	Coal	75/81	41,124	28,860	281,971	110,481	60,973	66,845
95	IA	Midamerican Energy Company	George Neal North and South	Coal/Gas	64/79	40,803	23,651	107,968	63,390	22,614	25,932	
96	SC	Duke Power	Wateree	Kershaw	Water	19	39,501	33,115	418,398	156,119	91,183	99,365
97	MO	Union Electric Co	Labadie	Franklin	Coal	70/73	38,781	15,962	634,172	302,066	141,745	157,691
98	NV	Southern California Edison Co.	Mohave	Clark	Coal/Gas	71/71	38,640	23,854	642,157	221,851	155,000	165,734
99	AR	Entergy Arkansas Inc.	White Bluff	Jefferson	Coal	80/81	38,206	21,101	249,719	129,949	56,049	62,823
100	TN	TVA	Bull Run	Anderson	Coal	67	38,179	26,036	284,776	160,042	71,267	81,630

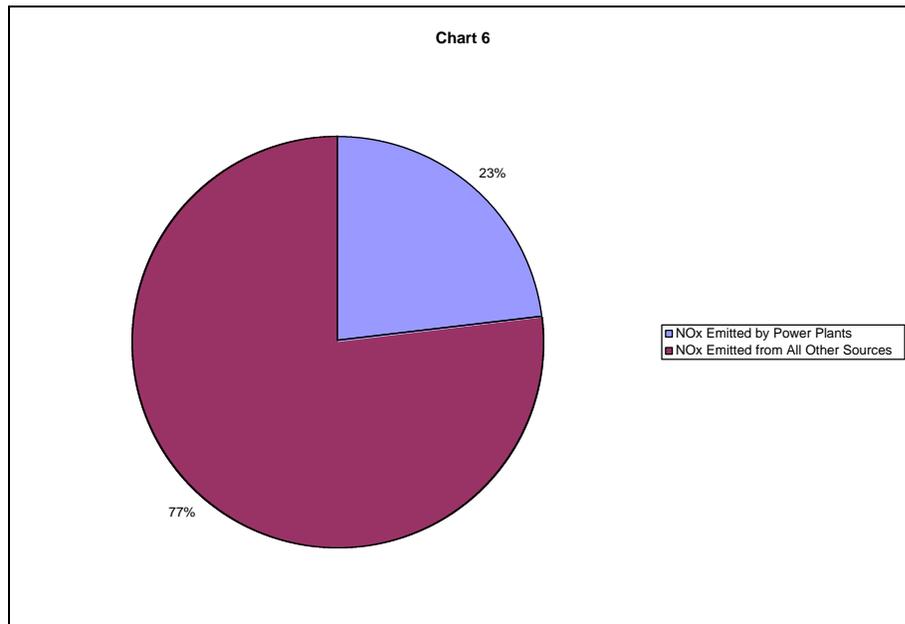
<b>Table 2: Ranking of States by Amount of Sulfur Dioxide Emitted by Power Plants in 1999</b>		
<b>State</b>	<b>1999 SO2 (tons)</b>	<b>Excess SO2</b>
1 OH Total	1,308,932	1,122,294
2 PA Total	959,564	815,950
3 IN Total	952,703	754,451
4 FL Total	732,516	549,980
5 IL Total	728,510	600,605
6 TX Total	695,129	451,062
7 WV Total	694,516	574,210
8 KY Total	678,790	521,456
9 AL Total	542,581	421,641
10 GA Total	512,142	398,434
11 NC Total	457,929	352,043
12 TN Total	443,478	361,609
13 MI Total	376,543	267,545
14 MD Total	281,771	226,432
15 NY Total	272,686	205,641
16 MO Total	250,581	147,957
17 VA Total	225,738	178,091
18 SC Total	214,637	162,029
19 WI Total	211,287	137,596
20 ND Total	188,742	136,973
21 IA Total	156,069	99,197
22 MA Total	128,618	90,939
23 MS Total	123,177	91,602
24 LA Total	121,758	63,452
25 KS Total	117,968	65,222
26 OK Total	108,987	55,103
27 WY Total	96,317	33,257
28 MN Total	92,749	48,566
29 CO Total	89,162	40,994
30 WA Total	87,756	72,193
31 AR Total	77,397	34,277
32 AZ Total	75,485	32,659
33 NM Total	73,431	26,289
34 NE Total	65,623	31,886
35 NH Total	55,693	46,872
36 NJ Total	49,344	37,037
37 NV Total	48,671	26,870
38 CT Total	41,252	24,576
39 UT Total	30,166	8,544
40 DE Total	29,202	21,034
41 SD Total	25,695	19,433
42 MT Total	21,240	4,379
43 ME Total	17,120	12,594
44 OR Total	16,577	10,248
45 CA Total	6	0

<b>Table 3: Dirty Dozen Holding Companies -- Ranked by Total 1999 SO2 Emissions</b>			
	<b>Holding Companies</b>	<b>SO2 (tons)</b>	<b>Excess SO2 (tons)</b>
1	Southern Company	1,143,160	892,493
2	American Electric Power Co, Inc	848,727	691,551
3	TVA	775,701	629,146
4	Cinergy Corp.	574,808	470,663
5	Allegheny Power System, Inc Total	562,121	471,473
6	GPU, Inc	439,710	382,896
7	Texas Utilities Company	432,173	252,712
8	Illinova Corp.	326,545	301,035
9	Dominion Resources	318,696	257,106
10	Carolina Power & Light	297,111	231,641
11	Ohio Edison Company	248,628	200,465
12	Duke Power Company	220,556	170,299

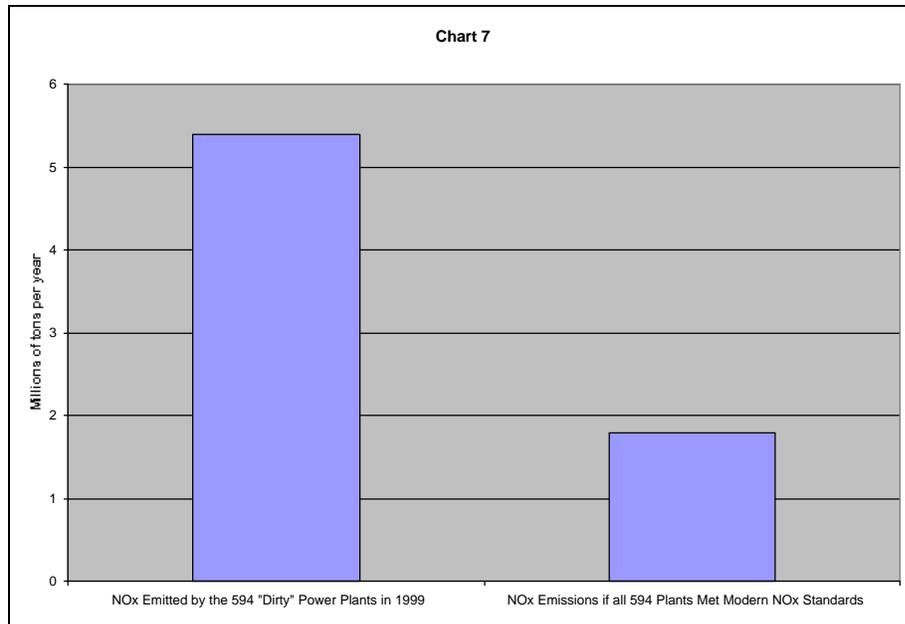
**B. Nitrogen Oxides:**

The 594 dirtiest plants profiled by this report emitted 5,365,246 tons of NOx in 1999. This is 23% of all NOx emitted in the United States from all sources, as reported by U.S. EPA (See Chart 6).<sup>52</sup>

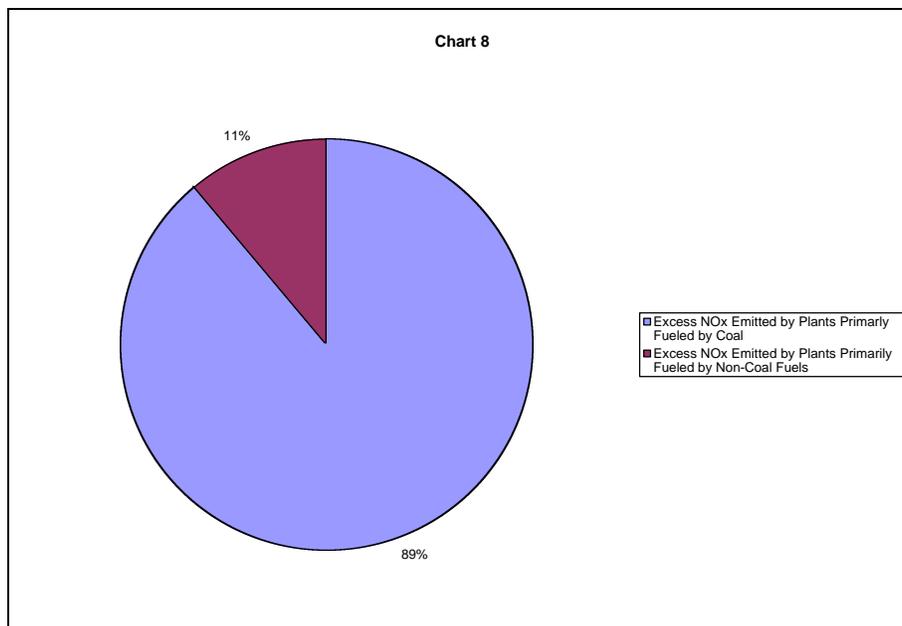
Of the nearly 5.4 million tons of NOx emitted by these plants, 3,576,979 tons (66%) was “excess NOx.” This means that if each of these plants was required to meet current new source emission standards for NOx, running at the same capacity as they did in 1999, nearly 3.6 million tons of NOx per year would be avoided (See Chart 7).

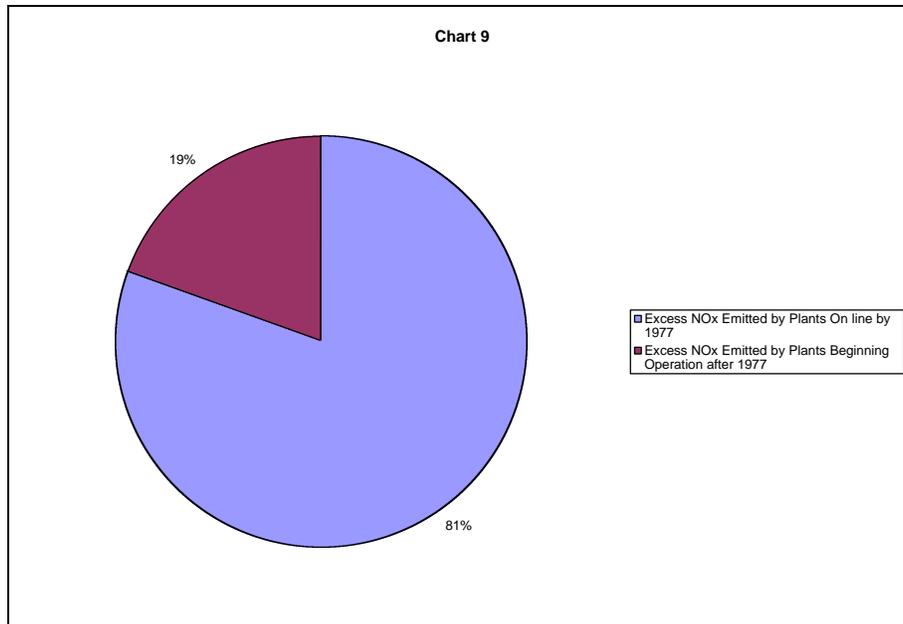


<sup>52</sup> U.S. EPA, National Air Quality and Emission Trends Report, 1998 update, available at [www.epa.gov/oar](http://www.epa.gov/oar).



As with SO<sub>2</sub>, there was a clear correlation between the most polluting plants, and those that are primarily fueled by coal. In the case of NO<sub>x</sub>, 89% of the excess tons were emitted by plants primarily fueled by coal. Again, there was also a high correlation between the most polluting plants and those that had at least one unit operating by 1977, with 81% of the excess NO<sub>x</sub> coming from plants that began operating on or before 1977 (See Charts 8&9).





The following three tables rank the 100 plants emitting the highest quantity of NOx in 1999 (Table 4), the states according to most NOx emitted from in-state power plants in 1999 (Table 5), and the 12 holding companies whose plants emitted the most NOx in 1999 (Table 6). The dirtiest plant in the nation was Tennessee Valley Authority's Paradise plant in Kentucky, which emitted 102,412 tons of NOx. Living in counties falling wholly or partly within a 50 mile radius of this plant are an estimated 278,231 children under 17 years of age, 126,292 seniors over 65 years of age, 63,066 people with asthma, and 21,783 people with either chronic bronchitis or chronic emphysema. The state with the highest power plant NOx pollution in 1999 was Ohio, whose power plants emitted 419,312 tons of NOx in 1999. Again, Southern Company, based in Atlanta, Georgia, was the holding company with the highest NOx emissions in 1999, emitting 369,826 tons.

Table 4: 100 Power Plants Emitting the Highest Quantities of Nitrogen Oxide Pollution in 1999								VULNERABLE POP. W/ 50 MILES OF PLANT				
ST	Operating Company	Name	County	Primary Fuel	1st Year On-Line	1999 NOx (tons)	Excess NOx	Children	Seniors	Asthma	COPD	
1	KY	TVA	Paradise	Muhlenberg	Coal	63/70	102,412	91,399	278,231	126,292	63,066	70,011
2	TN	TVA	Cumberland	Stewart	Coal	73	81,025	67,565	348,919	175,890	86,218	96,524
3	NC	Duke Power	Belews Creek	Stokes	Coal	74/75	67,626	57,068	443,839	254,590	115,065	131,736
4	WV	VEPCO	Mt Storm	Grant	Coal	65/73	60,965	46,546	246,318	158,437	58,812	68,775
5	OH	Ohio Edison Co	W H Sammis	Jefferson	Coal/Oil	59/72	57,426	45,934	1,128,714	778,421	269,117	316,363
6	WV	Appalachian Power Co	John E Amos	Putnam	Coal	71/73	54,249	41,079	328,944	184,345	73,800	85,010
7	IL	Illinois Power	Baldwin	Randolph	Coal	70/75	53,285	46,022	771,259	397,115	151,250	168,848
8	MO	Associated Electric Coop Inc	New Madrid	New Madrid	Coal	72/77	51,220	45,238	176,041	108,886	38,327	44,282
9	OH	Ohio Power Co	Gen J M Gavin	Gallia	Coal	74/75	50,187	38,550	313,755	174,628	72,084	82,847
10	IN	PSI Energy	Gibson	Gibson	Coal	75/82	49,041	32,758	224,926	133,319	49,774	57,323
11	OH	DPL Co	J M Stuart	Adams	Coal	70/74	48,736	37,967	614,827	285,623	137,690	153,363
12	NM	Arizona Public Service Co	Four Corners	San Juan	Coal	63/70	45,327	32,548	113,250	24,785	20,459	20,820
13	GA	Georgia Power	Scherer	Monroe	Coal	82/89	43,075	25,777	555,209	183,567	135,181	144,392
14	MI	Detroit Edison Co.	Monroe	Monroe	Coal/Oil	69/74	41,930	30,924	1,457,716	664,853	327,620	364,753
15	GA	Georgia Power	Bowen	Bartow	Coal	71/75	41,513	26,772	925,248	324,772	232,545	250,323
16	KY	KU Co.	Ghent	Caroll	Coal	74/84	39,183	25,933	852,437	398,520	193,789	215,963
17	IL	Commonwealth Edison	Powerton	Tazewille	Coal	72/75	38,390	32,062	329,359	192,872	74,988	85,694
18	MT	Montana Power Co	Colstrip	Rosebud	Coal	75/86	38,088	24,633	42,898	18,208	9,251	10,244
19	FL	FL Power	Crystal River	Citrus	Coal	66/84	37,835	25,993	216,501	267,913	66,100	84,401
20	WY	PacifiCorp	Jim Bridger	Sweetwater	Coal	74/79	37,644	23,197	30,099	8,952	5,655	6,077
21	IN	Indian Michigan Power Co.	Rockport	Spencer	Coal	84/89	37,006	22,773	247,444	124,296	53,952	60,767
22	NC	CP&L (Carolina Power and Light)	Roxboro	Person	Coal	66/80	34,417	22,652	452,075	231,619	121,188	135,928
23	AZ	Salt River Proj Ag I & P Dist	Navajo	Coconino	Coal	74/76	34,389	20,136	68,534	14,078	13,252	13,400
24	WV	Monongahela Power	Harrison	Harrison	Coal	72/74	34,260	23,406	283,134	192,851	66,316	78,185
25	KS	KCP&L	La Cygne	Linn	Coal	73/77	33,859	26,349	438,437	213,615	100,106	111,230
26	MI	Consumers Energy Co.	J H Campbell	Ottawa	Coal/Oil	62/80	33,799	26,070	449,799	184,878	97,061	106,373
27	IN	Indiana Michigan Power	Tanners Creek	Dearborn	Coal	51/64	33,233	28,654	816,138	375,529	182,156	202,869
28	TX	Houston Lighting and Power Co	W a Parish	Fort Bend	Coal/Gas	58/82	33,189	15,728	1,111,128	290,619	247,462	258,569
29	IN	Indiana-Kentucky Electric Corp.	Clifty Creek	Jefferson	Coal	55/56	32,899	26,398	690,185	338,123	154,730	173,646
30	OH	Cardinal Operating Co.	Cardinal	Jefferson	Coal	67/77	32,610	25,816	903,242	652,109	217,372	257,164
31	AL	AL Power	James H Miller Jr	Jefferson	Coal	78/91	32,008	16,390	407,143	212,092	94,304	106,690
32	MO	Associated Electric Coop Inc	Thomas Hill	Randolph	Coal	66/82	31,047	23,543	121,527	77,268	28,343	32,500
33	OH	Ohio Valley Electric Corp.	Kyger Creek	Gallia	Coal	55	30,196	24,739	313,755	174,628	72,084	82,847
34	FL	TECO	Big Bend	Hillsborough	Coal/Oil	69/85	30,178	22,576	653,292	726,168	184,769	231,115
35	GA	Georgia Power	Harilee Branch	Putnam	Coal	65/69	29,896	24,335	262,259	108,989	61,143	66,956
36	WV	Monongahela Power	Fort Martin	Monongalia	Coal	67/68	29,893	24,115	645,176	493,084	158,525	188,933
37	NM	Public Service Co of NM	San Juan	San Juan	Coal	73/82	29,178	19,129	89,694	20,912	16,446	16,888
38	AL	TVA	Widows Creek	Jackson	Coal	52/65	28,990	20,633	368,736	185,417	88,386	100,002
39	AL	AL Power	Gorgas	Walker	Coal	51/72	28,981	22,494	356,351	185,261	82,273	92,943
40	IN	NIPSCO Industries, Inc.	R M Schahfer	Jasper	Coal/Gas	76/86	28,783	20,078	1,842,199	882,342	411,319	456,201
41	TX	Texas Utilities Company	Martin Lake	Rusk	Coal	77/79	28,511	13,920	252,557	135,584	53,824	61,301
42	AL	AL Power	E C Gaston	Shelby	Coal	60/74	28,394	18,884	420,061	216,049	96,592	108,969
43	UT	Los Angeles City of	Intermountain	Millard	Coal	86/87	28,142	17,292	128,511	27,139	23,417	23,502
44	FL	TECO	F J Gannon	Hillsborough	Coal/Oil	57/69	27,772	23,317	653,292	726,168	184,769	231,115
45	IL	Central Illinois Public Service Co.	Coffeen	Montgomery	Coal	65/72	26,609	23,255	740,208	396,188	143,378	161,146
46	ND	Minnkota Power Coop Inc	Milton R Young	Oliver	Coal	70/77	26,341	21,637	44,169	20,109	8,727	9,747
47	TN	TVA	Kingston	Roane	Coal	54/55	26,233	18,317	350,031	199,581	88,173	101,034
48	OH	Cincinatti Gas & Electric	Miami Fort	Hamilton	Coal/Oil	49/78	26,145	19,014	835,131	384,143	186,113	207,334
49	NC	CP&L (Carolina Power and Light)	Marshall	Madison	Water	85	25,970	17,053	612,403	304,215	154,043	173,172
50	AL	AL Power	Barry	Mobile	Coal/Gas	54/71	25,913	17,156	312,667	134,291	69,443	76,648

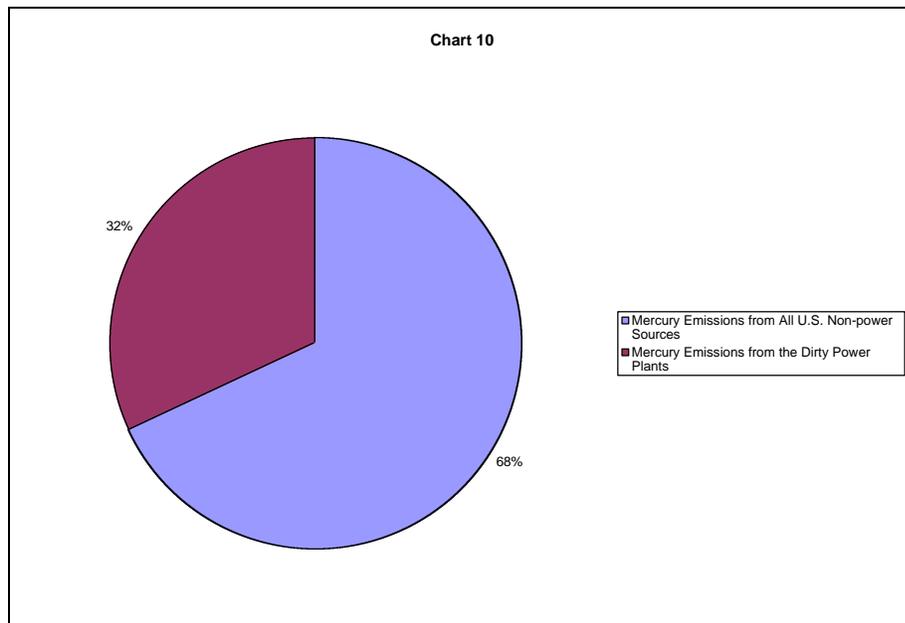
ST	Owner	Name	County	Primary Fuel	1st Year On-Line	1999 NOx (tons)	Excess NOx	Children	Seniors	Asthma	COPD	
51	IA	Midamerican Energy Company	George Neal North and South	Coal/Gas	64/79	25,910	17,334	107,968	63,390	22,614	25,932	
52	PA	Pennsylvania Electric Co.	Homer City	Indiana	Coal	69/77	25,872	16,347	687,635	514,172	170,190	201,547
53	IL	Dominion Energy	Kincaid	n/a	n/a	25,675	21,534	305,229	173,136	69,599	79,286	
54	FL	JEA	St Johns River Power	Duval	Coal/Oil	87/88	25,301	17,556	306,530	133,231	72,673	79,430
55	TX	Houston Lighting and Power Co	Limestone	Limestone	Coal	85/86	25,138	16,369	169,231	96,736	41,113	46,552
56	IN	NIPSCO Industries, Inc.	Bailly	Porter	Coal/Gas	62/68	24,494	21,922	2,123,731	961,990	476,997	525,605
57	KS	KPL Western Resources	Jeffrey Energy Centr	Pottawatomie	Coal	78/83	24,451	12,664	156,417	79,085	35,775	39,743
58	MD	Potomac Electric Power Co	Chalk Point	Prince George	Coal/Gas/Oil	67/91	24,062	17,661	1,495,496	632,681	372,844	409,694
59	WV	Ohio Power Co	Mitchell	Marshall	Coal	71	23,872	17,361	679,816	499,027	163,936	194,452
60	WI	Wisconsin Energy Corporation	Pleasant Prairie	Kenosha	Coal/Oil	80/85	23,862	15,727	2,334,523	1,056,005	527,750	580,792
61	MO	Union Electric Co	Sioux	St. Charles	Coal	67/68	23,780	19,879	653,575	314,281	146,307	162,944
62	MI	Detroit Edison Co.	St Clair	St Clair	Coal/Oil	53/69	23,742	16,951	1,084,161	501,460	244,252	272,760
63	KY	TVA	Shawnee	McCracken	Coal	53/56	23,548	16,216	179,389	123,736	42,806	50,151
64	OH	Columbus Southern Power Co.	Conesville	Coshocton	Coal	57/78	23,435	16,151	663,595	309,519	152,727	170,282
65	SD	Otter Tail Power Co	Big Stone	Grant	Coal/Oi	75	23,378	20,247	57,556	41,694	11,846	14,108
66	PA	Penn. Power	Bruce Mansfield	Beaver	Coal	76/80	22,767	12,843	1,013,536	713,673	242,160	285,547
67	OH	Cincinatti Gas & Electric	W H Zimmer	Clermont	Coal	91	22,512	15,327	828,136	380,116	186,593	207,583
68	SC	SC Pub. Serv. Auth	Winyah	Georgetown	Coal	75/81	22,504	16,372	281,971	110,481	60,973	66,845
69	TX	SWEPCO	Welsh	Titus	Coal	77/82	22,335	13,055	298,300	162,131	63,430	72,429
70	MD	Baltimore Gas & Electric Co	Brandon Shores	Anne Arundel	Coal	84/91	22,315	14,716	1,936,658	864,943	480,438	531,521
71	FL	Seminole Electric Coop Inc	Seminole	Putnam	Coal	84/85	22,266	14,586	463,282	314,242	122,482	141,759
72	OH	Cincinatti Gas & Electric	Walter C Beckjord	Clermont	Coal/Oil	52/72	22,233	15,900	523,581	253,212	115,411	129,432
73	MN	Northern States Power Co.	Sherburne County	Sherburne	Coal	76/87	22,003	10,407	754,727	294,671	172,800	186,922
74	MD	Potomac Electric Power Co	Morgantown	Charles	Coal/Oil	70/71	21,849	16,569	1,122,670	426,015	284,065	309,291
75	WA	PacifiCorp	Centralia	Lewis	Coal	72/73	21,531	13,750	690,526	320,377	171,514	189,948
76	OH	Ohio Power Co	Muskingum River	Morgan	Coal	53/68	20,823	16,505	284,908	153,090	64,216	73,459
77	PA	Pennsylvania Electric Co.	Conemaugh	Indiana	Coal	70/70	20,758	11,353	725,713	539,666	179,211	212,162
78	KY	LG&E Energy Corporation	Mill Creek	Jefferson	Coal	72/82	20,475	13,235	416,790	203,299	94,863	106,483
79	KY	Kentucky Power Co.	Big Sandy	Lawerence	Coal	63/69	20,437	14,760	305,901	158,335	67,500	76,843
80	PA	Pennsylvania Electric Co.	Keystone	Armstrong	Coal	67/68	20,420	11,411	784,887	588,610	191,011	226,877
81	TN	TVA	Johnsonville	Humphrey's	Coal/Oil	51/75	20,408	14,030	221,478	117,524	54,144	61,119
82	LA	Cajun Electric Power Coop Inc	Big Cajun 2	Pointe Coupe	Coal	81/83	20,381	10,745	379,346	130,840	77,330	83,138
83	TX	Texas Utilities Company	Monticello	Titus	Coal	74/78	20,370	8,792	227,340	129,231	49,695	57,133
84	TX	Texas Utilities Company	Handley	Tarrant	Gas/Oil	48/77	122,492	885	1,116,375	347,807	259,019	274,906
85	WV	Appalachian Power Co	Mountaineer (1301)	Mason	Coal	80	20,179	14,126	288,675	162,028	65,922	75,867
86	UT	PacifiCorp	Hunter (Emery)	Emery	Coal	78/83	20,114	12,153	133,822	29,225	24,200	24,361
87	IN	IPALCO Enterprises	Petersburg	Pike	Coal	67/86	19,979	10,573	244,162	139,902	56,531	64,613
88	GA	Georgia Power	Wansley	Heard	Coal	76/78	19,897	12,618	765,253	288,041	188,657	204,335
89	NV	Southern California Edison Co.	Mohave	Clark	Coal/Gas	71/71	19,714	12,321	642,157	221,851	155,000	165,734
90	AR	Entergy Arkansas Inc.	White Bluff	Jefferson	Coal	80/81	19,695	11,143	249,719	129,949	56,049	62,823
91	WV	Ohio Power Co	Kammer	Marshall	Coal	58/59	19,662	16,683	678,043	497,778	163,535	193,978
92	WV	Central Operating Co	Phil Sporn	Mason	Coal	50/60	19,575	15,282	288,675	162,028	65,922	75,867
93	PA	West Penn Power Co	Hatfields Ferry Po	Greene	Coal	69/71	19,509	13,079	703,568	531,980	172,240	204,961
94	TX	Lower Colorado River Authority	Sam Seymour	n/a	n/a	n/a	19,215	9,915	1,183,042	327,959	271,891	284,482
95	VA	Appalachian Power	Clinch River	Russel	Coal	58/61	19,214	16,032	303,680	164,463	70,219	80,474
96	MO	UtiliCorp United Inc	Sibley	Jackson	Coal	60/69	18,697	16,237	508,226	238,024	116,223	128,583
97	OH	Cleveland Electric Illum. Co	Avon Lake-total	Lorain	Coal/Oil	49/73	18,578	15,634	946,096	517,499	213,924	243,802
98	MN	Northern States Power Co.	Allen S King	n/a	n/a	n/a	18,241	15,707	744,618	291,741	171,782	185,947
99	IN	Southern Indiana Gas and Electric Co.	Warrick	Warrick	Coal	70	18,207	13,677	234,983	130,695	51,687	59,060
100	OH	Cleveland Electric Illum. Co	Eastlake	Lake	Coal	53/72	17,850	13,620	998,558	564,361	226,566	259,335

<b>Table 5: Ranking of States</b>			
<b>by Amount of Nitrogen Oxide</b>			
<b>Emitted by Power Plants in 1999</b>			
		<b>1999</b>	<b>Excess</b>
	<b>State</b>	<b>NOx (tons)</b>	<b>NOx</b>
1	OH Total	419,312	321,912
2	TX Total	396,869	183,702
3	IN Total	342,388	241,094
4	KY Total	311,881	232,845
5	WV Total	302,259	227,723
6	FL Total	282,835	186,860
7	IL Total	265,831	201,358
8	NC Total	197,607	144,636
9	PA Total	192,323	114,268
10	MO Total	183,181	132,020
11	AL Total	182,664	121,902
12	TN Total	181,782	135,349
13	MI Total	174,771	119,468
14	GA Total	172,201	114,590
15	WI Total	106,496	69,490
16	MD Total	102,686	74,854
17	LA Total	98,947	53,806
18	WY Total	92,073	53,614
19	OK Total	91,421	53,287
20	VA Total	91,335	62,623
21	SC Total	86,147	58,355
22	KS Total	84,440	54,717
23	AZ Total	83,678	49,788
24	ND Total	83,463	57,569
25	NM Total	82,342	55,507
26	MN Total	79,849	54,876
27	IA Total	79,300	50,214
28	NY Total	72,824	32,137
29	UT Total	71,539	43,444
30	CO Total	68,032	40,189
31	MS Total	56,966	38,704
32	AR Total	48,257	23,602
33	NE Total	47,460	30,488
34	NV Total	40,606	24,700
35	MT Total	40,213	25,615
36	MA Total	34,998	15,988
37	NJ Total	25,312	18,781
38	SD Total	23,378	20,247
39	WA Total	21,531	13,750
40	NH Total	12,154	7,743
41	CT Total	11,286	2,835
42	DE Total	8,957	4,873
43	OR Total	8,650	5,485
44	ME Total	4,051	1,787
45	CA Total	950	182

<b>Table 6: Dirty Dozen Holding Companies Ranked by Total 1999 NOx Emissions</b>		
<b>Holding Company</b>	<b>NOx (tons)</b>	<b>Excess NOx (tons)</b>
Southern Company	369,826	242,976
TVA	352,759	273,982
American Electric Power Co, Inc	334,398	251,797
Allegheny Power System, Inc	200,132	146,584
Texas Utilities Company	172,102	72,363
Cinergy Corp.	161,473	109,519
Dominion Resources	152,787	110,157
PacifiCorp	133,498	83,765
Entergy	131,679	68,096
Duke Power Company	110,319	85,192
Carolina Power & Light	104,245	71,478
Central and Southwest Corporation	102,618	52,500

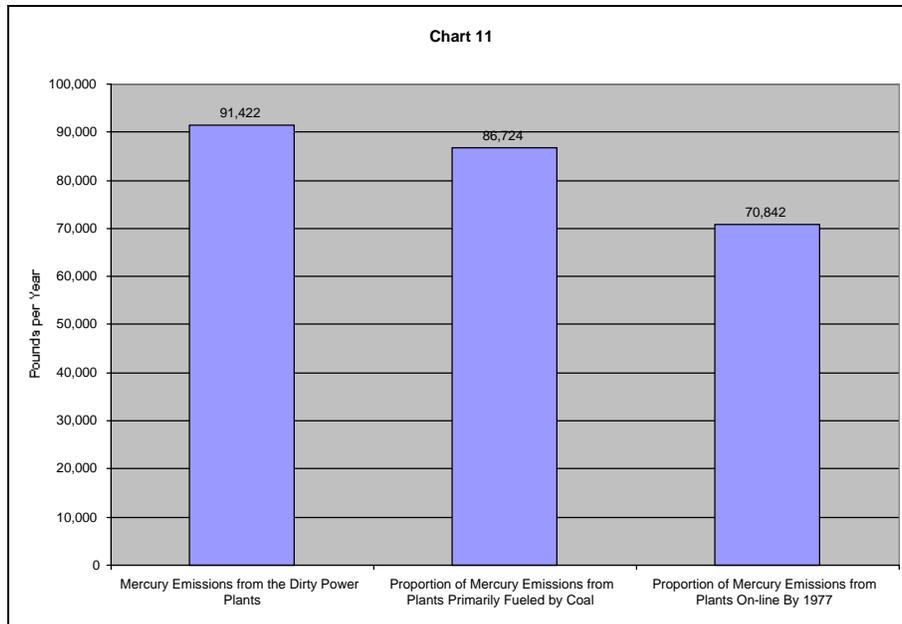
### C. Mercury

The 594 dirtiest plants profiled by this report emitted an estimated 91,422 pounds of mercury in 1998, or 32% of all mercury emitted in the United States from all sources, based on EPA's emissions estimates for 1994-95, which is the most recent estimate available (See Chart 10).<sup>53</sup>



As with NOx and SO2, there was a clear correlation between the highest emitting plants for mercury, and those that are primarily fueled by coal. In the case of mercury, 95% of emissions were from plants primarily fueled by coal. Again, there was also a high correlation between the most polluting plants and those that had at least one unit operating by 1977, with 77% of the mercury coming from plants that began operating on or before 1977 (See Chart 11).

<sup>53</sup> U.S. EPA, "Mercury Study Report to Congress," 1997.



The following three tables rank the 100 plants emitting the highest quantity of mercury in 1998 (Table 7), the states according to most mercury emitted from in-state power plants in 1998 (Table 8), and the 12 holding companies whose plants emitted the most mercury in 1998 (Table 9). The dirtiest plant in the nation for mercury was the Keystone Plant in Armstrong County Pennsylvania, owned by PECO, which emitted 1,911 pounds of mercury in 1998. The state with the highest power plant mercury pollution in 1998 was Pennsylvania, whose power plants emitted 9,161 pounds. Southern Company was the holding company with the highest mercury emissions in 1998, emitting 7,165 pounds of mercury that year.

<b>Table 7: 100 Power Plants Emitting the Highest Quantities of Mercury Pollution in 1999</b>							
	<b>State</b>	<b>Operating Company</b>	<b>Name</b>	<b>County</b>	<b>Primary Fuel</b>	<b>1st Year On-Line</b>	<b>1998 Hg (lbs)</b>
1	PA	Pennsylvania Electric Co.	Keystone	Armstrong	Coal	67/68	1,911
2	PA	Pennsylvania Electric Co.	Homer City	Indiana	Coal	69/77	1,633
3	TX	Texas Utilities Company	Monticello	Titus	Coal	74/78	1,396
4	AL	AL Power	James H Miller Jr	Jefferson	Coal	78/91	1,375
5	TX	Houston Lighting and Power Co	W a Parish	Fort Bend	Coal/Gas	58/82	1,326
6	WV	VEPCO	Mt Storm	Grant	Coal	65/73	1,303
7	PA	PP&L Resources, Inc.	Montour	Montour	Coal	72/73	1,267
8	TX	Texas Utilities Company	Martin Lake	Rusk	Coal	77/79	1,216
9	OH	Ohio Power Co	Gen J M Gavin	Gallia	Coal	74/75	1,141
10	IN	Indian Michigan Power Co.	Rockport	Spencer	Coal	84/89	1,092
11	AL	AL Power	E C Gaston	Shelby	Coal	60/74	1,080
12	OH	Columbus Southern Power Co.	Conesville	Coshocton	Coal	57/78	1,048
13	TX	Houston Lighting and Power Co	Limestone	Limestone	Coal	85/86	909
14	PA	Pennsylvania Electric Co.	Shawville	Clearfield	Coal/Oil	54/60	906
15	IL	Commonwealth Edison	Joliet 29	Will	Coal/Gas	65/66	865
16	IL	Commonwealth Edison	Powerton	Tazewille	Coal	72/75	837
17	IL	Commonwealth Edison	Waukegan	Lake	Coal	58/62	830
18	TX	SWEPCO	Pirkey	Harrison	Coal	85	821
19	IL	Commonwealth Edison	Will County	Will	Coal	55/63	814
20	AL	AL Power	Gorgas	Walker	Coal	51/72	812
21	NM	Public Service Co of NM	San Juan	San Juan	Coal	73/82	759
22	WV	Appalachian Power Co	John E Amos	Putnam	Coal	71/73	747
23	MI	Detroit Edison Co.	Monroe	Monroe	Coal/Oil	69/74	725
24	GA	Georgia Power	Scherer	Monroe	Coal	82/89	711
25	KY	TVA	Paradise	Muhlenberg	Coal	63/70	700
26	NC	CP&L (Carolina Power and Light)	Roxboro	Person	Coal	66/80	700
27	FL	FL Power	Crystal River	Citrus	Coal	66/84	660
28	PA	Pennsylvania Electric Co.	Conemaugh	Indiana	Coal	70/70	660
29	OH	Cleveland Electric Illum. Co	Eastlake	Lake	Coal	53/72	647
30	OH	DPL Co	J M Stuart	Adams	Coal	70/74	640
31	IN	PSI Energy	Gibson	Gibson	Coal	75/82	628
32	OH	Ohio Edison Co	W H Sammis	Jefferson	Coal/Oil	59/72	614
33	MT	Montana Power Co	Colstrip	Rosebud	Coal	75/86	613
34	GA	Georgia Power	Bowen	Bartow	Coal	71/75	603
35	IA	Midamerican Energy Company	George Neal North and	South	Coal/Gas	64/79	603
36	MO	Union Electric Co	Labadie	Franklin	Coal	70/73	589
37	ND	Coop Power Assn	Coal Creek	Mclean	Coal	79/80	586
38	KS	KPL Western Resources	Jeffrey Energy Centr	Pottawatomie	Coal	78/83	581
39	IN	Indiana-Kentucky Electric Corp.	Clifty Creek	Jefferson	Coal	55/56	580
40	IN	IPALCO Enterprises	Petersburg	Pike	Coal	67/86	565
41	IL	Electric Energy Inc.	Joppa Steam	Masaac	Coal/Gas	53/55	555
42	WV	Central Operating Co	Phil Sporn	Mason	Coal	50/60	536
43	PA	PP&L Resources, Inc.	Brunner Island	York	Coal/Oil	61/67	533
44	NM	Arizona Public Service Co	Four Corners	San Juan	Coal	63/70	528
45	OH	Cardinal Operating Co.	Cardinal	Jefferson	Coal	67/77	526
46	TN	TVA	Kingston	Roane	Coal	54/55	526
47	ND	Minnkota Power Coop Inc	Milton R Young	Oliver	Coal	70/77	510
48	WI	Wisconsin Energy Corporation	Pleasant Prairie	Kenosha	Coal/Oil	80/85	508
49	TN	TVA	Johnsonville	Humphrey's	Coal/Oil	51/75	506
50	TX	SWEPCO	Welsh	Titus	Coal	77/82	500

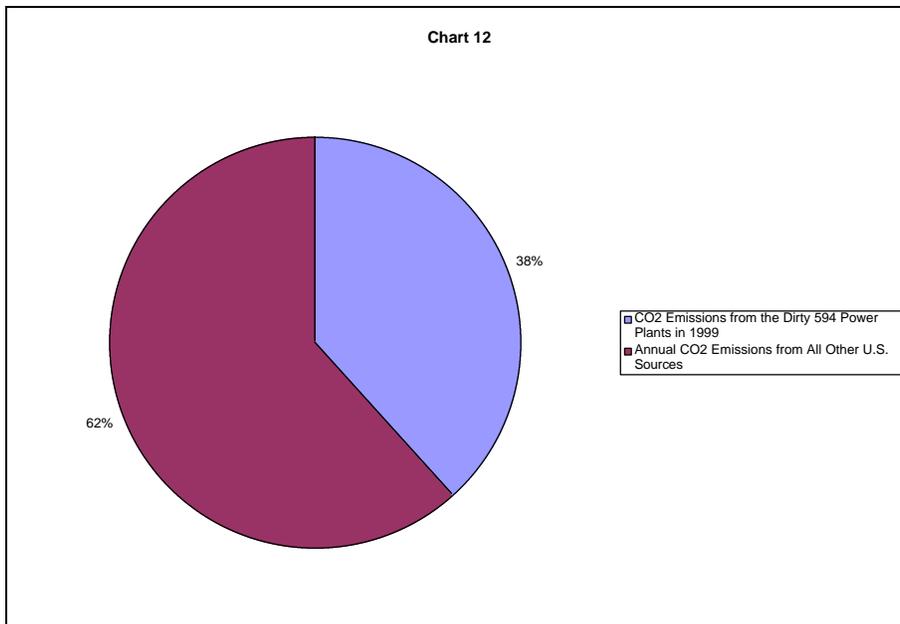
	State Owner		Name	County	Primary Fuel	1st Year On-Line	1998 Hg (lbs)
51	TN	TVA	Cumberland	Stewart	Coal	73	492
52	MD	Baltimore Gas & Electric Co	Brandon Shores	Anne Arundel	Coal	84/91	489
53	NC	Duke Power	Belews Creek	Stokes	Coal	74/75	477
54	OH	Ohio Valley Electric Corp.	Kyger Creek	Gallia	Coal	55	466
55	NC	CP&L (Carolina Power and Light)	Marshall	Madison	Water	85	459
56	TX	Lower Colorado River Authority	Sam Seymour	n/a	n/a	n/a	459
57	TX	Texas Utilities Company	Big Brown	Freestone	Coal	71/72	458
58	KY	Kentucky Power Co.	Big Sandy	Lawerence	Coal	63/69	453
59	AR	Entergy Arkansas Inc.	White Bluff	Jefferson	Coal	80/81	451
60	AL	AL Power	Barry	Mobile	Coal/Gas	54/71	450
61	WY	PacifiCorp	Jim Bridger	Sweetwater	Coal	74/79	449
62	MO	Union Electric Co	Rush Island	Jefferson	Coal	76/77	445
63	WV	Monongahela Power	Harrison	Harrison	Coal	72/74	438
64	AZ	Salt River Proj Ag I & P Dist	Navajo	Coconino	Coal	74/76	431
65	WA	PacifiCorp	Centralia	Lewis	Coal	72/73	421
66	MD	Potomac Electric Power Co	Morgantown	Charles	Coal/Oil	70/71	404
67	LA	Cajun Electric Power Coop Inc	Big Cajun 2	Pointe Coupee	Coal	81/83	403
68	NE	NPPD	Gentleman Sta	Lincoln	Coal	79/82	402
69	TN	TVA	Gallatin	Sumner	Coal/Oil	56/75	397
70	WI	WPL Co	Columbia	Columbia	Coal	75/78	396
71	KY	KU Co.	Ghent	Caroll	Coal	74/84	391
72	TX	San Antonio City of	J T Deely	Bexar	Coal	77/78	381
73	WV	Ohio Power Co	Mitchell	Marshall	Coal	71	380
74	OH	Cleveland Electric Illum. Co	Avon Lake-total	Lorain	Coal/Oil	49/73	375
75	MI	Consumers Energy Co.	J H Campbell	Ottawa	Coal/Oil	62/80	373
76	LA	Central Louisiana Elec Co Inc	Dolet Hills	De Soto	Coal/Gas	86	372
77	AL	TVA	Widows Creek	Jackson	Coal	52/65	371
78	OH	Cincinatti Gas & Electric	Walter C Beckjord	Clermont	Coal/Oil	52/72	371
79	TX	Southwestern Public Service Co	Tolk Station	Lamb	Coal/Gas	82/85	371
80	VA	VA Elec. & Power Co.	Chesterfield	Chesterfield	Coal	52/69	360
81	ND	Basin Electric Power Coop	Leland Olds	Mercer	Coal	66/75	359
82	OH	Cincinatti Gas & Electric	W H Zimmer	Clermont	Coal	91	357
83	KS	KCP&L	La Cygne	Linn	Coal	73/77	356
84	IL	Illinois Power	Baldwin	Randolph	Coal	70/75	349
85	PA	PP&L Resources, Inc.	Sunbury	Snyder	Coal/Oil	49/67	345
86	IN	NIPSCO Industries, Inc.	R M Schahfer	Jasper	Coal/Gas	76/86	341
87	OH	Cincinatti Gas & Electric	Miami Fort	Hamilton	Coal/Oil	49/78	334
88	AZ	Arizona Public Service Co.	Cholla	Navajo	Coal	62/81	332
89	PA	West Penn Power Co	Hatfields Ferry Po	Greene	Coal	69/71	324
90	KY	East Kentucky Power Coop Inc	H L Spurlock	Mason	Coal	77/81	323
91	PA	Pennsylvania Electric Co.	Seward	Indiana	Coal	50/57	318
92	AR	Entergy Arkansas Inc.	Independence	Independence	Coal	83/84	316
93	WV	Appalachian Power Co	Mountaineer (1301)	Mason	Coal	80	313
94	IL	Commonwealth Edison	Crawford	Cook	Coal/Gas	58/61	312
95	OH	Ohio Power Co	Muskingum River	Morgan	Coal	53/68	311
96	TN	TVA	Bull Run	Anderson	Coal	67	310
97	IA	Midamerican Energy Company	Louisa	Louisa	Coal	83	307
98	MN	Minnesota Power	Clay Boswell	Itasca	Coal/Oil	58/80	307
99	MD	Potomac Electric Power Co	Chalk Point	Prince Georges	Coal/Gas/Oil	67/91	302
100	MN	Northern States Power Co.	Sherburne County	Sherburne	Coal	76/87	301

<b>Table 8: Ranking of States</b>		
by Amount of Mercury (Hg)		
Emitted by Power Plants in 1998		
		<b>1998</b>
	<b>State</b>	<b>Hg (lbs)</b>
1	PA Total	9,161
2	TX Total	9,073
3	OH Total	7,770
4	IL Total	6,077
5	AL Total	4,875
6	IN Total	4,870
7	WV Total	4,750
8	KY Total	3,611
9	NC Total	2,871
10	MI Total	2,764
11	MO Total	2,563
12	TN Total	2,548
13	FL Total	2,429
14	GA Total	2,239
15	ND Total	2,039
16	WI Total	1,953
17	IA Total	1,926
18	MD Total	1,781
19	VA Total	1,375
20	NM Total	1,324
21	WY Total	1,269
22	KS Total	1,193
23	SC Total	1,182
24	LA Total	1,104
25	NY Total	1,064
26	AZ Total	1,035
27	OK Total	1,030
28	AR Total	939
29	MN Total	910
30	NE Total	799
31	CO Total	751
32	MT Total	678
33	MS Total	671
34	UT Total	660
35	WA Total	421
36	NV Total	416
37	NJ Total	411
38	DE Total	310
39	MA Total	242
40	OR Total	140
41	NH Total	135
42	SD Total	63
43	CT Total	0
44	ME Total	0
45	CA Total	0

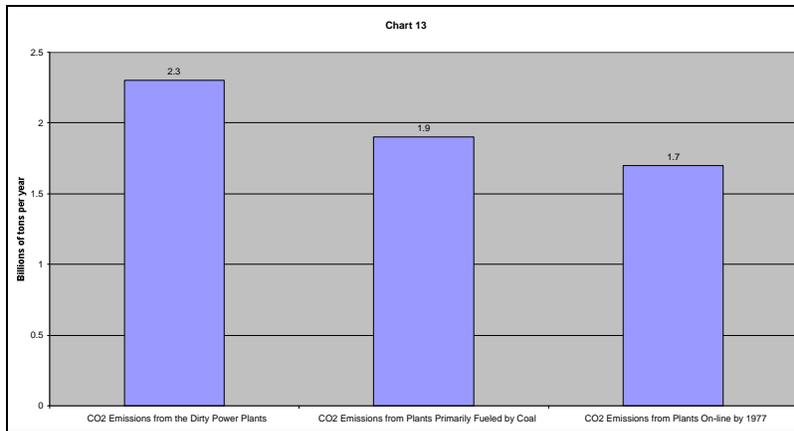
<b>Table 9: Dirty Dozen Holding Companies -- Ranked by Estimated 1998 Mercury (Hg) Emissions</b>		
	<b>Holding Company</b>	<b>Mercury (lbs)</b>
1	Southern Company	7,165
2	American Electric Power Co, Inc	6,660
3	GPU, Inc	5,581
4	Commonwealth Edison	4,111
5	TVA	4,108
6	Texas Utilities Company	3,288
7	Allegheny Power System, Inc	2,970
8	Dominion Resources	2,547
9	Cinergy Corp.	2,437
10	Central and Southwest Corporation	1,986
11	Carolina Power & Light	1,969
12	PacifiCorp	1,838

#### D. Carbon Dioxide (CO2)

The 594 dirtiest plants profiled by this report emitted 2.3 billion tons of CO2 in 1999, 38 percent of all U.S. CO2 emissions (See Chart 12 below).<sup>54</sup> As with the other three pollutants, there was a clear correlation between the most polluting plants, and those that are primarily fueled by coal. In the case of CO2, 85% was emitted by plants primarily fueled by coal. There was also a high correlation between the most polluting plants and those that had at least one unit that began operating on or before 1977, with 74% of the CO2 coming from plants operating by 1977 (See Chart 13).



<sup>54</sup> U.S. EPA, U.S. Department of Energy, "Carbon Dioxide Emissions from the Generation of Electric Power in the U.S., October 15, 1999.



The following three tables rank the 100 plants emitting the highest quantity of CO<sub>2</sub> in 1999 (Table 10), the states according to most CO<sub>2</sub> emitted from in-state power plants in 1999 (Table 11), and the 12 holding companies whose plants emitted the most CO<sub>2</sub> in 1999 (Table 12). The dirtiest plant in the nation was Southern Company's Scherer plant in Georgia, which emitted 23.6 million tons of CO<sub>2</sub>. The state with the highest power plant CO<sub>2</sub> pollution in 1999 was Texas, whose power plants emitted 235 million tons of CO<sub>2</sub> in 1999. As with all of the other pollutants, Southern Company, based in Atlanta, Georgia, was the holding company with the highest CO<sub>2</sub> emissions in 1999, emitting 171 million tons of CO<sub>2</sub>.

**Table 10: 100 Power Plants Emitting the Highest Quantities of Carbon Dioxide Pollution in 1999**

	ST	Operating Company	Name	County	Primary Fuel	1st Year On-Line	1999 CO2 (tons)
1	GA	Georgia Power	Scherer	Monroe	Coal	82/89	23,664,019
2	TX	Houston Lighting and Power Co	W a Parish	Fort Bend	Coal/Gas	58/82	23,028,926
3	IN	PSI Energy	Gibson	Gibson	Coal	75/82	22,276,074
4	AL	AL Power	James H Miller Jr	Jefferson	Coal	78/91	21,365,768
5	TX	Texas Utilities Company	Martin Lake	Rusk	Coal	77/79	20,486,049
6	GA	Georgia Power	Bowen	Bartow	Coal	71/75	20,165,773
7	WY	PacifiCorp	Jim Bridger	Sweetwater	Coal	74/79	19,764,403
8	AZ	Salt River Proj Ag I & P Dist	Navajo	Coconino	Coal	74/76	19,499,180
9	IN	Indian Michigan Power Co.	Rockport	Spencer	Coal	84/89	19,470,821
10	MT	Montana Power Co	Colstrip	Rosebud	Coal	75/86	18,619,409
11	TN	TVA	Cumberland	Stewart	Coal	73	18,413,027
12	KY	KU Co.	Ghent	Caroll	Coal	74/84	18,125,227
13	WV	Appalachian Power Co	John E Amos	Putnam	Coal	71/73	18,017,179
14	NM	Arizona Public Service Co	Four Corners	San Juan	Coal	63/70	17,483,077
15	FL	FL Power	Crystal River	Citrus	Coal	66/84	16,199,684
16	TX	Texas Utilities Company	Monticello	Titus	Coal	74/78	16,184,141
17	KS	KPL Western Resources	Jeffrey Energy Centr	Pottawatomie	Coal	78/83	16,124,844
18	NC	CP&L (Carolina Power and Light)	Roxboro	Person	Coal	66/80	16,092,703
19	OH	Ohio Power Co	Gen J M Gavin	Gallia	Coal	74/75	15,919,260
20	MN	Northern States Power Co.	Sherburne County	Sherburne	Coal	76/87	15,864,260
21	OH	Ohio Edison Co	W H Sammis	Jefferson	Coal/Oil	59/72	15,720,891
22	MO	Union Electric Co	Labadie	Franklin	Coal	70/73	15,608,008
23	KY	TVA	Paradise	Muhlenberg	Coal	63/70	15,065,232
24	MI	Detroit Edison Co.	Monroe	Monroe	Coal/Oil	69/74	15,042,097
25	WV	Monongahela Power	Harrison	Harrison	Coal	72/74	14,848,945
26	UT	Los Angeles City of	Intermountain	Millard	Coal	86/87	14,842,400
27	OH	DPL Co	J M Stuart	Adams	Coal	70/74	14,731,941
28	NC	Duke Power	Belews Creek	Stokes	Coal	74/75	14,444,191
29	WY	Basin Electric Power Coop	Laramie River	Platte	Coal	81/82	14,267,970
30	NM	Public Service Co of NM	San Juan	San Juan	Coal	73/82	13,748,364
31	PA	Penn. Power	Bruce Mansfield	Beaver	Coal	76/80	13,576,930
32	AR	Entergy Arkansas Inc.	Independence	Independence	Coal	83/84	13,282,750
33	LA	Cajun Electric Power Coop Inc	Big Cajun 2	Pointe Coupee	Coal	81/83	13,183,144
34	PA	Pennsylvania Electric Co.	Homer City	Indiana	Coal	69/77	13,029,807
35	AL	AL Power	E C Gaston	Shelby	Coal	60/74	13,010,925
36	IN	IPALCO Enterprises	Petersburg	Pike	Coal	67/86	12,867,750
37	PA	Pennsylvania Electric Co.	Conemaugh	Indiana	Coal	70/70	12,861,237
38	TX	Houston Lighting and Power Co	Limestone	Limestone	Coal	85/86	12,728,992
39	TX	Lower Colorado River Authority	Sam Seymour	n/a	n/a	n/a	12,723,703
40	TX	SWEPSCO	Welsh	Titus	Coal	77/82	12,695,086
41	PA	Pennsylvania Electric Co.	Keystone	Armstrong	Coal	67/68	12,323,856
42	NC	CP&L (Carolina Power and Light)	Marshall	Madison	Water	85	12,196,762
43	AL	AL Power	Barry	Mobile	Coal/Gas	54/71	11,969,557
44	IN	NIPSCO Industries, Inc.	R M Schahfer	Jasper	Coal/Gas	76/86	11,909,084
45	WV	VEPCO	Mt Storm	Grant	Coal	65/73	11,886,664
46	IA	Midamerican Energy Company	George Neal North and South		Coal/Gas	64/79	11,721,144
47	AR	Entergy Arkansas Inc.	White Bluff	Jefferson	Coal	80/81	11,690,979
48	AL	TVA	Widows Creek	Jackson	Coal	52/65	11,432,515
49	WI	Wisconsin Energy Corporation	Pleasant Prairie	Kenosha	Coal/Oil	80/85	11,128,237
50	UT	PacifiCorp	Hunter (Emery)	Emery	Coal	78/83	10,891,090

	ST	Owner	Name	County	Primary Fuel	1st Year On-Line	1999 CO2 (tons)
51	TN	TVA	Kingston	Roane	Coal	54/55	10,830,003
52	WA	PacifiCorp	Centralia	Lewis	Coal	72/73	10,645,221
53	FL	JEA	St Johns River Power	Duval	Coal/Oil	87/88	10,595,267
54	MI	Consumers Energy Co.	J H Campbell	Ottawa	Coal/Oil	62/80	10,573,777
55	ND	Coop Power Assn	Coal Creek	Mclean	Coal	79/80	10,549,158
56	FL	TECO	Big Bend	Hillsborough	Coal/Oil	69/85	10,398,081
57	MD	Baltimore Gas & Electric Co	Brandon Shores	Anne Arundel	Coal	84/91	10,395,000
58	OK	Oklahoma Gas & Electric Co	Muskogee	Muskogee	Coal/Gas	56/84	10,293,402
59	KS	KCP&L	La Cygne	Linn	Coal	73/77	10,273,828
60	MO	Associated Electric Coop Inc	Thomas Hill	Randolph	Coal	66/82	10,265,456
61	NV	Southern California Edison Co.	Mohave	Clark	Coal/Gas	71/71	10,107,992
62	MI	Detroit Edison Co.	Belle River	St. Clair	Coal/Oil	81/85	10,079,789
63	KY	TVA	Shawnee	McCracken	Coal	53/56	10,030,198
64	OH	Columbus Southern Power Co.	Conesville	Coshocton	Coal	57/78	9,962,005
65	GA	Georgia Power	Wansley	Heard	Coal	76/78	9,958,403
66	IL	Illinois Power	Baldwin	Randolph	Coal	70/75	9,943,296
67	KY	LG&E Energy Corporation	Mill Creek	Jefferson	Coal	72/82	9,904,727
68	OH	Cincinatti Gas & Electric	W H Zimmer	Clermont	Coal	91	9,828,655
69	FL	Seminole Electric Coop Inc	Seminole	Putnam	Coal	84/85	9,782,239
70	OH	Cincinatti Gas & Electric	Miami Fort	Hamilton	Coal/Oil	49/78	9,755,553
71	CO	Tri-State G & T Assn Inc	Craig	Moffat	Coal	79/84	9,715,232
72	IL	Electric Energy Inc.	Joppa Steam	Masaac	Coal/Gas	53/55	9,673,917
73	NE	NPPD	Gentleman Sta	Lincoln	Coal	79/82	9,434,513
74	MI	Detroit Edison Co.	St Clair	St Clair	Coal/Oil	53/69	9,299,565
75	OH	Cardinal Operating Co.	Cardinal	Jefferson	Coal	67/77	9,294,345
76	WV	Ohio Power Co	Mitchell	Marshall	Coal	71	8,906,422
77	IN	Indiana-Kentucky Electric Corp.	Clifty Creek	Jefferson	Coal	55/56	8,893,724
78	AL	AL Power	Gorgas	Walker	Coal	51/72	8,874,049
79	TX	Southwestern Public Service Co	Tolk Station	Lamb	Coal/Gas	82/85	8,860,632
80	MA	US Generating Co	Brayton Point	n/a	n/a	n/a	8,808,361
81	PA	West Penn Power Co	Hatfields Ferry	Greene	Coal	69/71	8,796,357
82	TX	Texas Utilities Company	Handley	Tarrant	Gas/Oil	48/77	8,788,760
83	TN	TVA	Johnsonville	Humphrey's	Coal/Oil	51/75	8,724,362
84	OH	Cincinatti Gas & Electric	Walter C Beckjord	Clermont	Coal/Oil	52/72	8,663,538
85	IL	Commonwealth Edison	Powerton	Tazeville	Coal	72/75	8,656,753
86	TX	Southwestern Public Service Co	Harrington Station	Potter	Coal/Gas	76/80	8,653,391
87	IN	Hoosier Energy R E C, Inc.	Merom	Sullivan	Coal	82/83	8,474,637
88	PA	PP&L Resources, Inc.	Montour	Montour	Coal	72/73	8,392,818
89	SC	SC Pub. Serv. Auth	Winyah	Georgetown	Coal	75/81	8,389,202
90	WV	Appalachian Power Co	Mountaineer (1301)	Mason	Coal	80	8,281,637
91	OK	Public Service Co of OK	Northeastern	Rogers	Coal/Gas/Oil	61/80	8,271,725
92	ND	Basin Electric Power Coop	Antelope Valley	Mercer	Coal	84/86	8,226,314
93	WI	WPL Co	Columbia	Columbia	Coal	75/78	8,216,765
94	MO	Associated Electric Coop Inc	New Madrid	New Madrid	Coal	72/77	8,183,447
95	WV	Monongahela Power	Pleasants	Pleasants	Coal	79/80	8,151,589
96	MO	Union Electric Co	Rush Island	Jefferson	Coal	76/77	8,021,847
97	AZ	Arizona Public Service Co.	Cholla	Navajo	Coal	62/81	8,017,733
98	TN	TVA	Gallatin	Sumner	Coal/Oil	56/75	7,908,462
99	WV	Monongahela Power	Fort Martin	Monongolia	Coal	67/68	7,904,276
100	VA	VA Elec. & Power Co.	Chesterfield	Chesterfield	Coal	52/69	7,883,971

<b>Table 11: Ranking of States by Amount of Carbon Dioxide Emitted by Power Plants in 1999</b>		
		<b>1999</b>
	<b>State</b>	<b>CO2 (tons)</b>
1	TX Total	235,258,09
2	IN Total	139,270,20
3	OH Total	133,338,47
4	FL Total	115,460,93
5	KY Total	108,030,89
6	PA Total	105,892,02
7	WV Total	94,126,99
8	IL Total	87,500,38
9	AL Total	83,126,04
10	GA Total	78,575,06
11	MI Total	74,743,77
12	NC Total	72,500,79
13	MO Total	69,787,24
14	TN Total	59,387,88
15	WY Total	52,602,65
16	WI Total	50,580,52
17	NY Total	48,738,68
18	LA Total	47,514,79
19	OK Total	45,271,29
20	AZ Total	45,266,40
21	IA Total	39,760,69
22	KS Total	39,388,31
23	UT Total	38,434,04
24	VA Total	38,225,64
25	SC Total	37,985,07
26	CO Total	37,949,17
27	ND Total	37,574,08
28	MD Total	36,556,89
29	NM Total	35,413,66
30	MN Total	35,042,02
31	AR Total	31,762,75
32	MS Total	23,982,99
33	NE Total	23,150,25
34	MA Total	23,115,13
35	NV Total	20,738,39
36	MT Total	20,242,94
37	WA Total	10,645,22
38	NJ Total	9,563,42
39	CT Total	8,901,33
40	NH Total	5,578,22
41	DE Total	5,005,94
42	OR Total	4,329,20
43	SD Total	4,299,87
44	ME Total	2,441,37
45	CA Total	1,234,54

<b>Table 12: Dirty Dozen Holding Companies, Ranked by 1999 CO2 Emissions</b>		
	<b>Holding Company</b>	<b>CO2 (tons)</b>
1	Southern Company	170,912,995
2	American Electric Power Co, Inc	112,996,035
3	TVA	103,633,835
4	Texas Utilities Company	91,275,605
5	Allegheny Power System, Inc	72,241,035
6	Cinergy Corp.	71,870,935
7	Entergy	68,090,395
8	PacifiCorp	68,022,015
9	Central and Southwest Corporation	57,371,810
10	Dominion Resources	49,426,920
11	GPU, Inc	46,349,090
12	Carolina Power & Light	44,855,810

## **Section 3: Policy Recommendations**

### **A. Closing the Lethal Loophole**

Nitrogen oxide and sulfur dioxide emissions are resulting in illness and premature death for tens of thousands of Americans, the loss of forest and aquatic ecosystems and loss of visibility in American's national parks. This report demonstrates that requiring old power plants to meet emission limits currently imposed only upon newer plants would reduce total nationwide SO<sub>2</sub> and NO<sub>x</sub> emissions by 9.4 million tons and 3.6 million tons respectively. Compared to EPA's estimate of total nationwide SO<sub>2</sub> and NO<sub>x</sub> emission of 20.4 million tons of SO<sub>2</sub> and 23.6 million tons of NO<sub>x</sub>, closing the loophole will eliminate 46% of total SO<sub>2</sub> emissions, and 15% of all NO<sub>x</sub> emissions from all sources. Congress should close the lethal loophole, requiring all power plants to meet modern pollution standards no later than 2005.

### **B. Standards for Power Plant Mercury Emissions**

Mercury has poisoned the fish in thousands of U.S. lakes and streams, putting people who eat these fish at risk for neurological damage, including delayed development in young children.

Mercury emissions from power plant smokestacks are uncontrolled, while other major sources, including medical and municipal waste incinerators are being required to reduce their mercury emissions. Coal-burning power plants are the largest source of this dangerous toxic metal. Congress must set strict emission limits for mercury from power plants designed to protect the public's health, reducing power plant mercury emissions by at least 90% by 2005.

### **C. Standards for Power Plant CO<sub>2</sub> Emissions**

Global warming threatens to radically alter the Earth's climate. The warming of the earth has potentially disastrous results such as the increase in extreme weather events, the spread of infectious disease, loss of habitat and species, and sea level rise.

Despite the fact that power plants are the largest industrial source of CO<sub>2</sub> that causes global warming, there are currently no limits on the amount of CO<sub>2</sub> that power plants can emit. Congress must set emission standards for CO<sub>2</sub> consistent with attainment of targets agreed to by 38 industrialized nations in Kyoto, Japan in 1997, which commits the U.S. to reduce overall emissions of greenhouse gases to levels 7% below levels emitted in 1990. At a minimum, power plant carbon dioxide levels should be reduced to 1990 levels by 2005.

The pollution reduction goals would be achieved in part or in full by measures contained in several bills introduced in the current Congress. Most notably, the Clean Smokestacks Act (H.R. 2900), the Clean Power Plants Act (H.R. 2980) and the Clean Energy Act (S. 1369) are among the bills that would, if enacted, achieve deep cuts in all four of the major power plant pollutants.

## **D. Energy Efficiency and Renewable Energy**

While in the short term, burning cleaner fuels such as natural gas and installing pollution controls can significantly reduce air pollution from the nation's dirty power plants, any sound energy policy must ultimately seek to replace fossil fuel and nuclear power plants with energy efficiency and renewable energy alternatives.

This decade has witnessed great advances in energy saving technology, bringing to the market household appliances, motors, lighting, heating and cooling systems that use 50-70% less energy than average models currently in use. However, even the most efficient appliances in the marketplace consume much more than is technologically achievable. Moreover, energy efficiency has the added benefit of saving consumers money. Since 1973, modest investments in energy efficiency have cut the national energy bill by at least \$150 billion per year.<sup>55</sup>

Likewise, the use of non-polluting renewable energy sources have significant potential to displace fossil and nuclear generation. Solar, wind, biomass, geothermal and fuel cell technologies are readily available, and can produce power with little or no pollution. Moreover, the cost of generating electricity using renewable technologies is falling dramatically, as the demand for renewable energy systems increases. Today, however, just two percent of America's power is generated from non-hydro renewable energy sources.

Incentives for investment in energy efficiency and renewable energy are critical to making them available to consumers in the marketplace. A renewable portfolio standard (RPS) setting a minimum renewable content requirement for all electricity providers would go a long way toward commercializing renewable power technologies. Moreover, a public benefits trust (PBT) creating a national fund for investment in energy efficiency would allow consumers to take advantage of cost effective energy saving technologies. Both of these policies are contained in bills proposed by Representative Frank Pallone of New Jersey (H.R. 2569) and Senator James Jeffords of Vermont (S. 1369).

## **E. Electric Industry Restructuring and the Environment**

Across the nation states are considering, or passing legislation to deregulate, or "restructure" their electric utilities. To date, 25 states have passed restructuring legislation, allowing competition among electricity providers. Meanwhile, at the federal level, several bills are being debated within the House Commerce Committee in an effort to pass national retail restructuring legislation. Due in part to competitive pressures in the industry, coal-burning power plants have steadily expanded their output in the last decade – nearly 16% in the last seven years alone. Much of this expanded output has been made possible by weaker emission standards for these plants that confer a clear economic

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<sup>55</sup> *American Council for an Energy Efficient Economy.*

advantage. Moreover, some studies have suggested that retail deregulation by Congress or the states could accelerate this trend in utilization of exempted older power plants, thus increasing emissions and associated sickness and environmental damage.

Restructuring makes it more important than ever before to create a level playing field for all power plants, old and new. Any federal bill to deregulate the electric utilities should contain adequate protections against further degradation of public health and the environment, including the pollution reduction policies and clean energy policies described above.