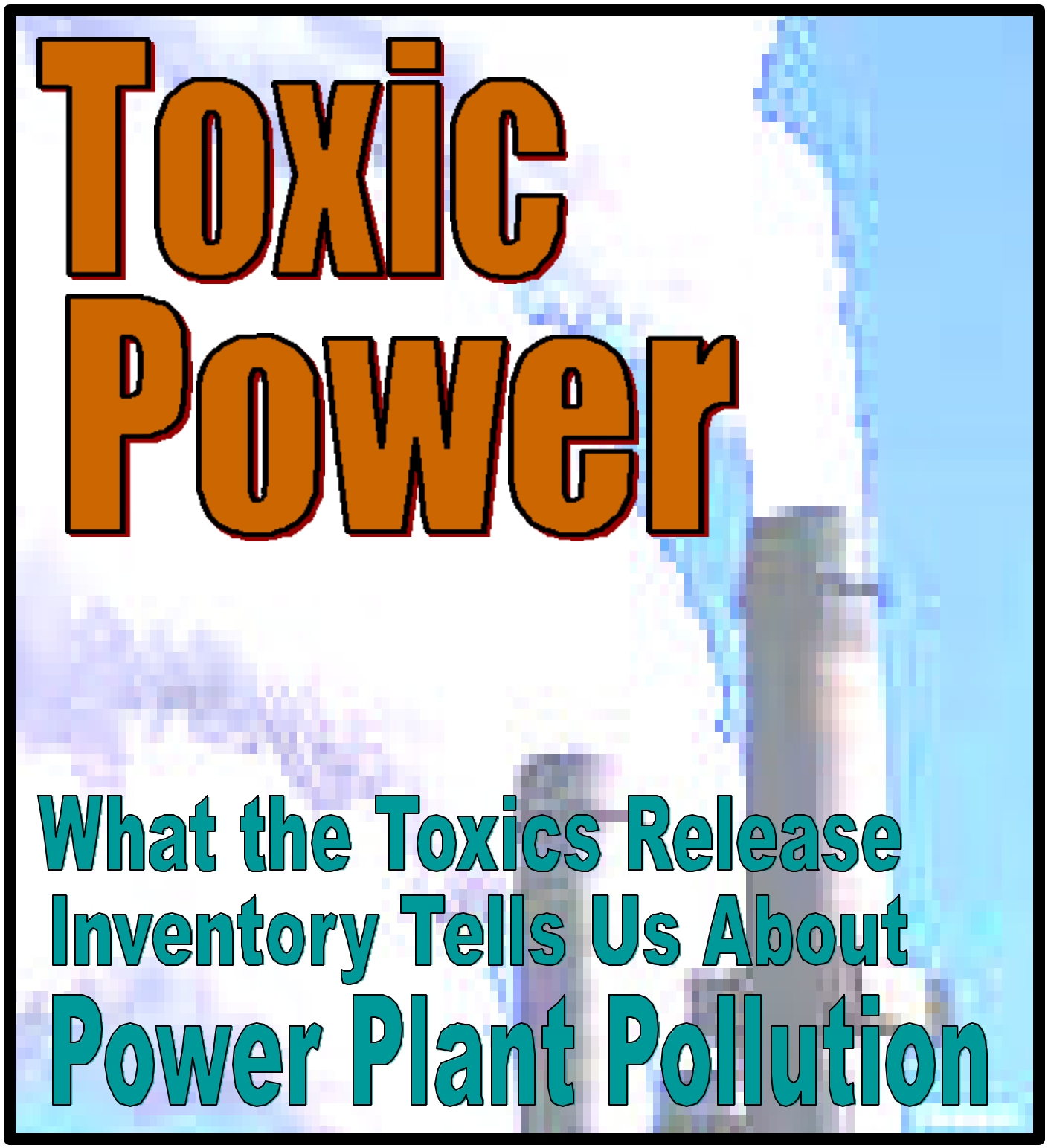
Toxic Power

What the Toxics Release Inventory Tells Us About Power Plant Pollution



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Toxic Power

What the Toxics Release Inventory Tells Us about Power Plant Pollution

By National Environmental Trust for Clear the Air, the National Campaign Against Dirty Power

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Executive Summary

Newly released EPA information on toxic air emissions shows that electric utilities are the biggest polluters in the US – far outstripping industries such as chemical manufacturing and refining. Utilities claim that their toxic releases – while large in the aggregate – pose no threat to the public. However, neither the electric utilities nor EPA have examined potential long-term risk to children, the elderly, and people with respiratory illnesses. Both EPA and the electric utility industry have also failed to analyze the impact of power plant toxic chemical emissions on particulate pollution, an enormous public health concern.

The Toxic Release Inventory, or TRI, is our nation's premiere database of information on how much toxic air, water and land pollution is released each year by various industries. A serious gap in this compendium was recently closed when, after years of resistance, coal- and oil-burning electric utilities were finally forced to disclose their air, land and water pollution. When EPA released the newest data to the public in May 2000, electric utilities instantly became known as the biggest toxic air polluters in the U.S.

This report is the first in-depth analysis of the quantity and nature of coal- and oil-burning power plant toxic pollution brought to light in the Toxic Release Inventory. It demonstrates that electric utility emissions can and do in fact present serious public health concerns. It also shows that special pollution exemptions for power plants have contributed to the massive quantity of toxic materials released by the electric power industry.

Key Findings of Toxic Power

- Electric utilities released over ***one billion pounds of toxic pollution*** in 1998, more than any other industry in the U.S. except for metal mining, which releases most of its toxics to land. Electric utilities emit more toxic chemical air pollution than the chemical, paper, plastics and refining industries *combined*.

- ***Southern Company***, ***American Electric Power*** (AEP), and ***Tennessee Valley Authority*** (TVA) ranked first, second, and third for total toxic releases in 1998. In addition, these companies ranked first, second, and third for air emissions. Southern Company was responsible for over 10 percent of reported emissions from the entire utility industry.

- Coal- and oil-fired power plants released nearly ***9 million pounds of toxic metals and metal compounds*** to the air in 1998, many of which are known or suspected carcinogens and neurotoxins. Power plants have no required controls specifically for toxic metals, even though they are among the largest sources of such pollution, releasing metals both to air and to land.

- Coal-and oil-fired power plants released over ***three-quarters of a billion pounds of dangerous acid gases*** to the environment in 1998, constituting the vast majority of their toxic pollution. Acid gases can cause acute respiratory problems, and aggravate asthma and emphysema.

- Acid gases and metals from coal-and oil-fired power plants also contribute to the formation of fine particle pollution, which is linked to as many as 45,000 premature deaths each year.

- Power plants with emissions controls for sulfur dioxide to reduce acid rain emit only about five percent as much hydrochloric and hydrofluoric acid gases per unit of electricity generated as power plants with no such controls, and about 60 percent as much sulfuric acid. Unfortunately, special pollution loopholes exempt hundreds of power plants from having sulfur dioxide emissions controls.

- Coal- and oil-burning power plants emit between 27 and 54 times more acid gases than chemical plants that actually make these gases as products. This is because chemical plant acid gas releases are regulated by federal emissions standards, while power plants acid gas pollution is unregulated.

- While, on average, other industries reporting to TRI release about one-quarter of their toxic chemical waste to the environment, coal- and oil-***burning power plants release 68 percent of their waste to the environment***.

- **Ohio** ranks highest for air emissions and total releases, followed by **West Virginia**. **Pennsylvania** ranked third for power plant air emissions, while **Florida** ranked third for total releases**. West Virginia** ranked highest for average releases per plant, followed by **Georgia** and **Alabama**.

Recommendations

The TRI data reveal that the electric power industry is by far the largest aggregate source of some of our most harmful toxic air pollution. Reducing this enormous source of toxic pollution will require a combination of closing special loopholes that exempt electric utilities from pollution controls that apply to other industries, modernizing our current fleet of power plants, and investing in cleaner power sources. Some of the measures that should be taken are as follow:

❶ The EPA is in the midst of evaluating whether to regulate toxic air pollution from electric power generation. EPA's decision is expected in December 2000. This analysis shows that the EPA needs to strictly regulate electric utility toxic air emissions so that, at a minimum, power plants meet the same standards other industries meet for mercury and other toxic air pollution.

❷ Congress is currently considering proposals that would take a comprehensive approach to cleaning up power plants, enabling the industry to make more rational decisions on how best to meet their environmental obligations. These proposals include provisions to close an existing loophole that allows older power plants to escape emissions controls for sulfur dioxide and nitrogen oxides. Reducing emissions of pollutants such as sulfur dioxide, nitrogen oxides, carbon dioxide and mercury will also help reduce some toxic air pollution.

❸ About half of the toxic pollution from power plants is contained in the wastes left over from coal and oil combustion. These wastes are presently disposed of in on- and off-site landfills that are not necessarily designed for hazardous waste, and that are capable of allowing toxic wastes to contaminate land and groundwater. The risk of such contamination would be significantly reduced if EPA were to designate these wastes as "hazardous" and require their proper disposal.

❹ The vast majority of electric power plants operating today are more than 30 years old. They burn coal and oil to produce electricity, both of which contain relatively high levels of impurities that result in toxic air pollution. Modernizing this fleet of plants by converting or replacing them with cleaner alternatives such as natural gas-fired power plants will help reduce toxic air pollution from electric utilities.

❺ Finally, a great deal of toxic air pollution can be avoided by shifting some of our electricity needs to renewable power sources such as wind, geothermal, solar and biomass. Energy efficiency measures will also reduce toxic air pollution by reducing the amount of fossil fuel burned to generate electricity.

The time has come for electric utilities to stop emitting more toxic air pollution than the chemical, paper, plastics and refining industries *combined*.

Introduction

1998 marked the first year that electric utilities were required to report to U.S. EPA's Toxics Release Inventory, or TRI. Since 1987 industrial facilities engaged in manufacturing have been required to report to TRI their annual releases to the environment and off-site transfers of waste on a chemical-specific basis. Since the first reports, TRI has been expanded to include more activities, industries, and substances. In 1991, TRI was expanded to require data for amounts of on-site recycling, energy recovery, and treatment activities at facilities. In 1995, the number of substances reportable to TRI nearly doubled. Finally, in 1997, EPA expanded the types of facilities required to report to TRI to include electric utilities burning coal or fuel oil, among other new sources such as mining.

Although it is a reporting program and does not set emissions limits, TRI has been responsible for huge reductions in emissions from industrial facilities. Simply having to report the data and subsequently having those data made public has caused facilities to examine their processes and reduce releases to the environment.[1] From 1988, the year EPA uses as its TRI baseline, reported releases to air, water, and land, and injections into deep wells have decreased by nearly 50 percent among the manufacturing sector facilities that report to TRI.[2] For many companies, assembling their 1987 TRI numbers was a big surprise – they had never examined their emissions as a whole, and the totals were extremely high. And, of course, the numbers were a surprise to communities and citizens' groups that had never previously had access to the information.

The numbers have turned out to be no less surprising for the 613 coal- and oil-burning electric power plants reporting to TRI for 1998. ***Nationwide, electric utilities ranked number one for air emissions in the TRI data, and number two for total TRI releases in 1998***.

Even before the TRI toxic air pollution data became available, electric power plants were known to be the largest industrial source of air pollutants such as smog-forming nitrogen oxides, soot-forming sulfur dioxide, and carbon dioxide, a powerful greenhouse gas.[3] The vast majority of this pollution comes from older coal-fired

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[1] For an analysis of TRI's impact on emissions reduction, see A. Fung and D. O'Rourke, "Reinventing Environmental Regulation from the Grassroots Up: Explaining and Expanding the Success of the Toxics Release Inventory." *Environmental Management.,* Vol. 25, No. 2, pp. 115-127 (2000)

[2] This figure includes only facilities in the manufacturing sector, and includes only the core set of chemicals that has been reported continuously since 1988. It does not include the electric power industry.

[3] Nationally, annual power plant emissions are responsible for 36 percent of carbon dioxide (2 billion tons), 64 percent of sulfur dioxide (13 million tons), 26 percent of nitrogen oxides (6 million tons) and 52 tons of mercury. US EPA, *National Air Quality and Emission Trends Report, 1997* (December 1998), Tables A-4 and A-8, pp. 114, 117. Available online at http://www.epa.gov/oar.

power plants.[4] The TRI data now confirm that these power plants are not only the largest industrial source of conventional air pollutants, but that they are also by far the largest source of toxic air pollution, primarily in the form of acid gases and toxic metals. The magnitude of power plant toxic releases is one more indication that the special interest favoritism that has long exempted utilities from controlling virtually any of their pollution must end.

This report examines nationwide and state TRI electric utility data for 1998. It shows the quantity and nature of toxic pollutants reported by power plants, and describes the potential health damage they can cause. It also suggests ways in which the massive amount of toxic power plant pollution can be reduced. The numerous data tables at the end of the report reveal how much toxic pollution electric utilities emit compared to other industries, rank the top-polluting utility holding companies, and list by amount the nearly 60 toxic chemicals released by power plants to the environment. The data tables also contain state-by-state information on electric utility toxic releases, including how the electric power industry compares to other top polluting industries in each state, and the quantity of toxic pollution released by each power plant in all 50 states.

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

National TRI Data on Electric Power Plants

How much toxic air pollution did electric utilities report for 1998?

Electric utilities reported releasing nearly **784 million tons** of chemicals to the air in 1998, and reported over **one billion pounds** of total releases to air, water, and land (see **Table 1**). Nationally, electric utilities ranked number one for industrial toxic air emissions in 1998, and number two for total TRI toxic releases, behind the metal mining industry.[5]

What are the top electric utilities or utility holding companies for TRI releases?

Southern Company, American Electric Power (AEP), and Tennessee Valley Authority (TVA) ranked first, second, and third for total TRI releases in 1998 for the utility industry (see **Table 2**). These companies also ranked first, second, and third for air emissions.[6] Southern Company reported releasing over 114 million pounds of TRI chemicals to the environment in 1998 from 24 power plants, and was responsible for over 10 percent of TRI emissions from the entire utility industry.[7]

What chemicals did electric utilities report to TRI?

The 613 power plants reporting to TRI for 1998 reported releasing an average of seven chemicals each to the air, although the industry as a whole reported air emissions of 61 different substances, and other releases of an additional two substances (See **Table 3**).

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[5] Facilities report their industry to TRI by means of Standard Industrial Classification (SIC) codes. A facility may report more than one SIC code to TRI, although the first SIC code reported is supposed to represent the major activity of the facility. This report uses the primary SIC code as the designation for the entire facility.

[6] For a listing of conventional air pollution (NOx, SO2, CO2 and mercury) releases by holding company, see *Lethal Legacy, The Dirty Truth About the Nation's Most Polluting Power Plants*. Available online at http://www.cleartheair.org.

[7] Although power plants report the names of their parent companies to TRI, they do not always report their ultimate parent company, especially when the electric utility that owns the plant is a subsidiary of a holding company. In addition, facilities reporting the same parent companies may use slight variations in name that don't allow the data for a parent company to be easily integrated (for example, "The Southern Company" as opposed to "Southern Company," or using initials or abbreviations). For these reasons, this report links TRI data with other data available from U.S. EPA and U.S. DOE and other data sources to determine the proper parent companies for those plants that could be matched among databases. Given the lag between data reporting and data availability, these parent company or holding company designations may not represent the current status as to number of plants and total emissions.

The top three chemicals released as reported by electric utilities – **hydrochloric acid**, **sulfuric acid**, and **hydrofluoric acid** (also known as hydrogen fluoride), accounted for **98 percent of electric utility TRI air emissions** in 1998. Releases of these three chemicals accounted for 73 percent of total releases from electric utilities. Power plants also reported releasing approximately **9 million pounds of metals and metal compounds** to the air. The reported metals with the greatest air emissions were compounds of barium, zinc, nickel, selenium, and manganese. The vast majority of metals released to the environment by power plants were from ash and soot disposed of on site. Mercury, however, was not reported (see below).

Table 3 lists air emissions, total releases, and production-related waste for TRI chemicals reported by electric utilities. Production-related waste includes releases to land, air, or water, amounts of each chemical managed on site (by recycling, energy recovery, or treatment), plus amounts of each chemical shipped off site as waste. ***Sixty-eight percent of production-related waste from power plants ended up as releases to the environment***, indicating little waste management activity or shipping waste off site, and few power plants with emission controls. In contrast, for non-utilities, only 23 percent of all TRI releases in 1998 were reported as production-related waste.

Why isn't mercury on the list of chemicals released by power plants?

Mercury and mercury compounds released by electric power plants were not reported to TRI for 1998, although they are on the list of TRI chemicals. While power plants are the single largest source of mercury air emissions in the U.S. (EPA estimates that they release some ***52 tons of mercury*** and mercury compounds to the air each year[8]), no single plant reaches the current TRI threshold for reporting. Large coal-fired power plants release several hundred pounds of mercury per year. The 1998 TRI reporting rules required reporting only for facilities that produce or process 25,000 pounds of a chemical, even if the chemical is an impurity like mercury.

However, in 1998 EPA finalized a new rule lowering the reporting threshold for mercury and mercury compounds to 10 pounds. Thus, power plants and other facilities generating mercury will have to report these releases to TRI for the year 2000. Although a few small power plants may fall below the 10-pound threshold, the vast majority will have to report their mercury emissions.

Are electric power plant emissions dangerous?

It's difficult to estimate exactly how much any individual will be exposed to power plant emissions and what any one person's health effects from power plant emissions might be. The Edison Electric Institute (EEI), a group representing the

[8] US EPA, "Electric Utility Steam Generating Units Hazardous Air Pollutant Emission Study," (Feb. 24, 1998), p. ES-5, Table ES-1.

electric power industry, has claimed that potential health effects from exposure to power plant emissions are negligible.

EEI's statements were based on an EPA study of hazardous air pollutant emissions from power plants.[9] EPA concluded that some pollutants from power plants are a public health concern that require further study, notably mercury, dioxins, arsenic and nickel. The study concluded that the high levels of acid gas emissions from power plants do not pose a public health risk, given the Agency's assumptions made in modeling power plant emissions.

EPA's analysis of short-term emissions of acid gases only considered four power plants and did not use actual measured concentrations of acid gases around the plants. The EPA study also acknowledges that their analysis used a modeled emission rate that was thought to represent an average rather than a peak emission rate. Peak short-term emissions from upsets or other atypical operating conditions may result in exposure to nearby communities at levels far higher than EPA estimated.[10] The study also did not consider long-term effects on sensitive populations such as children, the elderly, and people with existing respiratory illnesses.

The fact is that individual electric power plants release huge quantities of extremely hazardous substances, and also create other types of pollution contributing to public health problems:

- Acid aerosol emissions are corrosive and can cause acute respiratory problems, and aggravate asthma and emphysema. In addition, there is emerging evidence that breathing small concentrations of acid aerosols over time inhibits childhood lung development.[11] Furthermore, the fact that acid aerosol emissions from other industries are regulated and controlled demonstrates the recognized necessity of minimizing the health risks associated with their release.

- Many of the metals released by coal-fired power plants are known or suspected carcinogens, such as nickel and nickel compounds, chromium and chromium compounds, and arsenic compounds.

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

[10] While falling short of implicating average emissions of acid gases, the EPA study did point out that hydrochloric acid emissions significantly enhance the acidity of cloud water and thus can indirectly affect acid rain (by interacting with SO2 in the atmosphere). It also contributes to the formation of fine particles. According to EPA, hydrochloric acid in the atmosphere can affect the atmospheric chemistry of mercury which may affect how long mercury remains in the atmosphere before being deposited to earth.

[11] Raizenne, M. *et al* (1998). "Air Pollution Exposure and Children's Health*" Canadian Journal of Public Health* 89: S43-48.

- Several substances released by power plants are also neurotoxins that damage the nervous system, such as manganese compounds and n-hexane, and reproductive and developmental toxins, such as toluene and lead compounds.

- In addition to health effects for individual chemicals, power plant aerosol and metal emissions also contribute to secondary particulate pollution.[12] Emissions of acids and metals coalesce into small droplets and particles that are of particular concern for public health. As many as 45,000 people per year are estimated to die because of exposure to fine particle pollution.[13]

Appendix 3 lists health impacts associated with some of the key toxic pollutants released by power plants. The table in Appendix 3 does not imply that exposure automatically equals health effects, but demonstrates why these substances are cause for concern.

Where do the chemicals released by power plants come from?

Impurities present in coal and fuel oil are released to the environment when these fuels are burned by power plants. Although coal is mostly carbon, it also contains a small percentage by weight of sulfur compounds, compounds containing chlorine and fluorine, and various metals. While some coal is "cleaner" in that it has fewer impurities, all coal and fuel oil contain some impurities that create a variety of chemical substances when the fuel is burned. These substances end up either as air pollutants or are present in the ash left over after fuel combustion. They are also present in soot captured from the exhaust streams of smokestacks equipped with scrubbers or baghouses.

How do power plant releases compare to other plants that generate the same chemicals?

Table 4 compares electric power plant acid emissions to plants in other industries, both plants that manufacture the acids as products, and plants that produce the acids as byproducts and impurities. Electric power plants produce these acids as impurities, and ***the average power plant releases between 27 and 54 times more acid aerosols than the average plant in other industries*** that produce the acids as products, byproducts, or impurities.

For example, just as lumber, bricks and cement are the building blocks of the construction industry, acids are some of the building blocks of the chemical industry

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

[13] Natural Resources Defense Council, "Breathtaking: Premature Mortality Due to Particulate Air Pollution in 239 American Cities," (1996).

and are used to manufacture countless chemicals and materials we use every day. Hydrochloric, hydrofluoric and sulfuric acids are three such building blocks.[14] Plants that produce these acids for sale or distribution released about two-and-a-half million pounds of them to the air in 1998. In contrast, power plants do not produce these acids as products for sale, but merely as byproducts of the combustion of coal and oil – and yet they released more than ***three-quarters of a billion pounds*** of these acids to the air in 1998.

Most facilities in other industries are limited by the Clean Air Act as to the amount of acid aerosols and other chemicals they can release to the environment. So a plant that manufactures hydrofluoric acid will only be allowed to release a few thousand pounds of that chemical per year, even though it may produce tens of millions of pounds of the chemical as product. In contrast, the average electric power plant releases over 175,000 pounds of hydrofluoric acid aerosols each year without a permit.

How do legal loopholes and special exemptions affect toxic emissions from power plants?

The huge amount of toxic air pollution from power plants is at least in part the result of special pollution exemptions for the electric industry that currently exist in the Clean Air Act. They also enjoy an exemption under the Resource Conservation and Recovery Act (RCRA) that allows them to dispose of over 100 million tons of toxic combustion waste annually with no restrictions. While ending these special exemptions for power plants will not, by itself, resolve the massive toxic pollution from electricity generation, it is an important part of the solution. In particular, acid aerosols and toxic metals would be reduced by ending special exemptions for power plants.

➢ Acid aerosol air pollution be reduced by closing the Clean Air Act "grandfather" loophole

Because of a "grandfather" loophole under the Clean Air Act, the vast majority of coal- and oil-fired power plants fail to meet modern pollution standards for sulfur dioxide (SO_2). Grandfathered power plants emit SO_2 at rates up to 10 times that of modern coal plants. Power plants exempted from having SO_2 emission controls under the "grandfather" loophole in Clean Air Act also have higher emissions of acid aerosols than plants that have control systems.

[14] For example, hydrochloric acid is used in the production of chlorides, for refining ore in the production of tin and tantalum, for pickling and cleaning of metal products, in electroplating, in removing scale from boilers, for the neutralization of basic systems, as a laboratory reagent, as a catalyst and solvent in organic syntheses, in the manufacture of fertilizers and dyes, for hydrolyzing starch and proteins in the preparation of various food products, and in the textile and rubber industries.

Some larger power plants are required to control their SO_2 emissions under the acid rain provisions of the Clean Air Act. If these plants did not have SO_2 controls, emissions of hydrochloric acid would have been 25 percent higher.[15] SO_2 controls also reduced nationwide sulfuric acid emissions from power plants by 48 percent, and reduced hydrofluoric acid emissions by 30 percent.[16]

Although SO_2 controls are not present on every power plant and are not designed to capture acid aerosols as efficiently as control systems designed for those chemicals, they certainly reduce the amount of acid aerosols released to air.[17] ***The average coal-fired power plant with complete SO_2 controls releases 95% less hydrochloric and hydrofluoric acid aerosols per unit of electricity generated than is released by power plants without SO_2 controls, and about 40% less sulfuric acid***.[18] Removing the special favoritism conferred by the grandfathering provision in the Clean Air Act would result in substantial reductions in acid aerosol emissions.

- Toxic metal air pollution would be reduced by closing the Clean Air Act utility air toxics special exemption

Electric utilities have avoided regulation of their toxic pollution due to an exemption granted under the 1990 Clean Air Act.[19] At that time, Congress was persuaded that not enough was known about toxics emitted by power plants to justify national regulations. No other major industry was given this exemption.

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[15] For the purpose of this report, SO_2 controls refer to scrubbers, devices that chemically remove SO_2 from power plant emissions before they exit the stack. Among power plants that are required to control their SO_2 emissions, only about 20% use scrubbers; the rest simply burn lower sulfur coal.

[16] These figure were calculated from the difference between air emissions and production-related waste data for each chemical as listed in **Table 3**. Production-related waste includes releases plus amounts of waste managed on site. In the case of acid aerosols from power plants, this means the amount of acid removed by scrubbers installed to remove SO_2 from the air exhaust stream. If the scrubbers did not remove these acids, they would have been released to the air.

[17] See Appendix 2 for calculations and methodology.

[18] Because a large number of power plants burn low sulfur coal, the average percent reduction in emissions of sulfuric acid is lower than for the other acids. For plants burning high sulfur coal, the reduction can be as much as 95 percent from controls, as it is for hydrochloric and hydrofluoric acid. See Appendix 2.

[19] Clean Air Act, 42 U.S.C. Sec. 7412(n). Congress ordered EPA to prepare utility air toxics report, and to make a determination on whether to regulate utilities for their toxic emissions. When EPA finally released its utility air toxics study in February 1998, EPA asserted that it did not have enough information to make a positive regulatory determination. At that time, EPA negotiated an extension to December 15, 2000 for making its final determination. Unless EPA determines that utility air toxics should be regulated, power plants will continue to emit far greater quantities of toxic metals and other compounds than industries that are forced to control their toxic emissions.

Mercury is one example of a toxic metal emitted by power plants that has been reduced through the use of controls by other industrial emitters of mercury. Although power plants did not report their mercury emissions to TRI in 1998 (see above), other EPA data confirms that coal-fired electric power plants are far and away the single biggest source of mercury air pollution in the US. They are responsible for 34 percent of the total mercury emitted by all known sources.[20]

Power plants emit almost as much mercury as the next two biggest sources combined - municipal waste incinerators (19 percent) and coal and oil-fired commercial/industrial boilers (18 percent).[21] In stark contrast to coal-burning utilities, the other major sources of mercury pollution are doing – or will soon be doing – their fair share to reduce mercury emissions.

Recently-issued EPA regulations for municipal and medical waste incinerators will require that mercury air pollution be reduced by 90 percent and 94 percent respectively by 2002. The same level of control on power plants should be required. Similar controls should also be required for other toxic metals emitted by power plants. Other toxic metals can be captured to levels exceeding 95 percent and as high as the 99.9 percent by more efficient particulate controls.[22]

- Toxic waste contamination of land and water would be reduced by closing the RCRA combustion waste special exemption

Combustion waste is the solid and liquid waste left over from burning coal and oil to make electricity — ash, sludge, boiler slag, mixed together with a dozen or so smaller volume wastes. Every year, over 100 million tons of these wastes are produced at approximately 600 coal and oil-fired power plants. Seventy-six million tons are primarily disposed of at the power plant site in unlined and unmonitored wastewater lagoons, landfills and mines.[23]

These wastes are highly toxic. They contain concentrated levels of contaminants like arsenic, mercury, chromium and cadmium that can damage the nervous systems and other organs, especially in children. Analyses performed for EPA show

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[20] US EPA, Office of Water, *Air Pollution and Water Quality: Atmospheric Deposition Initiative: Where is the air pollution coming from?* Available at http://www.epa.gov/owowwtr1/oceans/airdep/air5.html.

[21] Id.

[22] Brown, T.D.; D.N. Smith, R.A. Hargis, Jr., W.J. O'Dowd. *Mercury Measurement and its Control: What we Know, Have Learned and Need to Further Investigate*. J. Air and Waste Management Assoc., June 1999, pp. 1-97.

[23] For more details on the hazards of toxic combustion waste, see "Laid to Waste: The Dirty Secret of Combustion Waste From America's Power Plants," (March 2000), available on-line at: http://www.cleanair.net/Resources/laidtowaste.htm

that some of these pollutants would eventually migrate and contaminate nearby groundwater. Incredibly, disposal of these toxic wastes is subject to no federal rule whatsoever, having been exempted from EPA rule by the Resource Conservation and Recovery Act (RCRA) for the past 20 years.

In 1998, power plants reported ***over 230 million pounds of six toxic metals*** managed on site, disposed of on site, or shipped off site for management and disposal (see **Table 3**). These toxic metals are primarily contained in the combustion waste. In particular, power plants reported nearly 180 million pounds of barium compounds managed, shipped as waste, or disposed of; as well as over 13 million pounds each of nickel and chromium compounds, nearly 10 million pounds of barium, over 8 million pounds of lead compounds, and over 6 million pounds of arsenic compounds.

Contamination of land and groundwater by toxic coal and oil combustion waste would be significantly reduced if EPA were to designate these wastes as "hazardous" under RCRA. Coal and oil power plant combustion wastes require federal regulatory oversight because of the toxicity of their components, the demonstrated and documented danger they pose to public health and the environment. State rules are inadequate to control or mitigate these risks and dangers. The effect of a federal designation of these wastes as hazardous would be significantly tighter controls on disposal of these wastes in landfills and lagoons with modern environmental controls such as liners, groundwater monitoring and leachate collection systems.

What other measures would reduce toxic pollution from power plants?

Even if all existing legal loopholes are closed, there will continue to be massive toxic emissions from power plants. Impurities present in coal and fuel oil, including sulfur compounds, compounds containing chlorine and fluorine, and various metals, will continue to be a source of massive toxic releases so long as these fuels are burned to produce electricity.

Taking just one example, even if the Clean Air Act grandfather loophole is closed and all power plants are required to control their SO_2 emissions, power plants will continue to be an enormous source of toxic sulfuric acid. The four power plants with SO_2 controls analyzed in this report emit nearly ***three million pounds*** of sulfuric acid (see Appendix 2). That means that just four power plants – *with SO_2 controls* – emit ***over four times more*** sulfuric acid than all other industries ***combined*** that actually produce sulfuric acid as a product or byproduct (see **Table 4**). That is because these other industries are forced to have pollution control equipment designed to remove sulfuric acid.

Burning cleaner fuels with fewer impurities – such as natural gas – will help lower power plant toxic emissions. In addition, improving energy efficiency and increasing the amount of electricity generated from renewable sources such as biomass, solar,

wind and geothermal will further reduce the overall toxic releases from the electric industry.

A national market-based **renewable energy portfolio standard (RPS)** that ensures growth in the percentage of electricity generated from renewable sources including biomass, geothermal, solar and wind energy will help achieve this goal. The RPS requires that each electricity producer offer a set amount of renewable energy, either by acquiring renewable generating capacity or by buying surplus renewable capacity from others.

Finally, reducing overall demand for coal- and oil-generated electricity through energy efficiency measures will also reduce toxic emissions from the power industry. This goal can be achieved by making investments in **energy efficiency** through the establishment of a **nationwide public benefits trust fund**. Investment in the trust fund is accomplished by a uniform charge for transmitting electricity over the existing utility grid.

State TRI Data on Electric Power Plants

How do electric utilities rank for emissions within the states compared to other industries?

Electric utilities ranked number one for either 1998 TRI air emissions or total TRI releases in 35 states and territories. Utilities ranked number two for air emissions or total releases in an additional eight states and territories (see **Table 5**). Electric utilities ranked low for emissions in states with small numbers of coal- and oil-fired power plants, such as California, Maine, and Oregon. In states such as Texas and Louisiana, with large chemical and petroleum industries, 1998 power plant emissions were still significant, although not the largest sources of releases. Likewise, in states with significant mining and metals processing, electric utilities ranked below those industries for total releases, although power plants are generally the top sources of air emissions in those states (see **Table 6**).

How do power plant emissions compare among states?

Table 7 compares electric utility emissions in each state for air emissions, total releases (air, water, and land), and average releases per plant. **Ohio** ranks highest for air emissions and total releases, followed by **West Virginia**. **Pennsylvania** ranked third for power plant air emissions, while **Florida** ranked third for total releases. **West Virginia** ranked highest for average releases per plant, followed by **Georgia** and **Alabama**.

Appendix 1 is a state-by-state listing of all power plants included in the 1998 TRI data. It contains information on reported toxic air emissions, total toxic releases, and production-related waste.

Table 1: 1998 TRI Releases by Industry

Rank by Air Emissions	Industry	Air Emissions (pounds)	Total Releases (pounds)	Rank by Total Releases	Number of Facilities
1	Electric Utilities	783,775,380	1,052,997,243	2	613
2	Chemicals and Allied Products	331,950,467	710,879,424	3	3,971
3	Paper and Allied Products	209,467,844	253,040,286	5	516
4	Primary Metal Industries	127,039,719	550,355,944	4	2,101
5	Rubber and Miscellaneous Plastics Products	110,961,205	111,947,219	7	1,964
6	Transportation Equipment	94,282,790	95,067,568	9	1,394
7	Food and Kindred Products	64,659,918	96,527,470	8	2,059
8	Fabricated Metal Products	63,647,401	66,108,286	11	3,120
9	Petroleum Refining and Related Industries	61,534,479	79,193,950	10	434
10	Stone, Clay, Glass, and Concrete Products	37,196,391	43,514,745	12	708
11	Lumber and Wood Products, Except Furniture	33,619,999	34,101,630	13	855
12	Printing, Publishing, and Allied Industries	22,618,040	22,619,418	14	239
13	Electronic and Other Electric Equipment	18,315,816	21,160,029	15	1,313
14	Furniture and Fixtures	17,899,525	17,946,338	16	403
15	Machinery, Except Electrical	16,948,511	17,283,695	17	1,240
16	Textile Mill Products	11,577,937	12,123,707	20	308
17	Instruments and Related Products	11,126,102	12,392,421	19	285
18	Miscellaneous Manufacturing Industries	9,737,078	9,861,257	21	342
19	Petroleum Terminals	4,289,270	4,480,437	23	549
20	Metal Mining, except Iron Ores and Uranium	4,226,816	3,399,883,360	1	115
21	Other Industries	4,146,470	5,291,340	22	190
22	Tobacco Manufacturers	3,154,283	3,326,579	24	24
23	Leather and Leather Products	2,550,015	2,628,813	25	80
24	National Security and International Affairs	1,700,368	1,796,937	26	57
25	Coal Mining, except Extraction Activities	1,457,714	13,338,619	18	55
26	Chemical Distributors	1,297,842	1,406,165	27	445
27	Solvent Recyclers	825,985	825,986	28	97
28	RCRA Regulated Treatment, Disposal, or Recycling Sites	558,417	229,437,613	6	115
29	Apparel and Other Finished Fabric Products	531,207	531,217	29	22
	U.S. Total	2,051,096,989	6,870,067,696		23,614

Table 2: Top 50 Electric Utilities for TRI Releases, 1998

Rank by Total Releases	Holding Company/Electric Utility	Air Emissions (pounds)	Total Releases (pounds)	Number of Plants Reporting	Average Releases per Plant (pounds)	Rank by Air Emissions	Rank by Average Releases per Plant
1	SOUTHERN CO.	87,117,382	114,388,391	24	4,766,183	1	9
2	AMERICAN ELECTRIC POWER	84,242,044	98,001,097	15	6,533,406	2	6
3	U.S. TENNESSEE VALLEY AUTHORITY	42,466,280	56,844,990	14	4,060,356	3	10
4	CAROLINA POWER & LIGHT CO.	31,115,901	40,837,729	5	8,167,546	5	3
5	CINERGY CORP.	29,276,036	38,122,493	10	3,812,249	6	12
6	FIRSTENERGY CORP.	32,245,149	32,566,463	10	3,256,646	4	15
7	LG&E ENERGY CORP.	20,515,344	27,783,036	14	1,984,503	7	32
8	AMEREN CORP.	16,450,961	25,574,937	9	2,841,660	11	17
9	DOMINION RESOURCES INC.	19,766,462	24,057,400	11	2,187,036	8	29
10	DAYTON POWER & LIGHT CO. (DPL INC.)	18,095,721	22,472,804	3	7,490,935	10	4
11	DTE ENERGY CO.	14,376,236	21,982,216	8	2,747,777	14	18
12	DUKE ENERGY CORP.	18,237,500	21,707,576	8	2,713,447	9	19
13	ALLEGHENY ENERGY INC.	13,098,441	17,771,006	9	1,974,556	16	33
14	PP&L RESOURCES INC.	15,361,047	15,618,066	5	3,123,613	12	16
15	GPU, INC.	14,802,571	14,940,500	6	2,490,083	13	26
16	CONSUMERS ENERGY (CMS ENERGY CO.)	12,181,777	14,057,490	4	3,514,373	18	13
17	OHIO VALLEY ELECTRIC CORP.	11,907,115	13,699,893	2	6,849,947	19	5
18	ILLINOVA CORP.	11,727,585	13,538,756	5	2,707,751	21	20
19	POTOMAC ELECTRIC POWER CO.	12,949,150	13,390,440	5	2,678,088	17	21
20	BALTIMORE GAS ELECTRIC CO.	13,290,452	13,298,569	5	2,659,714	15	23
21	CARDINAL OPERATING CO.	11,323,277	13,178,247	1	13,178,247	22	1
22	TECO ENERGY INC.	11,769,660	12,070,963	5	2,414,193	20	28
23	EDISON MISSION ENERGY	10,195,694	12,040,575	3	4,013,525	23	11
24	FLORIDA PROGRESS CORP.	10,113,862	10,469,782	4	2,617,446	24	24
25	PACIFICORP	3,170,423	10,221,508	7	1,460,215	46	39
26	PUERTO RICO ELECTRIC POWER AUTHORITY	9,857,078	10,073,942	10	1,007,394	25	46
27	WISCONSIN ENERGY CORP.	9,133,344	9,775,038	7	1,396,434	26	41
28	SEMINOLE GENERATING STATION	8,386,772	9,599,001	1	9,599,001	27	2
29	CENTRAL & SOUTH WEST CORP.	3,103,290	8,975,020	6	1,495,837	47	37
30	SCANA	7,228,660	8,459,063	6	1,409,844	28	40
31	MIDAMERICAN ENERGY CO.	3,480,710	8,203,080	5	1,640,616	42	35
32	EAST KENTUCKY POWER CO-OP INC.	6,785,554	8,025,616	3	2,675,205	29	22
33	JEA	6,374,110	7,652,170	3	2,550,723	31	25
34	CONECTIV	6,633,562	7,312,195	5	1,462,439	30	38
35	IPALCO ENTERPRISES INC.	5,719,290	7,264,614	3	2,421,538	33	27
36	AES CORP.	4,957,976	6,832,132	11	621,103	35	48
37	PUBLIC SERVICE ELECTRIC & GAS CO. (PSEG INC)	5,781,570	6,101,720	5	1,220,344	32	43

Table 2: Top 50 Electric Utilities for TRI Releases, 1998

Rank by Total Releases	Holding Company/Electric Utility	Air Emissions (pounds)	Total Releases (pounds)	Number of Plants Reporting	Average Releases per Plant (pounds)	Rank by Air Emissions	Rank by Average Releases per Plant
38	NIAGARA MOHAWK POWER CORP.	5,319,665	5,478,375	4	1,369,594	34	42
39	ALCOA INC.	4,012,531	5,032,201	1	5,032,201	37	7
40	CAJUN ELECTRIC POWER COOPERATIVE INC.	3,336,934	5,016,482	1	5,016,482	45	8
41	NORTHEAST UTILITIES	4,577,240	4,600,540	4	1,150,135	36	44
42	SOUTH CAROLINA PUBLIC SERVICE AUTHORITY	3,608,962	4,579,167	4	1,144,792	40	45
43	ENTERGY CORP.	3,033,459	4,259,581	5	851,916	49	47
44	DAIRYLAND POWER COOPERATIVE	3,992,031	4,084,181	2	2,042,091	38	30
45	BOARD OF PUBLIC UTILITIES	3,574,222	4,072,083	2	2,036,042	41	31
46	CENTRAL ILLINOIS LIGHT CORP. (CILCORP)	3,031,730	3,721,269	2	1,860,635	50	34
47	FLORIDA POWER & LIGHT CO. (FPL GROUP)	3,706,909	3,719,959	8	464,995	39	49
48	UNICOM CORP.	3,398,340	3,696,282	8	462,035	43	50
49	WESTERN FARMERS ELECTRIC COOP	3,392,000	3,408,700	1	3,408,700	44	14
50	DQE	3,086,320	3,250,956	2	1,625,478	48	36
	Total (for all utilities)	783,775,380	1,052,997,243	613	1,717,777		

Table 3: 1998 TRI Electric Utility Releases and Production-Related Waste, by Chemical

Rank by Air Emissions	Chemical Name	Air Emissions (pounds)	Total Releases (pounds)	Rank by Total Releases	Production-Related Waste (pounds)	Rank by Production-Related Waste
1	HYDROCHLORIC ACID (AEROSOLS)	535,647,988	535,647,994	1	713,517,078	1
2	SULFURIC ACID (AEROSOLS)	166,283,495	166,303,496	2	317,923,991	2
3	HYDROGEN FLUORIDE	64,855,706	65,186,520	4	97,307,224	4
4	AMMONIA	5,389,610	5,539,803	12	10,289,431	11
5	ZINC (FUME OR DUST)	2,636,024	2,922,093	15	3,069,389	17
6	BARIUM COMPOUNDS	2,195,450	144,877,675	3	182,088,371	3
7	FORMALDEHYDE	1,788,622	1,788,872	16	1,788,622	19
8	ZINC COMPOUNDS	883,781	28,745,338	6	36,079,301	7
9	NICKEL COMPOUNDS	681,162	11,825,981	8	14,239,449	9
10	SELENIUM COMPOUNDS	526,704	1,318,381	17	1,442,158	21
11	MANGANESE COMPOUNDS	441,428	33,914,747	5	40,229,501	6
12	NITRIC ACID	357,036	370,036	25	443,420	31
13	COPPER COMPOUNDS	287,764	14,504,918	7	18,464,923	8
14	CHROMIUM COMPOUNDS	275,750	10,858,627	9	13,331,773	10
15	BARIUM	220,602	7,591,467	10	10,215,559	12
16	LEAD COMPOUNDS	166,148	6,013,981	11	8,194,163	14
17	N-HEXANE	156,697	156,701	28	155,715	36
18	ARSENIC COMPOUNDS	152,021	5,535,538	13	6,554,449	15
19	METHANOL	118,321	121,051	32	8,227,970	13
20	COPPER	109,573	515,244	22	1,462,253	20
21	NICKEL	70,811	240,813	27	988,624	22
22	CHLORINE	66,563	505,877	23	609,371	27
23	COBALT COMPOUNDS	53,195	3,712,571	14	4,145,291	16
24	TOLUENE	44,848	44,848	34	47,530	39
25	XYLENE (MIXED ISOMERS)	42,313	42,313	35	46,073	40
26	FLUORINE	39,082	129,860	30	129,859	37
27	VANADIUM (FUME OR DUST)	38,272	465,548	24	563,029	28
28	THALLIUM COMPOUNDS	34,032	897,492	19	897,804	24
29	ACETOPHENONE	33,000	33,000	37	33,000	41
30	MANGANESE	28,824	985,739	18	1,987,640	18
31	PHENANTHRENE	26,006	26,006	39	26,006	43
32	MOLYBDENUM TRIOXIDE	22,044	145,654	29	780,729	25
33	BERYLLIUM COMPOUNDS	20,287	560,875	21	651,877	26
34	ACRYLAMIDE	17,000	17,000	41	17,000	46

Table 3: 1998 TRI Electric Utility Releases and Production-Related Waste, by Chemical

Rank by Air Emissions	Chemical Name	Air Emissions (pounds)	Total Releases (pounds)	Rank by Total Releases	Production-Related Waste (pounds)	Rank by Production-Related Waste
35	CHLORINE DIOXIDE	13,000	13,510	42	13,510	47
36	ANTIMONY COMPOUNDS	9,627	841,957	20	947,896	23
37	BENZENE	8,621	8,621	44	8,585	50
38	1,2,4-TRIMETHYLBENZENE	6,482	6,486	46	6,327	52
39	NAPHTHALENE	5,975	22,975	40	5,741	53
40	CHROMIUM	5,882	252,405	26	457,518	30
41	ETHYLENE GLYCOL	5,173	37,416	36	528,762	29
42	ARSENIC	3,565	125,028	31	387,342	32
43	STYRENE	2,900	2,900	48	2,900	54
44	LEAD	1,006	85,325	33	160,646	35
45	SELENIUM	762	762	50	12,733	48
46	COBALT	488	29,503	38	57,549	38
47	THALLIUM	280	8,340	45	8,440	51
48	CADMIUM COMPOUNDS	250	9,650	43	9,600	49
48	ETHYLENE	250	250	51	19	61
48	PROPYLENE	250	250	51	3	64
51	FORMIC ACID	170	189	53	30,190	42
52	DIISOCYANATES	150	150	54	150	56
53	METHYL ETHYL KETONE	124	124	55	120	57
54	TETRACHLOROETHYLENE	110	110	57	780	55
55	POLYCYCLIC AROMATIC COMPOUNDS	73	75	58	48,000,507	5
56	CYCLOHEXANE	30	30	59	30	59
57	ETHYLBENZENE	28	28	60	28	60
58	METHYL TERT-BUTYL ETHER	10	10	61	10	62
59	NITRATE COMPOUNDS	5	3,310	47	219,001	33
59	ANTIMONY	5	5	63	18,860	45
59	CERTAIN GLYCOL ETHERS	5	5	62	5	63
--	SODIUM NITRITE	0	1,650	49	23,310	44
--	HYDRAZINE	0	120	56	120	57
--	ALUMINUM (FUME OR DUST)	0	0	--	210,000	34
--	PHOSPHORIC ACID	0	0	--	0	--
--	BROMINE	0	0	--	0	--
--	TRICHLOROFLUOROMETHANE	0	0	--	0	--
--	O-XYLENE	0	0	--	0	--

Table 3: 1998 TRI Electric Utility Releases and Production-Related Waste, by Chemical

Rank by Air Emissions	Chemical Name	Air Emissions (pounds)	Total Releases (pounds)	Rank by Total Releases	Production-Related Waste (pounds)	Rank by Production-Related Waste
--	CARBONYL SULFIDE	0	0	--	0	--
--	CRESOL (MIXED ISOMERS)	0	0	--	0	--
--	SODIUM DIMETHYLDITHIOCARBAMATE	0	0	--	0	--
--	DIBENZOFURAN	0	0	--	0	--
--	PHENOL	0	0	--	0	--
--	BIPHENYL	0	0	--	0	--
--	ALUMINUM OXIDE (FIBROUS FORMS)	0	0	--	0	--
--	PYRIDINE	0	0	--	0	--
--	ANTHRACENE	0	0	--	0	--
--	ACETALDEHYDE	0	0	--	0	--
--	ACRYLIC ACID	0	0	--	0	--
--	CATECHOL	0	0	--	0	--
--	METHYL IODIDE	0	0	--	0	--
--	NABAM	0	0	--	0	--
	Total	783,775,380	1,052,997,243		1,547,059,255	

Table 4: 1998 TRI Electric Utility Acid Aerosol Emissions Compared to Other Industries

Chemical	Industry or Type of Use	Air Emissions (pounds)	Number of Facilities Reporting	Average Air Emissions per Facility (pounds)
Hydrochloric Acid	Electric Utilities	535,647,988	478	1,120,602
	Other Industries			
	--Produce for Sale/distribution	2,102,532	25	84,101
	--Produce as Byproduct	2,956,823	41	72,118
	--Produce as Impurity	62,039	3	20,680
Hydrofluoric Acid	Electric Utilities	64,855,706	370	175,286
	Other Industries			
	--Produce as Impurity	36,000	1	36,000
	--Produce as Byproduct	186,868	10	18,687
	--Produce for Sale/distribution	11,090	2	5,545
Sulfuric Acid	Electric Utilities	166,283,495	430	386,706
	Other Industries			
	--Produce as Byproduct	366,514	16	22,907
	--Produce for Sale/distribution	312,487	22	14,204

Table 5: Electric Utilities' Rank among Industries by State, 1998 TRI Data

State	Rank by Air Emissions	Rank by Total Releases
Alabama	1	1
Alaska	2	3
Arizona	1	2
Arkansas	8	3
California	14	13
Colorado	1	2
Connecticut	2	2
Delaware	1	1
District of Columbia	1	1
Florida	1	1
Georgia	1	1
Hawaii	1	1
Idaho	--	--
Illinois	1	1
Indiana	1	1
Iowa	2	1
Kansas	1	1
Kentucky	1	1
Louisiana	4	4
Maine	8	8
Maryland	1	1
Massachusetts	1	1
Michigan	1	1
Minnesota	1	1
Mississippi	1	2
Missouri	1	2
Montana	1	1
Nebraska	1	1
Nevada	2	4
New Hampshire	1	1
New Jersey	1	1
New Mexico	2	4
New York	1	1
North Carolina	1	1
North Dakota	1	1
Ohio	1	2
Oklahoma	2	2
Oregon	12	10
Pennsylvania	1	1
Puerto Rico	1	1
Rhode Island	1	1

Table 5: Electric Utilities' Rank among Industries by State, 1998 TRI Data

State	Rank by Air Emissions	Rank by Total Releases
South Carolina	1	2
South Dakota	5	3
Tennessee	2	2
Texas	3	2
Utah	2	4
Vermont	--	--
Virginia	1	1
Washington	7	3
West Virginia	1	1
Wisconsin	1	1
Wyoming	1	1
United States	1	2

Table 6: Statewide TRI Emissions by Industry, 1998 Data

Rank by Air Emissions	Industry	Air Emissions (pounds)	Total Releases (pounds)
Alabama			
1	Electric Utilities	28,660,982	45,714,366
2	Paper and Allied Products	19,808,253	25,691,968
3	Chemicals and Allied Products	17,302,849	18,952,104
4	Primary Metal Industries	2,922,052	10,689,587
5	Stone, Clay, Glass, and Concrete Products	2,194,236	2,229,810
6	Fabricated Metal Products	1,760,442	1,978,709
7	Electronic and Other Electric Equipment	1,757,222	1,757,799
8	Transportation Equipment	1,543,112	1,544,921
9	Rubber and Miscellaneous Plastics Products	1,522,789	1,540,083
10	Food and Kindred Products	1,450,147	2,664,249
11	Furniture and Fixtures	1,104,456	1,104,456
12	Lumber and Wood Products, Except Furniture	909,914	912,958
13	Machinery, Except Electrical	505,873	523,316
14	Textile Mill Products	341,281	349,538
15	Petroleum Refining and Related Industries	284,110	334,269
16	National Security and International Affairs	264,513	268,572
17	Other Industries	261,714	263,479
18	Printing, Publishing, and Allied Industries	114,628	114,628
19	Miscellaneous Manufacturing Industries	112,875	113,125
20	Chemical Distributors	25,568	25,568
21	Petroleum Terminals	9,381	9,484
22	Solvent Recyclers	7,572	7,572
23	RCRA Regulated Treatment, Disposal, or Recycling Sites	6,266	12,192,296
24	Instruments and Related Products	295	313
25	Coal Mining, except Extraction Activities	87	1,030,087
Alaska			
1	Chemicals and Allied Products	1,542,451	1,638,085
2	Electric Utilities	567,100	567,100
3	Metal Mining, except Iron Ores and Uranium	511,214	304,495,138
4	Petroleum Refining and Related Industries	235,466	238,388
5	Paper and Allied Products	61,000	61,000
6	Petroleum Terminals	16,962	17,000
7	Chemical Distributors	1,255	1,255
Arizona			
1	Electric Utilities	3,531,238	9,526,350
2	Primary Metal Industries	3,180,493	173,365,862
3	Paper and Allied Products	853,801	984,818
4	Rubber and Miscellaneous Plastics Products	595,067	600,187
5	Transportation Equipment	346,368	346,648
6	Fabricated Metal Products	252,290	252,548
7	Metal Mining, except Iron Ores and Uranium	248,347	882,384,685
8	Electronic and Other Electric Equipment	237,071	371,503

Table 6: Statewide TRI Emissions by Industry, 1998 Data

Rank by Air Emissions	Industry	Air Emissions (pounds)	Total Releases (pounds)
9	Miscellaneous Manufacturing Industries	189,621	193,421
10	Stone, Clay, Glass, and Concrete Products	166,587	166,587
11	Food and Kindred Products	137,754	137,759
12	Lumber and Wood Products, Except Furniture	67,088	67,088
13	Chemicals and Allied Products	63,809	66,224
14	Petroleum Terminals	57,387	57,387
15	Furniture and Fixtures	26,927	26,927
16	Printing, Publishing, and Allied Industries	25,478	25,478
17	National Security and International Affairs	16,500	16,500
18	Chemical Distributors	12,249	12,249
19	Machinery, Except Electrical	3,201	4,451
20	Instruments and Related Products	1,825	1,825
21	Petroleum Refining and Related Industries	1,005	1,005
22	Other Industries	1,000	5,471
23	RCRA Regulated Treatment, Disposal, or Recycling Sites	997	997
24	Textile Mill Products	674	674
Arkansas			
1	Chemicals and Allied Products	5,448,452	7,415,167
2	Paper and Allied Products	5,273,392	6,782,722
3	Rubber and Miscellaneous Plastics Products	2,772,372	2,791,157
4	Food and Kindred Products	2,219,831	2,748,843
5	Primary Metal Industries	1,934,271	2,814,925
6	Electronic and Other Electric Equipment	1,930,727	1,942,092
7	Transportation Equipment	1,378,230	1,378,235
8	Electric Utilities	1,248,681	3,312,053
9	Lumber and Wood Products, Except Furniture	1,134,383	1,190,775
10	Fabricated Metal Products	1,028,568	1,047,901
11	Petroleum Refining and Related Industries	804,772	806,566
12	Stone, Clay, Glass, and Concrete Products	536,521	776,860
13	Furniture and Fixtures	525,232	534,810
14	Machinery, Except Electrical	380,648	381,058
15	Instruments and Related Products	183,227	183,747
16	Textile Mill Products	88,826	89,110
17	Other Industries	67,424	67,540
18	Printing, Publishing, and Allied Industries	61,159	61,159
19	Miscellaneous Manufacturing Industries	47,722	56,372
20	Petroleum Terminals	24,216	24,216
21	RCRA Regulated Treatment, Disposal, or Recycling Sites	22,492	45,341
22	Leather and Leather Products	21,232	21,232
23	Chemical Distributors	985	985
California			
1	Petroleum Refining and Related Industries	7,034,534	9,745,237
2	Chemicals and Allied Products	3,205,540	3,710,449
3	Fabricated Metal Products	3,043,172	3,060,978

Table 6: Statewide TRI Emissions by Industry, 1998 Data

Rank by Air Emissions	Industry	Air Emissions (pounds)	Total Releases (pounds)
4	Food and Kindred Products	2,966,897	3,435,947
5	Rubber and Miscellaneous Plastics Products	2,807,975	2,808,020
6	Transportation Equipment	2,274,954	2,278,370
7	Stone, Clay, Glass, and Concrete Products	1,413,599	1,587,682
8	Lumber and Wood Products, Except Furniture	729,548	740,913
9	Paper and Allied Products	640,998	1,901,395
10	Printing, Publishing, and Allied Industries	497,240	497,240
11	Primary Metal Industries	488,042	1,033,769
12	Petroleum Terminals	470,307	472,422
13	Electronic and Other Electric Equipment	445,495	446,509
14	Electric Utilities	385,620	532,937
15	Furniture and Fixtures	370,140	370,140
16	Metal Mining, except Iron Ores and Uranium	362,004	8,735,327
17	Miscellaneous Manufacturing Industries	290,082	375,425
18	National Security and International Affairs	187,837	187,985
19	Textile Mill Products	180,289	180,316
20	Chemical Distributors	106,527	106,528
21	Instruments and Related Products	100,184	100,185
22	Machinery, Except Electrical	50,921	64,666
23	Leather and Leather Products	38,022	38,027
24	RCRA Regulated Treatment, Disposal, or Recycling Sites	29,119	20,151,312
25	Solvent Recyclers	23,904	23,904
26	Other Industries	12,985	12,987
Colorado			
1	Electric Utilities	1,912,616	5,069,056
2	Fabricated Metal Products	1,063,227	1,065,549
3	Stone, Clay, Glass, and Concrete Products	355,790	355,790
4	Chemicals and Allied Products	327,084	343,128
5	Rubber and Miscellaneous Plastics Products	308,396	308,396
6	Food and Kindred Products	204,259	679,705
7	Petroleum Refining and Related Industries	145,343	162,128
8	Instruments and Related Products	131,718	650,942
9	Primary Metal Industries	100,573	129,773
10	Petroleum Terminals	79,668	114,573
11	Paper and Allied Products	76,600	76,600
12	Lumber and Wood Products, Except Furniture	74,785	74,816
13	Electronic and Other Electric Equipment	74,162	74,162
14	Transportation Equipment	40,462	40,462
15	Machinery, Except Electrical	29,381	29,381
16	Furniture and Fixtures	22,189	22,189
17	Textile Mill Products	16,000	16,000
18	Chemical Distributors	11,712	11,712
19	Metal Mining, except Iron Ores and Uranium	10,768	14,310,777
20	Miscellaneous Manufacturing Industries	5,831	5,831
21	Other Industries	3,634	3,634
22	Coal Mining, except Extraction Activities	419	1,593,746

Table 6: Statewide TRI Emissions by Industry, 1998 Data

Rank by Air Emissions	Industry	Air Emissions (pounds)	Total Releases (pounds)
23	National Security and International Affairs	0	249
Connecticut			
1	Chemicals and Allied Products	1,664,551	2,100,831
2	Electric Utilities	1,259,018	1,259,057
3	Rubber and Miscellaneous Plastics Products	781,698	781,786
4	Fabricated Metal Products	667,588	750,504
5	Primary Metal Industries	359,577	476,287
6	Textile Mill Products	293,632	293,634
7	Electronic and Other Electric Equipment	236,864	259,412
8	Instruments and Related Products	198,232	198,492
9	Petroleum Terminals	177,468	177,513
10	Transportation Equipment	176,635	203,866
11	Paper and Allied Products	171,417	173,907
12	Machinery, Except Electrical	141,408	141,663
13	Furniture and Fixtures	44,200	44,200
14	Printing, Publishing, and Allied Industries	36,765	36,765
15	Miscellaneous Manufacturing Industries	23,749	23,986
16	Food and Kindred Products	9,212	32,462
17	Chemical Distributors	7,408	7,408
18	Stone, Clay, Glass, and Concrete Products	6,884	6,884
19	Lumber and Wood Products, Except Furniture	500	500
20	Petroleum Refining and Related Industries	250	250
21	RCRA Regulated Treatment, Disposal, or Recycling Sites	0	0
21	Other Industries	0	0
Delaware			
1	Electric Utilities	6,818,633	7,468,952
2	Petroleum Refining and Related Industries	1,580,497	1,919,578
3	Chemicals and Allied Products	1,220,718	1,895,409
4	Transportation Equipment	863,321	863,321
5	Food and Kindred Products	335,200	396,776
6	Textile Mill Products	91,858	91,858
7	Lumber and Wood Products, Except Furniture	52,315	52,315
8	Rubber and Miscellaneous Plastics Products	50,153	50,153
9	Furniture and Fixtures	29,203	29,203
10	Metal Mining, except Iron Ores and Uranium	11,963	11,963
11	Primary Metal Industries	11,224	12,165
12	Petroleum Terminals	2,100	2,100
13	Miscellaneous Manufacturing Industries	1,967	1,967
14	Instruments and Related Products	1,000	1,000
15	Fabricated Metal Products	479	479
16	Electronic and Other Electric Equipment	297	297
17	Paper and Allied Products	250	18,500
18	Machinery, Except Electrical	10	10

Table 6: Statewide TRI Emissions by Industry, 1998 Data

Rank by Air Emissions	Industry	Air Emissions (pounds)	Total Releases (pounds)
District of Columbia			
1	Electric Utilities	66,250	66,250
2	Other Industries	2,700	11,506
3	Printing, Publishing, and Allied Industries	0	0
Florida			
1	Electric Utilities	57,992,319	66,487,509
2	Paper and Allied Products	10,573,593	11,719,283
3	Chemicals and Allied Products	6,817,820	45,558,126
4	Transportation Equipment	3,746,157	3,748,614
5	Rubber and Miscellaneous Plastics Products	3,125,916	3,125,916
6	Fabricated Metal Products	2,851,155	2,851,641
7	Food and Kindred Products	2,747,749	6,844,074
8	Other Industries	348,521	379,594
9	Miscellaneous Manufacturing Industries	316,503	316,503
10	Instruments and Related Products	221,672	221,672
11	Furniture and Fixtures	208,321	208,321
12	Petroleum Terminals	151,682	153,881
13	Primary Metal Industries	114,561	140,405
14	Stone, Clay, Glass, and Concrete Products	108,201	118,981
15	Lumber and Wood Products, Except Furniture	106,572	107,240
16	National Security and International Affairs	103,236	103,236
17	Electronic and Other Electric Equipment	103,218	103,935
18	Printing, Publishing, and Allied Industries	84,180	84,180
19	Chemical Distributors	84,042	84,102
20	Machinery, Except Electrical	29,038	29,038
21	RCRA Regulated Treatment, Disposal, or Recycling Sites	18,103	27,943
22	Leather and Leather Products	9,670	9,670
23	Petroleum Refining and Related Industries	2,071	2,071
24	Textile Mill Products	1,761	1,761
25	Solvent Recyclers	6	6
26	Metal Mining, except Iron Ores and Uranium	0	0
Georgia			
1	Electric Utilities	47,191,872	58,465,758
2	Paper and Allied Products	16,717,701	19,164,367
3	Chemicals and Allied Products	6,037,048	9,189,655
4	Transportation Equipment	5,990,803	6,043,435
5	Stone, Clay, Glass, and Concrete Products	5,242,337	7,450,111
6	Rubber and Miscellaneous Plastics Products	3,254,529	3,264,073
7	Lumber and Wood Products, Except Furniture	1,878,951	1,879,844
8	Food and Kindred Products	1,878,144	1,958,892
9	Fabricated Metal Products	1,590,899	1,596,156
10	Printing, Publishing, and Allied Industries	833,075	833,075
11	Machinery, Except Electrical	742,737	746,259

Table 6: Statewide TRI Emissions by Industry, 1998 Data

Rank by Air Emissions	Industry	Air Emissions (pounds)	Total Releases (pounds)
12	Primary Metal Industries	646,939	729,269
13	National Security and International Affairs	372,404	373,061
14	Furniture and Fixtures	371,354	371,354
15	Textile Mill Products	354,969	646,585
16	Electronic and Other Electric Equipment	211,830	227,472
17	Tobacco Manufacturers	172,718	172,718
18	Miscellaneous Manufacturing Industries	111,897	112,131
19	Apparel and Other Finished Fabric Products	69,699	69,699
20	Other Industries	47,498	155,598
21	Instruments and Related Products	44,355	44,355
22	Chemical Distributors	35,448	35,448
23	Petroleum Terminals	34,607	35,152
24	Petroleum Refining and Related Industries	29,804	32,863
25	Solvent Recyclers	17,488	17,488
26	Leather and Leather Products	11,376	11,376
Hawaii			
1	Electric Utilities	3,133,022	3,133,022
2	Petroleum Refining and Related Industries	240,766	246,173
3	Fabricated Metal Products	109,162	109,162
4	Petroleum Terminals	56,407	56,407
5	National Security and International Affairs	26,188	27,186
6	Food and Kindred Products	0	33,135
6	Lumber and Wood Products, Except Furniture	0	0
6	Chemicals and Allied Products	0	0
6	Other Industries	0	0
Illinois			
1	Electric Utilities	32,126,653	36,919,395
2	Chemicals and Allied Products	17,869,696	20,731,428
3	Food and Kindred Products	10,939,024	14,312,476
4	Rubber and Miscellaneous Plastics Products	7,874,762	7,892,248
5	Fabricated Metal Products	4,862,162	4,923,330
6	Primary Metal Industries	3,079,795	22,407,767
7	Petroleum Refining and Related Industries	2,527,030	2,752,174
8	Transportation Equipment	2,450,163	2,450,544
9	Printing, Publishing, and Allied Industries	2,310,916	2,310,916
10	Machinery, Except Electrical	1,940,822	1,972,639
11	Paper and Allied Products	1,298,325	1,298,325
12	Stone, Clay, Glass, and Concrete Products	765,501	795,761
13	Miscellaneous Manufacturing Industries	426,913	426,913
14	Electronic and Other Electric Equipment	398,788	420,296
15	Lumber and Wood Products, Except Furniture	279,762	281,364
16	Furniture and Fixtures	224,142	224,142
17	Textile Mill Products	151,309	151,309
18	Leather and Leather Products	143,577	143,577

Table 6: Statewide TRI Emissions by Industry, 1998 Data

Rank by Air Emissions	Industry	Air Emissions (pounds)	Total Releases (pounds)
19	Petroleum Terminals	108,746	110,475
20	Solvent Recyclers	51,735	51,735
21	Chemical Distributors	36,143	36,179
22	RCRA Regulated Treatment, Disposal, or Recycling Sites	30,538	21,811,771
23	Instruments and Related Products	21,625	21,625
24	Metal Mining, except Iron Ores and Uranium	16,521	16,521
25	Other Industries	15,135	15,400
26	Coal Mining, except Extraction Activities	1,780	2,727,616
27	Tobacco Manufacturers	53	53
28	National Security and International Affairs	16	135
29	Apparel and Other Finished Fabric Products	0	0
Indiana			
1	Electric Utilities	44,326,731	61,049,964
2	Primary Metal Industries	10,123,727	26,062,496
3	Rubber and Miscellaneous Plastics Products	9,369,960	9,535,530
4	Transportation Equipment	7,866,202	7,875,967
5	Chemicals and Allied Products	4,925,717	5,889,699
6	Fabricated Metal Products	4,703,741	4,719,763
7	Food and Kindred Products	3,361,003	3,367,263
8	Petroleum Refining and Related Industries	2,091,357	2,201,443
9	Paper and Allied Products	1,439,039	1,446,683
10	Lumber and Wood Products, Except Furniture	1,417,695	1,430,595
11	Electronic and Other Electric Equipment	1,352,557	1,353,521
12	Miscellaneous Manufacturing Industries	1,337,524	1,344,022
13	Stone, Clay, Glass, and Concrete Products	1,315,015	1,648,112
14	Furniture and Fixtures	1,092,049	1,092,055
15	Printing, Publishing, and Allied Industries	1,026,059	1,026,379
16	Machinery, Except Electrical	755,396	761,820
17	Instruments and Related Products	355,338	355,338
18	Petroleum Terminals	175,042	176,284
19	Other Industries	173,558	174,777
20	Chemical Distributors	37,540	37,540
21	Textile Mill Products	36,366	36,366
22	RCRA Regulated Treatment, Disposal, or Recycling Sites	30,732	1,289,340
23	Coal Mining, except Extraction Activities	18,465	75,371
24	Solvent Recyclers	7,935	7,935
25	National Security and International Affairs	120	120
26	Apparel and Other Finished Fabric Products	0	0
Iowa			
1	Chemicals and Allied Products	9,681,809	10,456,698
2	Electric Utilities	8,696,569	12,656,829
3	Food and Kindred Products	6,470,022	8,907,445
4	Rubber and Miscellaneous Plastics Products	1,998,845	2,123,343
5	Electronic and Other Electric Equipment	1,197,609	1,200,493

Table 6: Statewide TRI Emissions by Industry, 1998 Data

Rank by Air Emissions	Industry	Air Emissions (pounds)	Total Releases (pounds)
6	Machinery, Except Electrical	1,191,295	1,196,013
7	Fabricated Metal Products	980,430	1,290,607
8	Transportation Equipment	827,727	829,442
9	Primary Metal Industries	707,613	2,344,882
10	Furniture and Fixtures	585,038	585,038
11	Paper and Allied Products	561,999	562,499
12	Miscellaneous Manufacturing Industries	409,950	409,980
13	Lumber and Wood Products, Except Furniture	342,120	342,120
14	Printing, Publishing, and Allied Industries	323,250	323,250
15	Stone, Clay, Glass, and Concrete Products	253,399	356,031
16	Chemical Distributors	13,902	16,121
17	National Security and International Affairs	11,599	11,599
18	Leather and Leather Products	11,105	11,105
19	Other Industries	11,000	15,350
20	Petroleum Terminals	9,935	9,935
21	Instruments and Related Products	8,386	8,386
22	Petroleum Refining and Related Industries	2,277	2,277
23	Solvent Recyclers	10	10
Kansas			
1	Electric Utilities	5,002,491	11,423,885
2	Chemicals and Allied Products	4,984,846	6,811,501
3	Transportation Equipment	4,047,178	4,097,925
4	Petroleum Refining and Related Industries	2,380,771	2,401,675
5	Food and Kindred Products	1,592,179	1,710,961
6	Stone, Clay, Glass, and Concrete Products	1,329,548	1,519,813
7	Paper and Allied Products	1,058,489	1,062,789
8	Fabricated Metal Products	978,484	997,057
9	Machinery, Except Electrical	895,473	896,748
10	Rubber and Miscellaneous Plastics Products	810,288	811,339
11	Other Industries	359,863	359,863
12	Lumber and Wood Products, Except Furniture	338,875	338,875
13	Instruments and Related Products	325,650	325,655
14	Miscellaneous Manufacturing Industries	157,332	157,332
15	Primary Metal Industries	116,481	961,904
16	Electronic and Other Electric Equipment	88,183	90,737
17	Furniture and Fixtures	28,769	28,769
18	Petroleum Terminals	28,055	29,075
19	RCRA Regulated Treatment, Disposal, or Recycling Sites	17,113	17,113
20	Printing, Publishing, and Allied Industries	12,769	12,769
21	Chemical Distributors	5,350	5,350
22	National Security and International Affairs	0	0
22	Solvent Recyclers	0	0
22	Apparel and Other Finished Fabric Products	0	0
Kentucky			

Table 6: Statewide TRI Emissions by Industry, 1998 Data

Rank by Air Emissions	Industry	Air Emissions (pounds)	Total Releases (pounds)
1	Electric Utilities	44,786,767	58,320,131
2	Chemicals and Allied Products	10,011,414	10,462,683
3	Rubber and Miscellaneous Plastics Products	4,982,859	5,023,737
4	Transportation Equipment	4,495,395	4,620,209
5	Paper and Allied Products	2,871,736	3,498,700
6	Primary Metal Industries	2,186,278	4,319,234
7	Printing, Publishing, and Allied Industries	1,172,438	1,172,438
8	Electronic and Other Electric Equipment	1,053,462	1,057,065
9	Food and Kindred Products	950,213	950,223
10	Fabricated Metal Products	936,106	958,100
11	Petroleum Refining and Related Industries	576,720	622,907
12	Machinery, Except Electrical	390,830	391,808
13	Stone, Clay, Glass, and Concrete Products	319,069	764,987
14	Miscellaneous Manufacturing Industries	283,810	284,060
15	Furniture and Fixtures	228,148	228,148
16	Lumber and Wood Products, Except Furniture	179,923	181,057
17	RCRA Regulated Treatment, Disposal, or Recycling Sites	41,600	1,141,699
18	Textile Mill Products	36,670	36,670
19	Petroleum Terminals	33,309	33,309
20	Chemical Distributors	29,946	29,946
21	Leather and Leather Products	15,350	15,350
22	Coal Mining, except Extraction Activities	14,688	19,588
23	Instruments and Related Products	11,630	11,630
24	Tobacco Manufacturers	5,586	5,586
25	Other Industries	53	14,132
26	National Security and International Affairs	5	10
27	Solvent Recyclers	4	4
28	Apparel and Other Finished Fabric Products	0	5
Louisiana			
1	Chemicals and Allied Products	45,403,040	135,882,800
2	Paper and Allied Products	19,333,829	22,528,491
3	Petroleum Refining and Related Industries	6,408,028	10,345,760
4	Electric Utilities	4,197,816	8,797,845
5	Transportation Equipment	1,038,908	1,042,556
6	Food and Kindred Products	733,240	1,004,382
7	Fabricated Metal Products	571,536	577,661
8	Lumber and Wood Products, Except Furniture	528,718	529,472
9	Rubber and Miscellaneous Plastics Products	188,423	188,426
10	Other Industries	133,549	133,799
11	Primary Metal Industries	101,744	208,546
12	Electronic and Other Electric Equipment	60,066	60,119
13	Chemical Distributors	44,898	44,898
14	Furniture and Fixtures	17,370	17,370
15	Printing, Publishing, and Allied Industries	13,890	14,420
16	Petroleum Terminals	9,389	9,392
17	Machinery, Except Electrical	2,259	2,264

Table 6: Statewide TRI Emissions by Industry, 1998 Data

Rank by Air Emissions	Industry	Air Emissions (pounds)	Total Releases (pounds)
18	RCRA Regulated Treatment, Disposal, or Recycling Sites	1,581	4,335,444
19	Stone, Clay, Glass, and Concrete Products	505	505
20	Instruments and Related Products	172	229
21	Solvent Recyclers	2	2
22	National Security and International Affairs	0	127
Maine			
1	Paper and Allied Products	5,634,216	7,540,363
2	Lumber and Wood Products, Except Furniture	247,653	274,673
3	Leather and Leather Products	209,265	209,265
4	Rubber and Miscellaneous Plastics Products	162,388	162,388
5	Transportation Equipment	93,111	117,189
6	Petroleum Terminals	50,787	50,789
7	Electronic and Other Electric Equipment	47,619	47,645
8	Electric Utilities	43,001	43,001
9	Food and Kindred Products	33,522	33,522
10	Chemicals and Allied Products	30,235	30,296
11	Printing, Publishing, and Allied Industries	26,600	26,600
12	Apparel and Other Finished Fabric Products	20,477	20,477
13	Fabricated Metal Products	13,128	13,271
14	Stone, Clay, Glass, and Concrete Products	2,724	3,643
15	Chemical Distributors	347	347
16	Machinery, Except Electrical	20	30
17	Textile Mill Products	0	0
17	National Security and International Affairs	0	0
Maryland			
1	Electric Utilities	24,749,607	25,026,614
2	Chemicals and Allied Products	2,061,249	4,864,682
3	Paper and Allied Products	1,556,348	1,565,148
4	Primary Metal Industries	846,698	2,150,208
5	Transportation Equipment	820,024	825,739
6	Rubber and Miscellaneous Plastics Products	594,041	594,041
7	Fabricated Metal Products	568,252	568,252
8	Food and Kindred Products	482,559	504,543
9	Stone, Clay, Glass, and Concrete Products	382,098	385,398
10	Instruments and Related Products	340,461	340,461
11	Leather and Leather Products	252,706	314,463
12	Printing, Publishing, and Allied Industries	224,414	224,414
13	Petroleum Terminals	89,175	90,891
14	Textile Mill Products	22,396	22,396
15	Furniture and Fixtures	15,288	15,288
16	Electronic and Other Electric Equipment	13,783	14,538
17	Coal Mining, except Extraction Activities	13,313	60,023
18	Machinery, Except Electrical	4,566	4,566
19	Other Industries	1,705	82,705

Table 6: Statewide TRI Emissions by Industry, 1998 Data

Rank by Air Emissions	Industry	Air Emissions (pounds)	Total Releases (pounds)
20	Miscellaneous Manufacturing Industries	1,000	1,000
21	Petroleum Refining and Related Industries	515	515
22	Chemical Distributors	260	260
23	Lumber and Wood Products, Except Furniture	30	30
24	Solvent Recyclers	6	6
25	National Security and International Affairs	2	79,607
Massachusetts			
1	Electric Utilities	5,639,923	5,679,789
2	Chemicals and Allied Products	1,049,820	1,052,607
3	Fabricated Metal Products	809,618	809,761
4	Rubber and Miscellaneous Plastics Products	629,526	630,304
5	Textile Mill Products	618,995	618,995
6	Paper and Allied Products	617,455	618,205
7	Petroleum Terminals	237,434	246,902
8	Electronic and Other Electric Equipment	198,432	245,482
9	Instruments and Related Products	181,416	183,046
10	Leather and Leather Products	167,904	167,904
11	Miscellaneous Manufacturing Industries	135,645	135,655
12	Primary Metal Industries	111,753	111,933
13	Stone, Clay, Glass, and Concrete Products	93,962	93,962
14	Furniture and Fixtures	75,546	75,546
15	Transportation Equipment	44,365	45,898
16	Machinery, Except Electrical	43,448	44,477
17	Printing, Publishing, and Allied Industries	18,693	18,693
18	Chemical Distributors	17,321	17,321
19	RCRA Regulated Treatment, Disposal, or Recycling Sites	4,980	4,985
20	Other Industries	4,626	4,626
21	Food and Kindred Products	200	200
22	Lumber and Wood Products, Except Furniture	30	35
23	Solvent Recyclers	6	6
24	Petroleum Refining and Related Industries	0	0
Michigan			
1	Electric Utilities	33,812,186	43,554,530
2	Transportation Equipment	13,997,378	14,010,076
3	Paper and Allied Products	6,349,972	7,070,366
4	Stone, Clay, Glass, and Concrete Products	4,811,168	5,242,443
5	Chemicals and Allied Products	3,545,319	7,108,776
6	Furniture and Fixtures	2,570,221	2,575,651
7	Rubber and Miscellaneous Plastics Products	2,230,119	2,231,295
8	Lumber and Wood Products, Except Furniture	1,706,714	1,730,364
9	Primary Metal Industries	1,560,787	2,752,411
10	Fabricated Metal Products	1,236,449	1,260,524
11	Food and Kindred Products	1,118,169	1,184,525
12	Machinery, Except Electrical	680,910	680,955

Table 6: Statewide TRI Emissions by Industry, 1998 Data

Rank by Air Emissions	Industry	Air Emissions (pounds)	Total Releases (pounds)
13	Miscellaneous Manufacturing Industries	441,506	441,506
14	Leather and Leather Products	261,564	261,574
15	Petroleum Refining and Related Industries	227,452	260,385
16	Petroleum Terminals	130,038	130,069
17	RCRA Regulated Treatment, Disposal, or Recycling Sites	117,098	8,375,998
18	Electronic and Other Electric Equipment	111,011	111,016
19	Textile Mill Products	55,875	55,875
20	Printing, Publishing, and Allied Industries	55,237	55,237
21	Chemical Distributors	28,177	28,177
22	Apparel and Other Finished Fabric Products	17,571	17,576
23	Solvent Recyclers	9,075	9,075
24	Other Industries	1,286	1,425
25	Instruments and Related Products	750	750
Minnesota			
1	Food and Kindred Products	2,471,941	2,581,170
2	Paper and Allied Products	2,306,220	2,615,220
3	Transportation Equipment	2,084,428	2,085,247
4	Fabricated Metal Products	2,009,431	2,009,586
5	Electric Utilities	1,751,834	11,867,980
6	Lumber and Wood Products, Except Furniture	1,386,988	1,387,008
7	Rubber and Miscellaneous Plastics Products	1,227,036	1,227,041
8	Chemicals and Allied Products	793,297	852,448
9	Electronic and Other Electric Equipment	653,964	654,367
10	Machinery, Except Electrical	635,283	635,283
11	Petroleum Refining and Related Industries	594,118	1,214,565
12	Stone, Clay, Glass, and Concrete Products	409,731	409,731
13	Instruments and Related Products	391,361	391,361
14	Primary Metal Industries	280,309	280,778
15	Furniture and Fixtures	147,723	147,723
16	Printing, Publishing, and Allied Industries	131,913	131,913
17	Leather and Leather Products	116,059	116,059
18	Miscellaneous Manufacturing Industries	103,197	103,197
19	Textile Mill Products	95,213	95,213
20	Other Industries	66,510	66,510
21	Chemical Distributors	18,019	18,029
22	Petroleum Terminals	3,110	3,110
23	RCRA Regulated Treatment, Disposal, or Recycling Sites	342	342
24	Solvent Recyclers	3	3
Mississippi			
1	Electric Utilities	9,271,476	11,304,718
2	Paper and Allied Products	7,790,901	9,068,544
3	Chemicals and Allied Products	5,592,785	22,373,062
4	Rubber and Miscellaneous Plastics Products	4,505,564	4,509,688
5	Lumber and Wood Products, Except Furniture	3,537,007	3,544,507

Table 6: Statewide TRI Emissions by Industry, 1998 Data

Rank by Air Emissions	Industry	Air Emissions (pounds)	Total Releases (pounds)
6	Petroleum Refining and Related Industries	3,470,264	3,709,467
7	Textile Mill Products	2,218,010	2,292,010
8	Food and Kindred Products	2,207,400	3,161,441
9	Printing, Publishing, and Allied Industries	1,445,780	1,445,780
10	Fabricated Metal Products	1,287,562	1,358,011
11	Transportation Equipment	830,608	832,138
12	Furniture and Fixtures	536,987	536,987
13	Miscellaneous Manufacturing Industries	498,076	499,326
14	Machinery, Except Electrical	479,808	480,162
15	Electronic and Other Electric Equipment	386,684	386,993
16	Stone, Clay, Glass, and Concrete Products	338,841	357,851
17	Primary Metal Industries	288,929	4,644,440
18	Petroleum Terminals	28,585	28,621
19	Instruments and Related Products	17,325	17,325
20	Chemical Distributors	7,961	7,961
21	Apparel and Other Finished Fabric Products	2,950	2,950
22	Other Industries	1,460	1,460
23	Solvent Recyclers	2	2
Missouri			
1	Electric Utilities	12,983,638	32,430,345
2	Chemicals and Allied Products	10,573,941	12,442,843
3	Transportation Equipment	7,463,155	7,504,036
4	Rubber and Miscellaneous Plastics Products	2,549,674	2,578,220
5	Food and Kindred Products	2,538,279	3,519,001
6	Primary Metal Industries	1,909,657	20,965,916
7	Fabricated Metal Products	1,608,246	1,658,447
8	Printing, Publishing, and Allied Industries	965,797	965,797
9	Machinery, Except Electrical	717,489	717,504
10	Electronic and Other Electric Equipment	658,283	678,166
11	Stone, Clay, Glass, and Concrete Products	620,868	942,886
12	Furniture and Fixtures	166,101	166,111
13	Metal Mining, except Iron Ores and Uranium	139,670	47,281,863
14	Leather and Leather Products	86,544	86,559
15	Petroleum Terminals	67,900	67,930
16	Miscellaneous Manufacturing Industries	63,950	63,950
17	Chemical Distributors	63,269	63,292
18	Instruments and Related Products	57,704	57,704
19	Lumber and Wood Products, Except Furniture	57,598	57,999
20	Petroleum Refining and Related Industries	33,607	39,262
21	Paper and Allied Products	32,000	32,000
22	Other Industries	25,275	25,285
23	RCRA Regulated Treatment, Disposal, or Recycling Sites	11,534	29,103
24	National Security and International Affairs	506	506
25	Textile Mill Products	474	474
26	Solvent Recyclers	18	18

Table 6: Statewide TRI Emissions by Industry, 1998 Data

Rank by Air Emissions	Industry	Air Emissions (pounds)	Total Releases (pounds)
Montana			
1	Paper and Allied Products	1,993,585	2,073,510
2	Electric Utilities	950,655	7,780,776
3	Lumber and Wood Products, Except Furniture	860,479	860,479
4	Petroleum Refining and Related Industries	470,604	481,083
5	Primary Metal Industries	415,123	42,534,316
6	Food and Kindred Products	272,100	286,600
7	Metal Mining, except Iron Ores and Uranium	143,173	68,423,630
8	Chemicals and Allied Products	65,242	67,540
9	Miscellaneous Manufacturing Industries	39,900	39,900
10	Stone, Clay, Glass, and Concrete Products	32,869	32,869
11	Petroleum Terminals	23,586	23,586
12	Chemical Distributors	1,907	1,907
13	Fabricated Metal Products	0	0
Nebraska			
1	Electric Utilities	4,086,255	7,818,322
2	Rubber and Miscellaneous Plastics Products	1,324,136	1,324,581
3	Food and Kindred Products	1,306,233	2,846,875
4	Chemicals and Allied Products	1,201,777	2,160,617
5	Fabricated Metal Products	648,684	666,224
6	Machinery, Except Electrical	582,695	582,695
7	Transportation Equipment	408,475	415,873
8	Instruments and Related Products	273,016	273,016
9	Stone, Clay, Glass, and Concrete Products	244,786	244,791
10	Furniture and Fixtures	117,126	117,126
11	Primary Metal Industries	83,271	83,737
12	Electronic and Other Electric Equipment	59,281	59,781
13	Lumber and Wood Products, Except Furniture	39,047	39,047
14	Leather and Leather Products	27,423	27,423
15	Printing, Publishing, and Allied Industries	22,000	22,000
16	RCRA Regulated Treatment, Disposal, or Recycling Sites	16,001	184,695
17	Chemical Distributors	557	557
18	Textile Mill Products	255	255
19	Solvent Recyclers	2	2
20	Other Industries	0	536,996
Nevada			
1	Metal Mining, except Iron Ores and Uranium	1,453,263	1,292,067,877
2	Electric Utilities	1,151,501	2,235,963
3	Printing, Publishing, and Allied Industries	580,572	580,572
4	Rubber and Miscellaneous Plastics Products	512,477	512,477
5	Chemicals and Allied Products	430,148	2,720,014
6	Primary Metal Industries	142,125	273,728

Table 6: Statewide TRI Emissions by Industry, 1998 Data

Rank by Air Emissions	Industry	Air Emissions (pounds)	Total Releases (pounds)
7	Fabricated Metal Products	23,636	23,636
8	Petroleum Refining and Related Industries	19,615	19,615
9	Lumber and Wood Products, Except Furniture	19,221	19,221
10	Electronic and Other Electric Equipment	17,259	17,259
11	Transportation Equipment	4,705	4,705
12	RCRA Regulated Treatment, Disposal, or Recycling Sites	1,865	1,323,065
13	Machinery, Except Electrical	505	505
14	Chemical Distributors	475	475
15	Food and Kindred Products	259	259
16	Miscellaneous Manufacturing Industries	0	0
New Hampshire			
1	Electric Utilities	4,026,179	4,047,879
2	Paper and Allied Products	883,892	1,078,606
3	Rubber and Miscellaneous Plastics Products	702,589	702,619
4	Fabricated Metal Products	188,559	189,931
5	Primary Metal Industries	121,808	122,396
6	Textile Mill Products	104,109	104,109
7	Electronic and Other Electric Equipment	93,827	94,499
8	Machinery, Except Electrical	52,618	52,618
9	Miscellaneous Manufacturing Industries	43,619	43,619
10	Transportation Equipment	34,223	34,223
11	Leather and Leather Products	26,191	26,191
12	Chemicals and Allied Products	21,155	33,491
13	Printing, Publishing, and Allied Industries	12,858	12,858
14	Instruments and Related Products	11,000	11,005
15	Furniture and Fixtures	1,058	1,058
16	Stone, Clay, Glass, and Concrete Products	1,000	1,000
17	Chemical Distributors	504	504
18	Food and Kindred Products	5	5
19	Lumber and Wood Products, Except Furniture	0	0
New Jersey			
1	Electric Utilities	7,529,062	7,877,531
2	Chemicals and Allied Products	2,636,573	6,719,146
3	Transportation Equipment	1,445,923	1,450,903
4	Primary Metal Industries	1,427,166	1,618,524
5	Petroleum Refining and Related Industries	1,147,731	3,280,354
6	Fabricated Metal Products	1,049,725	1,066,927
7	Paper and Allied Products	447,151	447,151
8	Rubber and Miscellaneous Plastics Products	438,409	454,185
9	Petroleum Terminals	296,064	296,601
10	Printing, Publishing, and Allied Industries	168,427	168,427
11	Stone, Clay, Glass, and Concrete Products	161,478	188,580
12	Chemical Distributors	144,514	144,519
13	Food and Kindred Products	124,310	124,310

Table 6: Statewide TRI Emissions by Industry, 1998 Data

Rank by Air Emissions	Industry	Air Emissions (pounds)	Total Releases (pounds)
14	Machinery, Except Electrical	70,819	71,069
15	Textile Mill Products	62,479	62,479
16	Instruments and Related Products	48,164	48,164
17	Electronic and Other Electric Equipment	25,656	28,806
18	Lumber and Wood Products, Except Furniture	21,492	21,492
19	Other Industries	21,467	21,467
20	Solvent Recyclers	18,237	18,237
21	Leather and Leather Products	12,495	12,495
22	Furniture and Fixtures	12,420	12,420
23	RCRA Regulated Treatment, Disposal, or Recycling Sites	7,192	7,933
24	Miscellaneous Manufacturing Industries	6,538	6,538
New Mexico			
1	Petroleum Refining and Related Industries	1,029,244	1,062,226
2	Electric Utilities	711,363	1,897,520
3	Metal Mining, except Iron Ores and Uranium	332,059	222,178,779
4	Primary Metal Industries	282,109	22,777,936
5	Electronic and Other Electric Equipment	72,618	72,643
6	Chemicals and Allied Products	50,980	50,980
7	Petroleum Terminals	42,055	42,055
8	Transportation Equipment	31,178	31,951
9	Rubber and Miscellaneous Plastics Products	14,450	14,450
10	Food and Kindred Products	13,515	649,157
11	Fabricated Metal Products	12,476	12,476
12	Other Industries	11,033	29,751
13	Solvent Recyclers	5,990	5,990
14	Instruments and Related Products	5,388	5,388
15	Lumber and Wood Products, Except Furniture	4,570	4,570
16	Stone, Clay, Glass, and Concrete Products	2,814	5,842
17	Chemical Distributors	1,340	1,340
18	Coal Mining, except Extraction Activities	0	5,620,000
18	National Security and International Affairs	0	0
18	Paper and Allied Products	0	0
New York			
1	Electric Utilities	16,100,588	18,192,033
2	Instruments and Related Products	5,711,086	6,398,900
3	Chemicals and Allied Products	3,148,783	3,284,253
4	Paper and Allied Products	2,350,346	8,167,890
5	Fabricated Metal Products	2,275,689	2,281,922
6	Primary Metal Industries	1,696,749	1,772,962
7	Other Industries	1,673,426	1,674,716
8	Stone, Clay, Glass, and Concrete Products	1,314,367	1,346,195
9	Printing, Publishing, and Allied Industries	842,198	842,198
10	Rubber and Miscellaneous Plastics Products	804,835	807,391
11	Electronic and Other Electric Equipment	481,221	949,928

Table 6: Statewide TRI Emissions by Industry, 1998 Data

Rank by Air Emissions	Industry	Air Emissions (pounds)	Total Releases (pounds)
12	Food and Kindred Products	360,910	973,628
13	Machinery, Except Electrical	332,412	333,725
14	Petroleum Terminals	302,039	302,866
15	Transportation Equipment	288,817	454,991
16	Miscellaneous Manufacturing Industries	240,756	246,938
17	Furniture and Fixtures	174,594	174,594
18	Lumber and Wood Products, Except Furniture	114,115	114,231
19	Metal Mining, except Iron Ores and Uranium	65,560	10,144,538
20	Textile Mill Products	37,820	37,820
21	Leather and Leather Products	18,194	18,194
22	Chemical Distributors	16,473	16,473
23	Solvent Recyclers	909	909
24	National Security and International Affairs	427	452
25	Petroleum Refining and Related Industries	425	425
26	RCRA Regulated Treatment, Disposal, or Recycling Sites	13	6,231,909
North Carolina			
1	Electric Utilities	48,387,026	56,791,632
2	Paper and Allied Products	11,923,841	13,405,958
3	Chemicals and Allied Products	7,862,372	27,571,390
4	Rubber and Miscellaneous Plastics Products	5,000,510	5,030,134
5	Furniture and Fixtures	3,858,574	3,858,574
6	Transportation Equipment	2,484,204	2,484,996
7	Textile Mill Products	2,357,822	2,388,811
8	Lumber and Wood Products, Except Furniture	2,263,601	2,282,487
9	Food and Kindred Products	2,096,453	6,628,787
10	Stone, Clay, Glass, and Concrete Products	1,914,527	1,932,940
11	Fabricated Metal Products	1,913,791	1,917,678
12	Tobacco Manufacturers	968,963	968,968
13	Primary Metal Industries	753,388	755,610
14	Printing, Publishing, and Allied Industries	417,161	417,161
15	Electronic and Other Electric Equipment	310,826	432,976
16	Instruments and Related Products	189,371	202,494
17	Leather and Leather Products	180,172	180,172
18	Petroleum Terminals	153,474	154,522
19	Miscellaneous Manufacturing Industries	128,518	128,523
20	Solvent Recyclers	66,663	66,663
21	Machinery, Except Electrical	51,581	57,695
22	National Security and International Affairs	32,872	33,232
23	Chemical Distributors	26,311	104,140
24	Other Industries	14,096	14,096
25	Petroleum Refining and Related Industries	255	255
26	RCRA Regulated Treatment, Disposal, or Recycling Sites	92	135
North Dakota			
1	Electric Utilities	1,404,407	10,155,778

Table 6: Statewide TRI Emissions by Industry, 1998 Data

Rank by Air Emissions	Industry	Air Emissions (pounds)	Total Releases (pounds)
2	Food and Kindred Products	1,282,462	1,325,365
3	Petroleum Refining and Related Industries	507,862	510,688
4	Machinery, Except Electrical	251,044	251,101
5	Miscellaneous Manufacturing Industries	134,847	134,847
6	Transportation Equipment	53,553	53,553
7	Rubber and Miscellaneous Plastics Products	25,755	25,755
8	Chemical Distributors	772	772
9	Chemicals and Allied Products	450	450
10	Coal Mining, except Extraction Activities	0	96,707
10	Lumber and Wood Products, Except Furniture	0	0
Ohio			
1	Electric Utilities	95,220,630	109,616,575
2	Chemicals and Allied Products	16,706,014	36,441,027
3	Primary Metal Industries	10,476,440	34,424,919
4	Rubber and Miscellaneous Plastics Products	7,516,207	7,889,976
5	Transportation Equipment	5,747,166	5,759,527
6	Paper and Allied Products	5,716,363	5,820,732
7	Fabricated Metal Products	5,650,222	5,707,006
8	Stone, Clay, Glass, and Concrete Products	3,951,562	4,231,979
9	Food and Kindred Products	2,240,702	2,361,952
10	Textile Mill Products	1,303,650	1,304,193
11	Electronic and Other Electric Equipment	1,101,882	1,104,035
12	Machinery, Except Electrical	1,011,000	1,012,467
13	Petroleum Refining and Related Industries	443,057	545,272
14	Lumber and Wood Products, Except Furniture	425,964	425,964
15	Miscellaneous Manufacturing Industries	373,458	373,458
16	Printing, Publishing, and Allied Industries	362,906	362,906
17	Solvent Recyclers	251,955	251,955
18	Furniture and Fixtures	235,991	235,991
19	Apparel and Other Finished Fabric Products	142,013	142,013
20	Petroleum Terminals	107,538	111,411
21	Chemical Distributors	91,269	91,299
22	Instruments and Related Products	66,994	67,074
23	RCRA Regulated Treatment, Disposal, or Recycling Sites	52,879	53,292,907
24	Other Industries	45,215	268,705
25	Coal Mining, except Extraction Activities	2,390	3,642
Oklahoma			
1	Chemicals and Allied Products	6,435,414	10,406,873
2	Electric Utilities	6,178,303	8,079,268
3	Paper and Allied Products	3,628,613	4,207,648
4	Petroleum Refining and Related Industries	1,638,808	1,717,804
5	Transportation Equipment	1,536,277	1,551,013
6	Fabricated Metal Products	881,255	948,067
7	Rubber and Miscellaneous Plastics Products	710,853	727,827

Table 6: Statewide TRI Emissions by Industry, 1998 Data

Rank by Air Emissions	Industry	Air Emissions (pounds)	Total Releases (pounds)
8	Food and Kindred Products	402,944	402,944
9	National Security and International Affairs	295,216	295,424
10	Lumber and Wood Products, Except Furniture	278,786	280,224
11	Machinery, Except Electrical	227,975	230,873
12	Stone, Clay, Glass, and Concrete Products	182,056	195,830
13	Instruments and Related Products	175,236	175,236
14	Electronic and Other Electric Equipment	174,384	174,634
15	Primary Metal Industries	142,226	194,261
16	Furniture and Fixtures	88,916	88,916
17	Petroleum Terminals	49,020	49,020
18	Printing, Publishing, and Allied Industries	47,157	47,157
19	Textile Mill Products	18,500	18,500
20	Chemical Distributors	11,281	11,281
21	Miscellaneous Manufacturing Industries	2,585	2,585
22	RCRA Regulated Treatment, Disposal, or Recycling Sites	1,737	7,753,500
Oregon			
1	Paper and Allied Products	6,894,997	7,406,148
2	Lumber and Wood Products, Except Furniture	2,252,344	2,494,218
3	Primary Metal Industries	1,412,787	4,305,123
4	Instruments and Related Products	1,118,410	1,118,410
5	Transportation Equipment	1,043,346	1,045,876
6	Chemicals and Allied Products	1,039,703	1,188,939
7	Rubber and Miscellaneous Plastics Products	961,364	961,648
8	Food and Kindred Products	659,390	903,714
9	Electronic and Other Electric Equipment	270,908	1,317,817
10	Miscellaneous Manufacturing Industries	214,511	214,511
11	Fabricated Metal Products	206,741	207,530
12	Electric Utilities	127,585	747,590
13	Stone, Clay, Glass, and Concrete Products	83,660	119,832
14	Petroleum Terminals	60,199	60,237
15	Furniture and Fixtures	48,194	48,194
16	Chemical Distributors	25,327	25,397
17	Leather and Leather Products	22,782	22,782
18	Petroleum Refining and Related Industries	19,226	19,226
19	Metal Mining, except Iron Ores and Uranium	10,460	18,189,856
20	RCRA Regulated Treatment, Disposal, or Recycling Sites	4,263	23,953,860
21	Machinery, Except Electrical	1,504	1,509
22	Printing, Publishing, and Allied Industries	1,146	1,146
23	Solvent Recyclers	2	2
24	Textile Mill Products	0	0
Pennsylvania			
1	Electric Utilities	58,857,300	64,730,536
2	Paper and Allied Products	6,979,236	8,653,459
3	Primary Metal Industries	5,999,102	51,223,716

Table 6: Statewide TRI Emissions by Industry, 1998 Data

Rank by Air Emissions	Industry	Air Emissions (pounds)	Total Releases (pounds)
4	Rubber and Miscellaneous Plastics Products	5,893,783	5,903,287
5	Chemicals and Allied Products	3,808,178	4,052,931
6	Petroleum Refining and Related Industries	2,812,649	3,005,987
7	Fabricated Metal Products	2,468,503	2,607,450
8	Stone, Clay, Glass, and Concrete Products	2,039,489	2,070,243
9	Printing, Publishing, and Allied Industries	1,839,262	1,839,483
10	Lumber and Wood Products, Except Furniture	1,489,010	1,523,762
11	Transportation Equipment	1,382,451	1,383,702
12	Miscellaneous Manufacturing Industries	1,103,777	1,104,527
13	Furniture and Fixtures	641,007	641,007
14	Machinery, Except Electrical	639,201	640,184
15	Electronic and Other Electric Equipment	469,355	485,345
16	Leather and Leather Products	318,527	332,199
17	Petroleum Terminals	216,828	218,995
18	Food and Kindred Products	192,028	291,098
19	Textile Mill Products	153,668	153,668
20	Tobacco Manufacturers	128,500	128,500
21	Instruments and Related Products	106,381	106,602
22	Chemical Distributors	41,652	41,662
23	Coal Mining, except Extraction Activities	36,853	318,563
24	Apparel and Other Finished Fabric Products	30,184	30,184
25	Other Industries	23,006	27,122
26	National Security and International Affairs	8,327	8,450
27	RCRA Regulated Treatment, Disposal, or Recycling Sites	5,410	4,503,220
28	Solvent Recyclers	42	42
Puerto Rico			
1	Electric Utilities	9,857,078	10,073,942
2	Chemicals and Allied Products	3,879,169	3,992,921
3	Petroleum Refining and Related Industries	963,613	981,668
4	Miscellaneous Manufacturing Industries	680,396	680,396
5	Fabricated Metal Products	279,416	279,416
6	Solvent Recyclers	264,929	264,929
7	Instruments and Related Products	74,719	74,719
8	Rubber and Miscellaneous Plastics Products	51,445	58,045
9	Leather and Leather Products	34,717	34,717
10	Electronic and Other Electric Equipment	33,608	33,613
11	Food and Kindred Products	26,516	26,516
12	Petroleum Terminals	21,796	21,796
13	Furniture and Fixtures	19,239	19,239
14	Machinery, Except Electrical	17,200	17,200
15	Chemical Distributors	13,851	24,640
16	Other Industries	9,766	9,766
17	Textile Mill Products	4,950	4,950
18	Primary Metal Industries	2,337	2,355
19	Stone, Clay, Glass, and Concrete Products	2,314	2,314
20	Tobacco Manufacturers	542	543

Table 6: Statewide TRI Emissions by Industry, 1998 Data

Rank by Air Emissions	Industry	Air Emissions (pounds)	Total Releases (pounds)
21	Lumber and Wood Products, Except Furniture	0	0
21	Transportation Equipment	0	0
Rhode Island			
1	Electric Utilities	455,002	455,007
2	Printing, Publishing, and Allied Industries	420,934	420,959
3	Rubber and Miscellaneous Plastics Products	213,206	213,206
4	Paper and Allied Products	197,970	197,970
5	Fabricated Metal Products	164,021	164,021
6	Stone, Clay, Glass, and Concrete Products	100,315	100,369
7	Transportation Equipment	89,514	89,627
8	Textile Mill Products	83,007	83,507
9	Chemicals and Allied Products	72,984	74,240
10	Primary Metal Industries	48,132	48,132
11	Petroleum Terminals	48,113	48,469
12	Furniture and Fixtures	14,000	14,000
13	Miscellaneous Manufacturing Industries	9,675	9,687
14	Electronic and Other Electric Equipment	8,901	8,911
15	Instruments and Related Products	4,500	4,500
16	Solvent Recyclers	402	402
17	Chemical Distributors	250	250
18	RCRA Regulated Treatment, Disposal, or Recycling Sites	20	20
19	Other Industries	0	0
19	Food and Kindred Products	0	0
19	Machinery, Except Electrical	0	0
South Carolina			
1	Paper and Allied Products	14,679,529	17,069,921
2	Electric Utilities	13,713,725	16,109,538
3	Rubber and Miscellaneous Plastics Products	8,779,354	8,780,533
4	Chemicals and Allied Products	8,081,306	9,876,107
5	Lumber and Wood Products, Except Furniture	2,163,379	2,163,438
6	Stone, Clay, Glass, and Concrete Products	1,638,253	1,825,408
7	Food and Kindred Products	1,560,780	1,891,547
8	Transportation Equipment	1,265,872	1,286,796
9	Fabricated Metal Products	901,410	903,425
10	Electronic and Other Electric Equipment	815,479	1,278,799
11	Textile Mill Products	807,896	835,779
12	Primary Metal Industries	663,172	676,701
13	Printing, Publishing, and Allied Industries	484,381	484,383
14	Miscellaneous Manufacturing Industries	450,913	450,913
15	Instruments and Related Products	338,625	338,647
16	Machinery, Except Electrical	310,177	477,162
17	Furniture and Fixtures	272,882	272,887
18	RCRA Regulated Treatment, Disposal, or Recycling Sites	38,175	5,183,694
19	Petroleum Terminals	27,662	28,223

Table 6: Statewide TRI Emissions by Industry, 1998 Data

Rank by Air Emissions	Industry	Air Emissions (pounds)	Total Releases (pounds)
20	Metal Mining, except Iron Ores and Uranium	24,000	23,017,000
21	Chemical Distributors	12,990	14,483
22	Solvent Recyclers	4,716	4,716
23	National Security and International Affairs	1,500	1,500
24	Petroleum Refining and Related Industries	402	411
25	Other Industries	0	568
South Dakota			
1	Food and Kindred Products	1,104,253	1,912,134
2	Chemicals and Allied Products	294,026	294,026
3	Machinery, Except Electrical	222,729	236,286
4	Rubber and Miscellaneous Plastics Products	199,201	199,201
5	Electric Utilities	189,732	1,814,788
6	Fabricated Metal Products	150,220	150,220
7	Primary Metal Industries	123,987	123,987
8	Lumber and Wood Products, Except Furniture	120,248	120,428
9	Metal Mining, except Iron Ores and Uranium	85,608	17,147,708
10	Transportation Equipment	70,371	70,371
11	Miscellaneous Manufacturing Industries	20,889	20,889
12	Electronic and Other Electric Equipment	8,251	8,501
13	Instruments and Related Products	265	265
Tennessee			
1	Chemicals and Allied Products	34,985,420	42,869,120
2	Electric Utilities	26,657,215	34,784,135
3	Rubber and Miscellaneous Plastics Products	12,467,737	12,518,628
4	Paper and Allied Products	7,221,843	7,846,896
5	Transportation Equipment	5,398,910	5,400,325
6	Printing, Publishing, and Allied Industries	4,455,199	4,455,219
7	Fabricated Metal Products	2,962,136	3,246,513
8	Primary Metal Industries	2,255,620	2,429,820
9	Food and Kindred Products	1,946,557	1,953,753
10	Furniture and Fixtures	1,596,508	1,627,352
11	Textile Mill Products	1,046,437	1,046,942
12	Electronic and Other Electric Equipment	973,448	979,756
13	Machinery, Except Electrical	794,746	797,478
14	Stone, Clay, Glass, and Concrete Products	535,207	563,511
15	Other Industries	432,217	496,249
16	Miscellaneous Manufacturing Industries	406,376	406,381
17	Lumber and Wood Products, Except Furniture	233,263	233,406
18	Metal Mining, except Iron Ores and Uranium	177,725	10,752,750
19	Petroleum Refining and Related Industries	135,837	137,322
20	Petroleum Terminals	45,312	45,706
21	Chemical Distributors	28,104	28,414
22	Leather and Leather Products	10,158	10,158
23	Solvent Recyclers	7,226	7,226

Table 6: Statewide TRI Emissions by Industry, 1998 Data

Rank by Air Emissions	Industry	Air Emissions (pounds)	Total Releases (pounds)
24	Instruments and Related Products	6,257	6,257
25	Tobacco Manufacturers	136	136
26	RCRA Regulated Treatment, Disposal, or Recycling Sites	95	7,134
27	Apparel and Other Finished Fabric Products	12	12
28	National Security and International Affairs	0	0
Texas			
1	Chemicals and Allied Products	60,144,003	182,157,550
2	Petroleum Refining and Related Industries	19,113,234	25,571,325
3	Electric Utilities	8,138,409	33,452,683
4	Paper and Allied Products	6,046,246	7,509,533
5	Rubber and Miscellaneous Plastics Products	4,944,807	4,975,490
6	Primary Metal Industries	3,134,101	5,126,994
7	Fabricated Metal Products	3,106,138	3,112,056
8	Stone, Clay, Glass, and Concrete Products	2,907,246	3,938,799
9	Transportation Equipment	2,877,134	2,880,169
10	Food and Kindred Products	2,446,176	2,894,594
11	Lumber and Wood Products, Except Furniture	2,369,346	2,401,275
12	Machinery, Except Electrical	865,607	917,601
13	Electronic and Other Electric Equipment	861,934	872,873
14	Printing, Publishing, and Allied Industries	639,430	639,430
15	Petroleum Terminals	551,344	554,152
16	Furniture and Fixtures	238,949	238,949
17	Chemical Distributors	225,264	225,277
18	Instruments and Related Products	150,440	193,742
19	Apparel and Other Finished Fabric Products	147,149	147,149
20	Leather and Leather Products	104,111	107,143
21	Other Industries	86,083	87,398
22	National Security and International Affairs	69,336	69,457
23	RCRA Regulated Treatment, Disposal, or Recycling Sites	59,566	9,498,574
24	Miscellaneous Manufacturing Industries	55,858	58,466
25	Metal Mining, except Iron Ores and Uranium	54,030	54,030
26	Solvent Recyclers	17,060	17,060
27	Textile Mill Products	11,540	11,790
Utah			
1	Primary Metal Industries	58,365,285	95,463,559
2	Electric Utilities	2,981,457	9,013,401
3	Transportation Equipment	1,276,882	1,276,886
4	Metal Mining, except Iron Ores and Uranium	532,913	434,892,075
5	Rubber and Miscellaneous Plastics Products	297,140	297,186
6	Petroleum Refining and Related Industries	199,757	204,857
7	Chemicals and Allied Products	192,545	216,105
8	Lumber and Wood Products, Except Furniture	189,712	189,712
9	Fabricated Metal Products	158,669	158,760
10	Instruments and Related Products	125,944	125,971

Table 6: Statewide TRI Emissions by Industry, 1998 Data

Rank by Air Emissions	Industry	Air Emissions (pounds)	Total Releases (pounds)
11	Furniture and Fixtures	123,632	123,632
12	National Security and International Affairs	122,869	122,869
13	Stone, Clay, Glass, and Concrete Products	68,538	89,988
14	Electronic and Other Electric Equipment	59,446	59,468
15	Miscellaneous Manufacturing Industries	17,424	17,463
16	Food and Kindred Products	9,110	139,438
17	Petroleum Terminals	5,988	5,988
18	Chemical Distributors	4,718	4,718
19	RCRA Regulated Treatment, Disposal, or Recycling Sites	3,237	16,396,906
20	Machinery, Except Electrical	1,630	1,900
21	Printing, Publishing, and Allied Industries	0	250
21	Leather and Leather Products	0	0
Virginia			
1	Electric Utilities	17,440,545	20,525,941
2	Paper and Allied Products	15,598,524	16,548,430
3	Chemicals and Allied Products	9,602,091	10,750,157
4	Rubber and Miscellaneous Plastics Products	4,938,577	4,949,694
5	Transportation Equipment	2,540,105	2,720,134
6	Printing, Publishing, and Allied Industries	2,084,224	2,084,229
7	Tobacco Manufacturers	1,877,785	2,050,075
8	Lumber and Wood Products, Except Furniture	1,578,435	1,578,845
9	Furniture and Fixtures	1,473,117	1,473,307
10	Fabricated Metal Products	1,395,798	2,289,606
11	Stone, Clay, Glass, and Concrete Products	894,455	894,754
12	Primary Metal Industries	759,289	1,373,470
13	Food and Kindred Products	640,887	663,793
14	Miscellaneous Manufacturing Industries	482,568	490,579
15	Petroleum Refining and Related Industries	363,904	432,404
16	Textile Mill Products	341,213	450,645
17	Electronic and Other Electric Equipment	300,810	300,847
18	Machinery, Except Electrical	169,340	169,340
19	Petroleum Terminals	127,367	240,494
20	Instruments and Related Products	108,268	108,268
21	National Security and International Affairs	74,198	74,213
22	Other Industries	73,045	73,045
23	Chemical Distributors	24,597	24,597
24	Solvent Recyclers	4,937	4,937
25	Coal Mining, except Extraction Activities	1,630	1,810
Washington			
1	Paper and Allied Products	8,173,217	11,052,655
2	Primary Metal Industries	5,293,610	5,865,125
3	Transportation Equipment	1,878,579	1,880,438
4	Fabricated Metal Products	1,328,109	1,328,134
5	Chemicals and Allied Products	1,315,596	1,471,752

Table 6: Statewide TRI Emissions by Industry, 1998 Data

Rank by Air Emissions	Industry	Air Emissions (pounds)	Total Releases (pounds)
6	Petroleum Refining and Related Industries	1,188,520	1,297,642
7	Electric Utilities	1,139,941	4,505,615
8	Rubber and Miscellaneous Plastics Products	924,976	924,976
9	Lumber and Wood Products, Except Furniture	684,069	684,650
10	Electronic and Other Electric Equipment	132,921	135,576
11	National Security and International Affairs	112,697	122,447
12	Machinery, Except Electrical	107,897	107,897
13	Food and Kindred Products	107,228	217,083
14	Textile Mill Products	97,900	97,900
15	Stone, Clay, Glass, and Concrete Products	87,599	87,599
16	Petroleum Terminals	73,452	80,520
17	Miscellaneous Manufacturing Industries	64,198	64,198
18	Other Industries	48,956	48,956
19	Furniture and Fixtures	28,233	28,983
20	Metal Mining, except Iron Ores and Uranium	27,045	574,070
21	Printing, Publishing, and Allied Industries	18,567	18,567
22	Chemical Distributors	16,565	31,290
23	Instruments and Related Products	50	50
24	RCRA Regulated Treatment, Disposal, or Recycling Sites	0	0
West Virginia			
1	Electric Utilities	62,340,582	73,922,866
2	Chemicals and Allied Products	6,928,389	14,013,396
3	Fabricated Metal Products	1,825,265	1,833,200
4	Coal Mining, except Extraction Activities	1,368,089	1,791,466
5	Primary Metal Industries	1,262,598	1,430,226
6	Lumber and Wood Products, Except Furniture	1,033,810	1,033,883
7	Rubber and Miscellaneous Plastics Products	494,111	494,112
8	Machinery, Except Electrical	280,420	280,420
9	Stone, Clay, Glass, and Concrete Products	261,358	282,154
10	Printing, Publishing, and Allied Industries	128,350	128,350
11	Petroleum Refining and Related Industries	124,260	128,005
12	Transportation Equipment	30,464	30,464
13	Food and Kindred Products	23,344	23,349
14	Petroleum Terminals	12,119	13,904
15	Instruments and Related Products	11,566	11,566
16	Chemical Distributors	2,200	2,200
17	Electronic and Other Electric Equipment	814	816
18	Solvent Recyclers	6	6
19	Other Industries	0	24,644
19	Paper and Allied Products	0	0
Wisconsin			
1	Electric Utilities	13,704,098	15,488,793
2	Paper and Allied Products	10,349,250	14,418,080
3	Fabricated Metal Products	2,703,069	2,734,332

Table 6: Statewide TRI Emissions by Industry, 1998 Data

Rank by Air Emissions	Industry	Air Emissions (pounds)	Total Releases (pounds)
4	Transportation Equipment	1,862,432	1,862,682
5	Lumber and Wood Products, Except Furniture	1,745,055	1,748,861
6	Rubber and Miscellaneous Plastics Products	1,327,159	1,327,953
7	Machinery, Except Electrical	1,267,750	1,270,759
8	Primary Metal Industries	1,082,738	1,100,737
9	Chemicals and Allied Products	1,057,357	1,058,637
10	Printing, Publishing, and Allied Industries	712,987	712,992
11	Electronic and Other Electric Equipment	619,700	643,703
12	Textile Mill Products	536,003	536,003
13	Leather and Leather Products	450,871	451,178
14	Furniture and Fixtures	419,177	419,177
15	Miscellaneous Manufacturing Industries	301,117	301,132
16	Food and Kindred Products	265,426	1,225,290
17	Apparel and Other Finished Fabric Products	101,152	101,152
18	Stone, Clay, Glass, and Concrete Products	91,512	131,518
19	Other Industries	71,772	73,392
20	Petroleum Refining and Related Industries	55,616	56,009
21	Petroleum Terminals	24,885	24,940
22	RCRA Regulated Treatment, Disposal, or Recycling Sites	22,662	22,662
23	Chemical Distributors	18,594	19,294
24	Instruments and Related Products	6,096	6,106
25	Solvent Recyclers	5,379	5,379
Wyoming			
1	Electric Utilities	2,270,618	12,174,782
2	Petroleum Refining and Related Industries	689,061	720,261
3	Chemicals and Allied Products	530,299	8,187,420
4	Fabricated Metal Products	280,254	280,254
5	Food and Kindred Products	163,486	174,939
6	Other Industries	36,550	40,555
7	Stone, Clay, Glass, and Concrete Products	8,859	8,859
8	Machinery, Except Electrical	329	329
9	Primary Metal Industries	20	20
10	Lumber and Wood Products, Except Furniture	0	0

Table 7: State Rankings for Electric Power Plant Emissions, 1998 TRI Data

State	Air Emissions (pounds)	Total Releases (pounds)	Number of Power Plants Reporting	Average Releases per Plant (pounds)	Rank for Power Plant Air Emissions	Rank for Total Power Plant Releases	Rank for Average Releases per Plant
Alabama	28,660,982	45,714,366	11	4,155,851	11	9	3
Alaska	567,100	567,100	1	567,100	44	46	38
Arizona	3,531,238	9,526,350	6	1,587,725	31	27	19
Arkansas	1,248,681	3,312,053	4	828,013	39	39	35
California	385,620	532,937	16	33,309	46	47	49
Colorado	1,912,616	5,069,056	14	362,075	35	36	44
Connecticut	1,259,018	1,259,057	7	179,865	38	44	46
Delaware	6,818,633	7,468,952	3	2,489,651	24	34	10
District of Columbia	66,250	66,250	1	66,250	49	49	48
Florida	57,992,319	66,487,509	37	1,796,960	4	3	16
Georgia	47,191,872	58,465,758	14	4,176,126	6	6	2
Hawaii	3,133,022	3,133,022	10	313,302	32	40	45
Idaho	0	0	0	--	--	--	--
Illinois	32,126,653	36,919,395	25	1,476,776	10	11	22
Indiana	44,326,731	61,049,964	23	2,654,346	8	5	8
Iowa	8,696,569	12,656,829	18	703,157	21	20	37
Kansas	5,002,491	11,423,885	8	1,427,986	27	23	24
Kentucky	44,786,767	58,320,131	19	3,069,481	7	7	6
Louisiana	4,197,816	8,797,845	4	2,199,461	28	29	12
Maine	43,001	43,001	2	21,501	50	50	50
Maryland	24,749,607	25,026,614	10	2,502,661	13	15	9
Massachusetts	5,639,923	5,679,789	13	436,907	26	35	42
Michigan	33,812,186	43,554,530	24	1,814,772	9	10	14
Minnesota	1,751,834	11,867,980	13	912,922	36	22	33
Mississippi	9,271,476	11,304,718	5	2,260,944	20	24	11
Missouri	12,983,638	32,430,345	18	1,801,686	18	14	15
Montana	950,655	7,780,776	4	1,945,194	42	33	13
Nebraska	4,086,255	7,818,322	7	1,116,903	29	32	29
Nevada	1,151,501	2,235,963	4	558,991	40	41	39
New Hampshire	4,026,179	4,047,879	3	1,349,293	30	38	25
New Jersey	7,529,062	7,877,531	16	492,346	23	31	41
New Mexico	711,363	1,897,520	2	948,760	43	42	32
New York	16,100,588	18,192,033	34	535,060	15	17	40
North Carolina	48,387,026	56,791,632	21	2,704,363	5	8	7
North Dakota	1,404,407	10,155,778	7	1,450,825	37	25	23
Ohio	95,220,630	109,616,575	27	4,059,873	1	1	4
Oklahoma	6,178,303	8,079,268	7	1,154,181	25	30	26
Oregon	127,585	747,590	2	373,795	48	45	43
Pennsylvania	58,857,300	64,730,536	41	1,578,794	3	4	20
Puerto Rico	9,857,078	10,073,942	10	1,007,394	19	26	30

Table 7: State Rankings for Electric Power Plant Emissions, 1998 TRI Data

State	Air Emissions (pounds)	Total Releases (pounds)	Number of ower Plants Reporting	Average Releases per Plant (pounds)	Rank for Power Plant Air Emissions	Rank for Total Power Plant Releases	Rank for Average Releases per Plant
Rhode Island	455,002	455,007	3	151,669	45	48	47
South Carolina	13,713,725	16,109,538	14	1,150,681	16	18	27
South Dakota	189,732	1,814,788	2	907,394	47	43	34
Tennessee	26,657,215	34,784,135	9	3,864,904	12	12	5
Texas	8,138,409	33,452,683	19	1,760,668	22	13	17
Utah	2,981,457	9,013,401	6	1,502,234	33	28	21
Vermont	0	0	0	--	--	--	--
Virginia	17,440,545	20,525,941	21	977,426	14	16	31
Washington	1,139,941	4,505,615	4	1,126,404	41	37	28
West Virginia	62,340,582	73,922,866	14	5,280,205	2	2	1
Wisconsin	13,704,098	15,488,793	20	774,440	17	19	36
Wyoming	2,270,618	12,174,782	7	1,739,255	34	21	18
U.S. Total	783,775,380	1,052,997,243	613	1,717,777	--	--	--

Appendix 1: Electric Utility Releases and Production-Related Waste by State and Power Plant, 1998 TRI Data

Plant Name	City	Air Emissions (pounds)	Total Releaes (pounds)	Production-Related Waste (pounds)
Alabama				
ALABAMA POWER CO. - PLANT BARRY	BUCKS	5,637,540	8,586,564	8,586,564
ALABAMA POWER CO. - PLANT GADSDEN	GADSDEN	176,971	295,849	295,849
ALABAMA POWER CO. - PLANT GASTON	WILSONVILLE	4,065,426	7,370,304	7,370,304
ALABAMA POWER CO. - PLANT GORGAS	PARRISH	3,685,888	6,017,755	6,017,755
ALABAMA POWER CO. - PLANT GREENE COUNTY	FORKLAND	4,760,319	5,366,957	5,366,957
ALABAMA POWER CO. - PLANT MILLER	QUINTON	2,603,215	6,947,464	6,947,465
CHARLES R. LOWMAN POWER PLANT	LEROY	555,594	940,264	915,034
MOBILE ENERGY SERVICES CO. L.L.C.	MOBILE	1,067,849	1,067,849	9,446,088
U. S. TVA BROWNS FERRY NUCLEAR PLANT	ATHENS	110	22,110	22,780
U.S. TVA COLBERT FOSSIL PLANT	TUSCUMBIA	3,379,770	4,857,695	5,676,020
U.S. TVA WIDOWS CREEK FOSSIL PLANT	STEVENSON	2,728,300	4,241,555	9,964,720
Alaska				
HEALY POWER PLANT	HEALY	567,100	567,100	567,100
Arizona				
ARIZONA ELECTRIC POWER COOPERATIVE INC.	COCHISE	156,786	519,991	771,000
CHOLLA POWER PLANT	JOSEPH CITY	578,456	1,194,206	1,612,500
CORONADO GENERATING STATION	SAINT JOHNS	1,579,369	2,511,569	3,098,200
IRVINGTON GENERATING STATION	TUCSON	68,115	68,115	94,000
NAVAJO GENERATING STATION	PAGE	1,057,277	3,660,727	4,750,358
SPRINGERVILLE GENERATING STATION	SPRINGERVILLE	91,235	1,571,742	1,570,560
Arkansas				
ARKANSAS ELECTRIC COOP. CORP., MCCLELLAN GENERATING STATI	CAMDEN	10	12	8
ENERGY - INDEPENDENCE STEAM ELECTRIC STATION	NEWARK	423,645	1,614,523	1,614,927
ENTERGY- WHITE BLUFF GENERATING PLANT	REDFIELD	390,209	399,461	399,866
FLINT CREEK POWER PLANT	GENTRY	434,817	1,298,057	1,366,010
California				

Appendix 1: Electric Utility Releases and Production-Related Waste by State and Power Plant, 1998 TRI Data

Plant Name	City	Air Emissions (pounds)	Total Releaes (pounds)	Production-Related Waste (pounds)
ACE COGENERATION FACILITY	TRONA	128,400	214,400	0
GWF POWER SYS. CO. INC.	ANTIOCH	7,105	7,105	7,370
GWF POWER SYS. CO. INC.	ANTIOCH	6,910	6,910	7,500
GWF POWER SYS. CO. INC.	PITTSBURG	5,010	5,010	5,690
GWF POWER SYS. CO. INC.	BAY POINT	6,210	6,210	7,070
GWF POWER SYS. CO. INC.	PITTSBURG	10,415	10,420	11,183
HANFORD L.P.	HANFORD	24,250	24,250	24,000
MT. POSO COGENERATION	BAKERSFIELD	6,090	6,090	6,090
OLS ENERGY - CAMARILLO	CAMARILLO	29,562	29,562	0
OLS ENERGY - CHINO	CHINO	30,272	30,272	0
PEBBLY BEACH GENERATING STATION	AVALON	129	137	199
PORT OF STOCKTON DISTRICT ENERGY FACILITY L.P.	STOCKTON	29,154	90,458	91,400
RIO BRAVO JASMIN	BAKERSFIELD	8,431	8,431	8,431
RIO BRAVO POSO	BAKERSFIELD	6,386	6,386	6,547
SAN DIEGO GAS & ELECTRIC	CHULA VISTA	34,005	34,005	34,000
STOCKTON COGEN CO.	STOCKTON	53,291	53,291	98,984
Colorado				
MARTIN DRAKE POWER PLANT	COLORADO SPRINGS	84,510	84,510	492,000
PUBLIC SERVICE CO. OF COLORADO - ARAPAHOE STATION	DENVER	3,550	4,110	442,600
PUBLIC SERVICE CO. OF COLORADO - CAMEO STATION	PALISADE	67,370	177,370	177,000
PUBLIC SERVICE CO. OF COLORADO - CHEROKEE STATION	DENVER	344,170	712,850	1,635,400
PUBLIC SERVICE CO. OF COLORADO - COMANCHE STATION	PUEBLO	44,180	581,610	776,740
PUBLIC SERVICE CO. OF COLORADO - HAYDEN STATION	HAYDEN	712,260	1,191,260	1,193,000
PUBLIC SERVICE CO. OF COLORADO - PAWNEE STATION	BRUSH	5,315	278,015	752,500
PUBLIC SERVICE CO. OF COLORADO - VALMONT STATION	BOULDER	162,903	402,903	402,000
RAWHIDE ENERGY STATION	WELLINGTON	68,794	751,614	819,200
RAY NIXON POWER PLANT	FOUNTAIN	94,510	488,010	622,000
TRIGEN-NATIONS ENERGY CO. L.L.L.P.	GOLDEN	127,121	127,121	298,700
TRI-STATE GENERATION & TRANSMISSION - CRAIG STATION	CRAIG	112,456	112,496	3,173,010
TRI-STATE GENERATION & TRANSMISSION - NUCLA STATION	NUCLA	85,405	85,405	434,910
UTILICORP UNITED W. N. CLARK STATION	CANON CITY	72	71,782	71,782

Appendix 1: Electric Utility Releases and Production-Related Waste by State and Power Plant, 1998 TRI Data

Plant Name	City	Air Emissions (pounds)	Total Releaes (pounds)	Production-Related Waste (pounds)
Connecticut				
AES THAMES INC.	UNCASVILLE	79,917	79,956	194,000
BRIDGEPORT HARBOR STATION	BRIDGEPORT	519,000	519,000	519,000
DEVON STATION	MILFORD	70,000	70,000	70,000
MIDDLETOWN STATION	MIDDLETOWN	113,000	113,000	113,000
MONTVILLE STATION	UNCASVILLE	129,000	129,000	136,000
NEW HAVEN HARBOR STATION	NEW HAVEN	199,400	199,400	274,400
NORWALK HARBOR STATION	NORWALK	148,701	148,701	171,000
Delaware				
EDGE MOOR/HAY ROAD POWER PLANTS	WILMINGTON	1,965,628	2,026,816	2,507,832
FIRST STATE POWER MANAGEMENT INC.	DOVER	1,508,037	1,508,037	1,508,037
INDIAN RIVER POWER PLANT	MILLSBORO	3,344,968	3,934,099	4,643,762
District of Columbia				
BENNING GENERATING STATION	WASHINGTON	66,250	66,250	66,000
Florida				
C.D. MCINTOSH JR. POWER PLANT	LAKELAND	332,755	1,267,487	1,511,357
CAPE CANAVERAL POWER PLANT	COCOA	318,001	319,251	319,251
CEDAR BAY GENERATING CO.	JACKSONVILLE	63,540	63,540	2,355,400
CHARLES LARSON MEMORIAL POWER PLANT	LAKELAND	53,507	53,507	53,508
CITY ELECTRIC SYSTEM	KEY WEST	317	317	317
CITY OF VERO BEACH MUNICIPAL UTILITIES	VERO BEACH	0	0	0
FLORIDA CRUSHED STONE CO. CPL DIV.	BROOKSVILLE	294,927	294,927	294,927
FLORIDA POWER CORP. - P. L. BARTOW PLANT	SAINT PETERSBURG	511,075	512,895	1,232,017
FLORIDA POWER CORP., ANCLOTE POWER PLANT	HOLIDAY	848,158	849,458	1,530,000
FLORIDA POWER CORP., CRYSTAL RIVER ENERGY COMPLEX	CRYSTAL RIVER	8,440,499	8,793,299	10,093,300
FLORIDA POWER CORP., SUWANNEE RIVER POWER PLANT	LIVE OAK	314,130	314,130	444,000
FORT MYERS POWER PLANT	FORT MYERS	283,001	283,001	283,001
FPL MANATEE POWER PLANT	PARRISH	1,151,902	1,154,582	1,154,902

Appendix 1: Electric Utility Releases and Production-Related Waste by State and Power Plant, 1998 TRI Data

Plant Name	City	Air Emissions (pounds)	Total Releaes (pounds)	Production-Related Waste (pounds)
FPL PORT EVERGLADES POWER PLANT	FORT LAUDERDALE	433,001	442,001	442,001
FPL PUTMAN POWER PLANT	EAST PALATKA	250	257	320
GAINESVILLE REGIONAL UTILITIES DEERHAVEN GENERATING STATIOI	GAINESVILLE	2,072,068	2,077,379	2,161,600
GULF POWER CO. - PLANT CRIST	PENSACOLA	9,275,450	9,758,750	9,758,750
GULF POWER CO. - PLANT LANSING SMITH	SOUTHPORT	3,279,421	3,594,294	3,594,294
INDIAN RIVER POWER PLANT	TITUSVILLE	1,979,350	1,997,105	1,980,100
INDIANTOWN GENERATING PLANT	INDIANTOWN	29,935	29,935	1,540,300
KENNEDY GENERALTING STATION	JACKSONVILLE	92,000	92,000	92,000
LAKE COGENERATION LTD. PTNR.	UMATILLA	0	0	3,000
MARTIN POWER PLANT	INDIANTOWN	502,001	502,001	502,001
MULBERRY COGENERATION FACILITY	BARTOW	7,521	7,521	7,525
RIVIERA POWER PLANT	RIVIERA BEACH	163,001	163,001	163,001
SANFORD POWER PLANT	DE BARY	578,001	578,001	578,001
SEMINOLE GENERATING STATION	PALATKA	8,386,772	9,599,001	16,548,307
SOUTHSIDE GENERALTING STATION	JACKSONVILLE	130,000	130,000	130,000
ST. JOHNS RIVER POWER PARK NORTHSIDE GENERATING STATIN	JACKSONVILLE	6,152,110	7,430,170	11,779,100
STANTON ENERGY COMPLEX	ORLANDO	251,710	3,830,360	9,528,380
TAMPA ELECTIC CO.-J.H.PHILLIPS STATION	SEBRING	61,000	61,000	61,000
TAMPA ELECTRIC CO. - BIG BEND STATION	APOLLO BEACH	3,244,564	3,386,151	3,386,161
TAMPA ELECTRIC CO. - GANNON STATION	TAMPA	8,000,790	8,131,499	11,091,547
TAMPA ELECTRIC CO.-HOOKERS POINT STATION	TAMPA	97,000	97,000	97,000
TAMPA ELECTRIC CO.POLK POWER STATION	MULBERRY	366,306	395,313	421,309
TOM G. SMITH MUNCIPAL POWER PLANT/LAKE WORTH WTP	LAKE WORTH	255	255	595
TURKEY POINT POWER PLANT	HOMESTEAD	278,001	278,121	278,121
Georgia				
ARKWRIGHT STEAM ELECTRIC GENERATING PLANT	MACON	193,828	218,781	218,756
BOWEN STEAM ELECTRIC GENERATING PLANT	CARTERSVILLE	18,052,259	19,500,925	19,500,943
BRANCH STEAM ELECTRIC GENERATING PLANT	MILLEDGEVILLE	5,576,860	6,959,177	6,959,184
HAMMOND STEAM ELECTRIC GENERATING PLANT	COOSA	1,262,847	1,822,978	1,822,978
MCDONOUGH/ATKINSON STEAM ELECTRIC GENERATING PLANT	SMYRNA	3,021,517	3,415,350	3,415,352
MCMANUS STEAM ELECTRIC GENERATING PLANT	BRUNSWICK	123,133	123,133	123,133
MID-GEORGIA COGEN	KATHLEEN	41,690	41,690	42,000
MITCHELL STEAM ELECTRIC GENERATING PLANT	ALBANY	153,768	209,276	209,276

Appendix 1: Electric Utility Releases and Production-Related Waste by State and Power Plant, 1998 TRI Data

Plant Name	City	Air Emissions (pounds)	Total Releaes (pounds)	Production-Related Waste (pounds)
SAVANNAH ELECTRIC - PLANT KRAFT	PORT WENTWORTH	200,401	208,886	208,886
SAVANNAH ELECTRIC - PLANT MCINTOSH	RINCON	442,558	496,291	496,291
SCHERER STEAM ELECTRIC GENERATING PLANT	JULIETTE	8,917,138	13,950,362	13,950,365
SOUTHERN NUCLEAR - PLANT WILSON/VOGTLE	WAYNESBORO	1,543	23,480	23,480
WANSLEY STEAM ELECTRIC GENERATING PLANT	ROOPVILLE	6,675,128	8,042,076	8,042,081
YATES STEAM ELECTRIC GENERATING PLANT	NEWNAN	2,529,202	3,453,353	3,453,356
Hawaii				
AES HAWAII INC.	KAPOLEI	1,169,295	1,169,295	1,169,295
HILL GENERATING STATION	HILO	200,632	200,632	200,632
KAHE GENERATING STATION	WAIANAE	888,329	888,329	888,329
KAHULUI GENERATING STATION	KAHULUI	235,936	235,936	235,936
KALAELOA COGENERATION PLANT	KAPOLEI	17,700	17,700	22,200
KAUAI ELECTRIC	ELEELE	30,425	30,425	30,390
MAALAEA GENERATING STATION	WAILUKU	53,305	53,305	53,305
PUNA GENERATING STATION	KEAAU	138,602	138,602	138,602
SHIPMAN GENERATING STATION	HILO	60,242	60,242	60,242
WAIAU GENERATING STATION	PEARL CITY	338,556	338,556	338,556
s				
AMEREN CORP. GRAND TOWER POWER STATION	GRAND TOWER	540,540	540,952	760,950
AMEREN CORP. HUTSONVILLE POWER STATION	HUTSONVILLE	92,150	109,150	259,000
AMEREN CORP. NEWTON POWER STATION	NEWTON	1,131,344	2,647,280	3,464,000
AMEREN CORP.COFFEEN POWER STATION	COFFEEN	4,513,765	4,514,554	6,208,700
AMEREN CORP.MEREDOSIA POWER STATION	KILBOURNE	970,911	1,063,138	1,394,000
BALDWIN POWER STATION	BALDWIN	8,450,555	9,597,455	15,318,900
CILCO-DUCK CREEK STATION	CANTON	234,222	881,046	3,865,442
CITY WATER LIGHT & POWER CITY OF SPRINGFIELD	SPRINGFIELD	2,785,444	2,811,444	5,472,000
COLLINS GENERATING STATION	MORRIS	65,300	65,300	65,300
CRAWFORD GENERATING STATION	CHICAGO	321,675	322,766	926,781
DOMINION RESOURCES INC. KINCAID GENERATION L.L.C.	KINCAID	2,617,278	2,691,238	4,027,000
E. D. EDWARDS STATION	BARTONVILLE	2,797,508	2,840,223	4,227,946
ELECTRIC ENERGY INC.	JOPPA	584,804	783,926	949,000

Appendix 1: Electric Utility Releases and Production-Related Waste by State and Power Plant, 1998 TRI Data

Plant Name	City	Air Emissions (pounds)	Total Releaes (pounds)	Production-Related Waste (pounds)
FISK GENERATING STATION	CHICAGO	193,805	193,908	591,043
HAVANA POWER STATION	HAVANA	332,965	560,965	628,200
ILLINOVA CORP. VERMILION STATION	OAKWOOD	723,795	856,145	1,080,100
ILLINOVA CORP. WOOD RIVER POWER STATION	ALTON	967,000	1,061,331	1,347,800
ILLINOVA HENNEPIN POWER STATION	HENNEPIN	1,253,270	1,462,860	2,421,000
JOLIET #29 GENERATING STATION	JOLIET	702,445	970,933	2,269,585
JOLIET GENERATING STATION #9	JOLIET	167,000	175,800	661,800
SOUTHERN ILLINOIS POWER COOPERATIVE	MARION	590,514	593,207	2,919,640
SOYLAND POWER CO-OP INC., PEARL STATION	PEARL	142,248	208,199	0
UNICORN CORP. POWERTON GENERATING STATION	PEKIN	683,285	690,685	2,082,570
WAUKEGAN GENERATING STATION	WAUKEGAN	585,405	596,225	1,715,810
WILL COUNTY GENERATING STATION	ROMEOVILLE	679,425	680,665	2,085,950
Indiana				
ALCOA GENERATING CORP./SIGECO, WARRICK POWER PLANT	NEWBURGH	4,012,531	5,032,201	5,025,066
CLIFTY CREEK STATION	MADISON	4,199,470	4,968,817	6,164,500
FRANK E. RATTS GENERATING STATION	PETERSBURG	1,113,840	1,678,590	1,670,590
INDIANAPOLIS POWER & LIGHT CO., E.W. STOUT GENERATING STATIO	INDIANAPOLIS	2,220,457	2,309,484	2,330,809
INDIANAPOLIS POWER & LIGHT CO., H.T. PRITCHARD GENERATING ST.	MARTINSVILLE	714,050	863,226	871,353
INDIANAPOLIS POWER & LIGHT CO., PETERSBURG GENERATING STAT	PETERSBURG	2,784,783	4,091,904	11,916,929
MEROM GENERATING STATION	SULLIVAN	1,294,991	2,875,790	2,896,416
NORTHERN INDIANA PUBLIC SERVICE CO. - BAILLY GEN. STA.	CHESTERTON	494,985	605,485	4,934,500
NORTHERN INDIANA PUBLIC SERVICE CO. - D.H. MITCHELL GEN. STA.	GARY	211,566	311,471	528,731
NORTHERN INDIANA PUBLIC SERVICE CO. - MICHIGAN CITY GEN. STA.	MICHIGAN CITY	563,026	566,456	1,075,951
NORTHERN INDIANA PUBLIC SERVICE CO. - R.M. SCHAHFER GEN. STA	WHEATFIELD	1,264,271	2,960,061	9,194,905
PSI GIBSON GENERATING STATION	PRINCETON	8,128,647	12,395,357	23,419,000
PSI NOBLEVILLE GENERATING STATION	NOBLESVILLE	167,285	167,308	312,870
PSI- WABASH RIVER GENERATING STATION	WEST TERRE HAUTE	1,767,475	2,137,705	3,383,601
PSI-CAYUGA GENERATING STATION	CAYUGA	3,156,020	4,337,065	5,753,400
PSI-EDWARDSPORT GENERATING STATION	EDWARDSPORT	228,087	251,087	388,640
PSI-ENERGY- GALLAGHER GENERATING STATION	NEW ALBANY	2,901,835	3,140,357	3,928,200
ROCKPORT PLANT	ROCKPORT	2,228,121	4,008,283	4,338,500
SIGECO A. B. BROWN GENERATING STATION	MOUNT VERNON	450,345	830,825	3,260,300
SIGECO F. B. CULLEY GENERATING STATION	NEWBURGH	503,710	949,065	3,594,000

Appendix 1: Electric Utility Releases and Production-Related Waste by State and Power Plant, 1998 TRI Data

Plant Name	City	Air Emissions (pounds)	Total Releaes (pounds)	Production-Related Waste (pounds)
STATE LINE ENERGY L.L.C.	HAMMOND	9,960	9,960	47,316
TANNERS CREEK PLANT	LAWRENCEBURG	5,043,274	5,687,886	6,051,500
WHITEWATER VALLEY GENERATING STATION	RICHMOND	868,002	871,581	951,806
Iowa				
ALLIANT ENERGY M L KAPP GENERATING STATION	CLINTON	144,842	153,542	452,700
ALLIANT ENERGY SUTHERLAND PLANT	MARSHALLTOWN	69,851	69,918	226,580
ALLIANT ENERGY-BURLINGTON GENERATING STATION	BURLINGTON	8,910	8,910	53,500
CEDAR FALLS UTILITIES	CEDAR FALLS	3,028,141	3,028,141	2,265,402
CITY OF AMES POWER PLANT	AMES	376,585	410,585	376,590
COUNCIL BLUFFS ENERGY CENTER	COUNCIL BLUFFS	702,390	2,267,640	2,264,000
DUBUQUE POWER PLANT	DUBUQUE	231,494	231,494	238,707
FAIR STATION	MONTPELIER	244,760	244,760	244,760
GEORGE NEAL NORTH	SIOUX CITY	718,535	1,898,190	1,895,000
LANSING POWER STATION	LANSING	726,591	726,592	772,276
LOUISA GENERATING STATION	MUSCATINE	1,386,290	2,539,095	2,541,000
MUSCATINE POWER & WATER GENERATION	MUSCATINE	165,625	165,742	501,500
OTTUMWA GENERATING STATION	OTTUMWA	201,670	201,670	314,300
PELLA MUNICIPAL POWER PLANT	PELLA	62,800	62,800	62,800
PRAIRIE CREEK GENERATING STATION	CEDAR RAPIDS	54,715	54,715	118,220
RIVERSIDE GENERATING STATION	BETTENDORF	180,755	186,410	322,000
SIXTH STREET GENERATING STATION	CEDAR RAPIDS	339,105	339,105	370,000
WISDOM GENERATING STATION	SPENCER	53,510	67,520	68,000
Kansas				
HOLCOMB UNIT 1	HOLCOMB	354,556	1,817,668	1,817,666
JEFFREY ENERGY CENTER	SAINT MARYS	402,165	2,138,765	3,153,000
LA CYGNE	LA CYGNE	327,710	2,277,720	2,280,314
LAWRENCE ENERGY CENTER	LAWRENCE	69,210	460,710	624,000
NEARMAN CREEK POWER STATION	KANSAS CITY	2,365,063	2,692,199	3,099,529
QUINDARO POWER STATION	KANSAS CITY	1,209,159	1,379,884	1,625,776
RIVERTON GENERATING STATION	RIVERTON	122,018	297,329	297,324
TECUMSEH ENERGY CENTER	TECUMSEH	152,610	359,610	371,500

Appendix 1: Electric Utility Releases and Production-Related Waste by State and Power Plant, 1998 TRI Data

Plant Name	City	Air Emissions (pounds)	Total Releaes (pounds)	Production-Related Waste (pounds)
Kentucky				
BIG SANDY PLANT	LOUISA	6,464,315	7,650,020	8,680,200
CG&E EAST BEND GENERATING STATION	UNION	684,809	1,261,454	4,915,000
COLEMAN	HAWESVILLE	1,880,545	2,087,061	2,200,512
COOPER POWER STATION	BURNSIDE	1,711,240	1,995,021	1,992,000
DALE POWER STATION	FORD	1,239,160	1,393,470	1,395,000
ELMER SMITH STATION - OWENSBORO MUNICIPAL UTILITIES	OWENSBORO	665,885	690,535	4,697,700
KENTUCKY UTILITIES CO. - E. W. BROWN STATION	BURGIN	3,704,750	4,444,720	4,452,000
KENTUCKY UTILITIES CO. - GHENT STATION	GHENT	8,471,776	10,965,026	10,979,000
KENTUCKY UTILITIES CO. - GREEN RIVER STATION	CENTRAL CITY	1,324,217	1,335,593	1,474,000
KENTUCKY UTILITIES CO. - TYRONE STATION	VERSAILLES	208,000	208,000	208,000
KENTUCKY UTILITIES CO., PINEVILLE STATION	PINEVILLE	96,000	96,000	96,000
LOUISVILLE GAS & ELECTRIC CO. - CANE RUN STATION	LOUISVILLE	1,322,504	1,968,907	1,964,003
LOUISVILLE GAS & ELECTRIC CO. - MILL CREEK STATION	LOUISVILLE	2,054,724	3,610,513	3,612,600
LOUISVILLE GAS & ELECTRIC CO. - TRIMBLE COUNTY STATION	BEDFORD	901,249	1,503,531	1,504,000
REID/GREEN/HMP&L STATION II	ROBARDS	380,077	1,125,922	1,189,287
SPURLOCK POWER STATION	MAYSVILLE	3,835,154	4,637,125	4,569,000
U.S. TVA PARADISE FOSSIL PLANT	DRAKESBORO	9,095,350	9,850,910	21,988,020
U.S. TVA SHAWNEE FOSSIL PLANT	WEST PADUCAH	605,535	3,088,585	4,212,020
WILSON STATION	ISLAND	141,477	407,738	412,101
Louisiana				
BIG CAJUN 2	NEW ROADS	3,336,934	5,016,482	5,138,000
CLECO CORP. DOLET HILLS POWER STATION	MANSFIELD	569,959	3,446,819	4,505,567
CLECO CORP. RODEMACHER POWER STATION	LENA	148,930	166,559	166,558
ENTERGY - ROY S. NELSON GENERATING PLT.	WESTLAKE	141,993	167,985	170,135
Maine				
MASON STEAM STATION	WISCASSET	0	0	1
W.F. WYMAN STEAM STATION	YARMOUTH	43,001	43,001	43,001

Appendix 1: Electric Utility Releases and Production-Related Waste by State and Power Plant, 1998 TRI Data

Plant Name	City	Air Emissions (pounds)	Total Releaes (pounds)	Production-Related Waste (pounds)
Maryland				
BRANDON SHORES & WAGNER COMPLEX	BALTIMORE	11,434,848	11,442,945	11,450,045
C. P. CRANE GENERATING STATION	BALTIMORE	1,823,604	1,823,624	1,823,624
DICKERSON GENERATING STATION	DICKERSON	2,633,770	2,790,380	3,259,000
GOULD STREET GENERATING STATION	BALTIMORE	32,000	32,000	32,000
PEPCO CHALK POINT GENERATING STATION	AQUASCO	3,306,575	3,344,530	52,975,159
PEPCO MORGANTOWN GENERATING STATION	NEWBURG	5,280,870	5,355,195	5,892,523
PERRYMAN GENERATING STATION	BALTIMORE	0	0	0
R. PAUL SMITH POWER STATION	WILLIAMSPORT	152,152	152,152	152,000
RIVERSIDE GENERATING STATION	BALTIMORE	0	0	0
VIENNA POWER PLANT	VIENNA	85,788	85,788	85,788
Massachusetts				
CAMBRIDGE ELECTRIC LIGHT CO. - BLACKSTONE STATION	CAMBRIDGE	0	0	0
CAMBRIDGE ELECTRIC LIGHT CO. - KENDALL SQUARE STATION	CAMBRIDGE	0	0	0
CANAL ELECTRIC CO.	SANDWICH	1,973,030	1,973,030	2,048,994
DARTMOUTH POWER ASSOCIATES	NORTH DARTMOUTH	17,747	17,747	17,747
MASSPOWER	INDIAN ORCHARD	82,880	82,880	83,000
MT. TOM STATION	HOLYOKE	551,061	552,661	580,000
MYSTIC STATION	CHARLESTOWN	133,468	133,468	192,588
NEW BOSTON STATION	SOUTH BOSTON	130,211	130,211	129,854
PITTSFIELD GENERATING CO. L.P.	PITTSFIELD	48,240	48,240	48,620
SOMERSET POWER L.L.C.	SOMERSET	667,279	667,331	778,000
TAUNTON MUNICIPAL LIGHTING PLANT CLEARY FLOOD STATION	TAUNTON	1,550	1,550	1,300
US GEN NEW ENGLAND INC. - SALEM HARBOR STATION	SALEM	858,320	858,660	1,104,490
USGEN NEW ENGLAND INC.	SOMERSET	1,176,137	1,214,011	1,288,550
Michigan				
BC COBB GENERATING PLANT	MUSKEGON	637,309	649,998	1,466,300
DE KARN - JC WEADOCK GENERATING PLT.	ESSEXVILLE	3,545,292	4,299,917	5,358,550
DETROIT EDISON - RIVER ROUGE POWER PLANT	RIVER ROUGE	1,930,681	2,029,702	2,864,000
DETROIT EDISON CO. - GREENWOOD ENERGY CENTER	AVOCA	0	0	0

Appendix 1: Electric Utility Releases and Production-Related Waste by State and Power Plant, 1998 TRI Data

Plant Name	City	Air Emissions (pounds)	Total Releaes (pounds)	Production-Related Waste (pounds)
DETROIT EDISON CO. - HARBOR BEACH POWER PLANT	HARBOR BEACH	298,135	298,150	367,490
DETROIT EDISON CO. - MARYSVILLE POWER PLANT	MARYSVILLE	346,010	346,010	373,000
DETROIT EDISON MONROE POWER PLANT	MONROE	8,058,508	12,608,402	14,704,000
DETROIT EDISON ST., CLAIR POWER PLANT	EAST CHINA TOWNSHI	1,682,933	3,262,774	4,640,200
DETROIT EDISON, BELLE RIVER POWER PLANT	CHINA TOWNSHIP	437,590	1,664,829	2,747,200
DETROIT EDISON-TRENTON CHANNEL POWER PLANT	TRENTON	1,622,379	1,772,349	3,339,550
FORD, ROUGE POWER & UTILITIES OPS.	DEARBORN	406,348	408,948	408,989
GRAND HAVEN BOARD OF LIGHT & POWER	GRAND HAVEN	2,774,125	2,774,156	2,755,788
HOLLAND BPW 48TH STREET GENERATION STATION	HOLLAND	574	574	574
HOLLAND BPW 6TH STREET GENERATION STATION	HOLLAND	29	29	29
HOLLAND BPW JAMES DE YOUNG GENERATION STATION	HOLLAND	526,467	529,257	529,257
J.H. CAMPBELL GENERATING PLANT	WEST OLIVE	5,912,302	6,869,128	8,931,000
J.R. WHITING GENERATING PLANT	LUNA PIER	2,086,874	2,238,447	2,466,500
LANSING BOARD WATER & LIGHT ECKERT STATION	LANSING	1,418,341	1,441,714	1,838,073
LANSING BOARD WATER & LIGHT ERICKSON STATION	LANSING	653,716	653,717	749,117
MARQUETTE BD OF LIGHT & POWER	MARQUETTE	0	0	184,820
MICHIGAN S. CENTRAL POWER AGENCY	LITCHFIELD	1,200	1,284	1,284
PRESQUE ISLE POWER PLANT	MARQUETTE	1,340,768	1,572,540	1,573,000
T.E.S. FILER CITY STATION	FILER CITY	12,605	12,605	726,447
UPPER PENINSULA POWER-ESCANABA GENERATING STATION	ESCANABA	120,000	120,000	128,400
Minnesota				
A.S. KING GENERATING PLANT	BAYPORT	89,211	90,806	718,300
ALLIANT ENERGY FOX LAKE PLANT	SHERBURN	500	500	260
AUSTIN UTILITIES NORTHEAST POWER STATION	AUSTIN	149,800	149,815	289,800
BLACK DOG GENERATING PLANT	BURNSVILLE	32,715	62,750	231,200
BOSWELL ENERGY CENTER	COHASSET	124,200	1,735,415	1,849,000
GEORGE NEAL SOUTH	SAINT PAUL	492,740	1,311,745	1,318,000
HIGH BRIDGE GENERATING PLANT	SAINT PAUL	31,315	83,315	227,800
LASKIN ENERGY CENTER	HOYT LAKES	2,105	136,110	140,000
LSP - COTTAGE GROVE L.P.	COTTAGE GROVE	120,005	120,005	120,000
NORTHERN STATES POWER CO.	BECKER	121,446	7,489,601	8,042,751
OTTER TAIL POWER CO., HOOT LAKE PLANT	FERGUS FALLS	14,402	114,402	150,300
RIVERSIDE GENERATING PLANT	MINNEAPOLIS	61,395	61,516	457,000

Appendix 1: Electric Utility Releases and Production-Related Waste by State and Power Plant, 1998 TRI Data

Plant Name	City	Air Emissions (pounds)	Total Releaes (pounds)	Production-Related Waste (pounds)
ROCHESTER PUBLIC UTILITIES SILVER LAKE PLANT	ROCHESTER	512,000	512,000	513,100
Mississippi				
ENTERGY BAXTER WILSON GENERATING PLANT	VICKSBURG	889,593	889,593	889,593
ENTERGY GERALD ANDRUS PLANT	GREENVILLE	1,188,019	1,188,019	1,188,019
MISSISSIPPI POWER CO. - PLANT DANIEL	ESCATAWPA	206,994	1,078,901	1,078,901
MISSISSIPPI POWER CO. - PLANT WATSON	GULFPORT	6,266,016	6,937,525	6,937,525
R. D. MORROW SR. GENERATING PLANT	PURVIS	720,854	1,210,680	1,210,680
Missouri				
ASBURY GENERATING STATION	ASBURY	251,987	694,988	694,988
CHAMOIS POWER PLANT	CHAMOIS	340,000	340,000	560,000
CITY OF INDEPENDENCE	INDEPENDENCE	94,617	122,983	122,964
COLUMBIA MUNICIPAL POWER PLANT	COLUMBIA	132,613	573,329	573,329
HAWTHORN GENERATING FACILITY	KANSAS CITY	92,800	253,050	251,000
IATAN GENERATING STATION	WESTON	248,065	984,065	984,000
JAMES RIVER POWER STATION	SPRINGFIELD	433,698	436,006	1,585,600
LABADIE POWER STATION	LABADIE	1,966,147	5,454,754	7,575,000
MERAMEC PLANT	SAINT LOUIS	3,535,486	3,892,976	4,402,000
MONTROSE	CLINTON	176,470	571,180	569,900
NEW MADRID POWER PLANT	NEW MADRID	332,130	1,526,730	1,950,600
RUSH ISLAND PLANT	FESTUS	349,294	2,677,774	3,293,000
SIBLEY GENERATING STATION	SIBLEY	210,138	213,592	1,526,646
SIKESTON POWER STATION	SIKESTON	340,982	7,377,940	7,377,942
SIOUX POWER PLANT	WEST ALTON	3,351,324	4,674,359	5,561,000
SOUTHWEST POWER STATION	SPRINGFIELD	182,788	194,416	377,000
ST. JOSEPH LIGHT & POWER-LAKE ROAD FACILITY	SAINT JOSEPH	623,239	624,343	624,338
THOMAS HILL ENERGY CENTER - POWER DIV.	CLIFTON HILL	321,860	1,817,860	2,260,900
Montana				
LEWIS & CLARK STATION	SIDNEY	5,959	45,359	434,900
MONTANA POWER CO. COLSTRIP PROJECT DIV.	COLSTRIP	307,865	6,887,215	10,020,720

Appendix 1: Electric Utility Releases and Production-Related Waste by State and Power Plant, 1998 TRI Data

Plant Name	City	Air Emissions (pounds)	Total Releaes (pounds)	Production-Related Waste (pounds)
MONTANA POWER CO. CORETTE THERMAL PLANT	BILLINGS	38,850	38,860	124,630
ROSEBUD POWER PLANT	COLSTRIP	597,981	809,342	842,302
Nebraska				
CITY OF FREMONT DEPARTMENT OF UTILITIES LON D. WRIGHT POWEI	FREMONT	423,600	540,610	701,000
NEBRASKA PUBLIC POWER DISTRICT - SHELDON STATION	HALLAM	387,760	607,260	613,020
NEBRASKA PUBLIC POWER DISTRICT. GERALD GENTLEMAN STATION	SUTHERLAND	1,583,200	3,715,200	3,720,720
OMAHA PUBLIC POWER DISTRICT NEBRASKA CITY STATION	NEBRASKA CITY	820,490	1,697,740	1,697,000
OMAHA PUBLIC POWER DISTRICT NORTH OMAHA STATION	OMAHA	804,790	1,186,095	1,186,300
PLATTE GENERATING STATION	GRAND ISLAND	43,135	43,145	43,155
WHELAN ENERGY CENTER	HASTINGS	23,280	28,272	28,272
Nevada				
FORT CHURCHILL POWER STATION	YERINGTON	0	0	0
MOHAVE GENERATING STATION	LAUGHLIN	1,002,819	1,451,724	1,460,650
NEVADA POWER CO. -REID GARDNER STATION	MOAPA	37,372	589,929	1,226,240
SIERRA PACIFIC POWER CO., NORTH VALMY STATION	VALMY	111,310	194,310	203,400
New Hampshire				
NEWINGTON STATION	NEWINGTON	201,153	201,153	223,940
PUBLIC SERVICE CO. OF NEW HAMPSHIRE SCHILLER STATION	PORTSMOUTH	728,851	728,851	772,400
PUBLIC SERVICE CO. OF NEW HAMPSHIRE, MERRIMACK STATION	BOW	3,096,175	3,117,875	3,118,010
New Jersey				
B.L. ENGLAND GENERATING STATION	BEESLEYS POINT	752,464	780,778	1,911,070
BERGEN GENERATING STATION	RIDGEFIELD	0	0	0
BURLINGTON GENERATING STATION	BURLINGTON	13,250	13,500	13,000
CAMDEN COGEN L.P.	CAMDEN	38,377	38,377	38,377
CARNEY'S POINT GENERATING PLANT	CARNEYS POINT	72,881	72,881	1,453,218
COGEN TECH. NOLOGIES NJ VENTURE L.P.	BAYONNE	78,278	78,278	78,278
DEEPWATER GENERATING STATION	PENNSVILLE	484,714	484,714	577,987

Appendix 1: Electric Utility Releases and Production-Related Waste by State and Power Plant, 1998 TRI Data

Plant Name	City	Air Emissions (pounds)	Total Releaes (pounds)	Production-Related Waste (pounds)
EAGLE POINT COGENERATION PTNR. (EPCP)	WESTVILLE	155,836	155,836	155,358
HUDSON GENERATING STATION	JERSEY CITY	2,567,990	2,885,890	2,968,500
LAKEWOOD COGENERATION	LAKEWOOD	5,222	5,222	5,203
MERCER GENERATING STATION	HAMILTON TOWNSHIP	3,200,330	3,202,330	3,270,650
NUCLEAR BUSINESS UNIT	HANCOCKS BRIDGE	0	0	0
PEDRICKTOWN COGENERATION PLANT	PEDRICKTOWN	19,250	19,250	19,000
PG&E CORP., LOGAN GENERATING PLANT	SWEDESBORO	56,360	56,360	1,160,148
TRIGEN - TRENTON ENERGY CORP.	TRENTON	1,100	1,100	1,106
VINELAND MUNICIPAL ELECTRIC UTILITY H M DOWN STATION	VINELAND	83,010	83,015	95,869
New Mexico				
FOUR CORNERS STEAM ELECTRIC STATION	FRUITLAND	255,842	1,372,210	6,621,000
SAN JUAN GENERATING STATION	WATERFLOW	455,521	525,310	4,121,310
New York				
AES JENNISON L.L.C.	BAINBRIDGE	172,300	172,300	172,300
AES SOMERSET L.L.C.	BARKER	345,800	1,765,964	4,695,000
AES-CAYUGA L.L.C.	LANSING	193,017	336,327	1,886,190
AES-GREENIDGE,L.L.C.	DRESDEN	1,003,234	1,223,627	1,223,000
AES-HICKLING L.L.C.	CORNING	598,415	598,415	623,400
AES-WESTOVER L.L.C	JOHNSON CITY	883,026	973,276	973,000
BEEBEE STATION	ROCHESTER	624,610	624,630	624,920
BOWLINE POINT GENERATING STATION	WEST HAVERSTRAW	72,000	72,000	144,000
BROOKLYN NAVY YARD COGENERATION FACILITY	BROOKLYN	1,000	2,600	36,600
C.R. HUNTLEY STEAM STATION	TONAWANDA	2,804,370	2,903,480	3,592,000
CONSOLIDATED EDISON CO. OF NEW YORK - ASTORIA FACILITY	ASTORIA	53,977	53,977	108,000
CONSOLIDATED EDISON CO. OF NEW YORK -EAST RIVER FACILITY	MANHATTAN	41,072	41,072	82,000
CONSOLIDATED EDISON CO. OF NEW YORK -RAVENSWOOD FACILITY	LONG ISLAND CITY	43,057	43,057	86,000
DANSKAMMER GENERATING STATION	NEWBURGH	1,466,580	1,516,756	1,529,000
E.F. BARRETT POWER STATION	ISLAND PARK	0	0	0
FIBERTEK ENERGY L.L.C.	SYRACUSE	352,000	352,000	562,000
FORT DRUM H.T.W. COGENERATION FACILITY	FORT DRUM	153,000	153,000	153,000
HOLTSVILLE LNG FACILITY	HOLTSVILLE	250	250	50,000

Appendix 1: Electric Utility Releases and Production-Related Waste by State and Power Plant, 1998 TRI Data

Plant Name	City	Air Emissions (pounds)	Total Releaes (pounds)	Production-Related Waste (pounds)
INDECK - CORINTH ENERGY CENTER	CORINTH	2,591	2,591	2,591
LOCKPORT COGENERATION FACILITY	LOCKPORT	0	0	0
LOVETT GENERATING STATION	WEST HAVERSTRAW	1,002,567	1,006,319	1,197,600
NEW YORK POWER AUTHORITY CHARLES POLETTI POWER PLANT	ASTORIA	358,365	358,365	358,370
NIAGARA MOHAWK POWER CORP. DUNKIRK STEAM STATION	DUNKIRK	2,344,290	2,403,890	3,388,100
NIAGARA MOHAWK POWER CORP. OSWEGO STEAM STATION	OSWEGO	61,000	61,000	391,000
NIAGARA MOHAWK POWER CORP.ALBANY STEAM STATION	GLENMONT	110,005	110,005	220,000
NORTHPORT POWER STATION	NORTHPORT	490,215	490,216	543,100
OGDENSBURG ENERGY FACILITY	OGDENSBURG	476	476	476
ONONDAGA COGENERATION L.P.	SYRACUSE	21,630	21,630	0
PORT JEFFERSON POWER STATION	PORT JEFFERSON	159,005	159,005	159,000
RENSSELAER COGEN	RENSSELAER	3,479	3,479	3,479
RICHARD M. FLYNN POWER PLANT	HOLTSVILLE	0	2,730	2,730
ROSETON GENERATING STATION	NEWBURGH	835,300	835,309	835,300
RUSSELL STATION	ROCHESTER	1,820,590	1,820,920	1,821,400
SAMUEL CARLSON GENERATING STATION	JAMESTOWN	1,692,241	1,692,256	1,770,471
North Carolina				
ASHEVILLE PLANT	ARDEN	2,419,423	2,882,855	2,881,000
CAPE FEAR STEAM ELECTRIC PLANT	MONCURE	2,067,218	2,461,656	2,458,000
COGENTRIX EASTERN CAROLINA CORP. ELIZABETHTOWN	ELIZABETHTOWN	35,000	35,000	35,000
COGENTRIX EASTERN CAROLINA CORP. KENANSVILLE	KENANSVILLE	39,000	39,000	39,000
COGENTRIX EASTERN CAROLINA CORP. LUMBERTON	LUMBERTON	34,000	34,000	34,000
COGENTRIX OF NORTH CAROLINA ROXBORO	ROXBORO	65,000	65,000	65,000
COGENTRIX OF NORTH CAROLINA SOUTHPORT	SOUTHPORT	174,000	174,000	174,000
COGENTRIX OF ROCKY MOUNT	BATTLEBORO	42,900	42,900	856,900
DUKE ENERGY BELEWS CREEK STEAM STATION	WALNUT COVE	6,579,395	7,272,834	7,544,900
DUKE ENERGY BUCK STEAM STATION	SALISBURY	732,715	939,026	945,100
DUKE ENERGY DAN RIVER STEAM STATION	EDEN	371,580	438,585	443,200
DUKE ENERGY MARSHALL STEAM STATION	TERRELL	5,696,215	6,644,230	6,750,300
DUKE ENERGY PLANT ALLEN	BELMONT	1,847,800	2,565,565	2,589,000
DUKE ENERGY RIVERBEND STEAM STATION	MOUNT HOLLY	810,945	1,034,755	1,041,900
DUKE ENERGY, CLIFFSIDE STEAM STATION	CLIFFSIDE	1,720,530	2,249,056	2,296,300
H.F. LEE STEAM ELECTRIC PLANT	GOLDSBORO	1,870,976	2,244,625	2,242,000

Appendix 1: Electric Utility Releases and Production-Related Waste by State and Power Plant, 1998 TRI Data

Plant Name	City	Air Emissions (pounds)	Total Releaes (pounds)	Production-Related Waste (pounds)
L. V. SUTTON PLANT	WILMINGTON	3,127,286	3,742,926	3,745,000
MAYO ELECTRIC GENERATING PLANT	ROXBORO	4,720,134	5,662,324	5,662,000
ROANOKE VALLEY ENERGY FACILITY	WELDON	100,605	100,605	2,161,960
ROXBORO STEAM ELECTRIC PLANT	SEMORA	15,148,574	17,290,877	17,362,000
W.H. WEATHERSPOON PLANT	LUMBERTON	783,730	871,813	872,000
North Dakota				
ANTELOPE VALLEY STATION	BEULAH	149,412	149,412	4,796,100
GREAT RIVER ENERGY STANTON STATION	STANTON	78,505	319,905	973,000
GREAT RIVER ENERGY, COAL CREEK STATION	UNDERWOOD	665,075	4,618,475	6,572,000
LELAND OLDS STATION	STANTON	142,701	2,220,126	3,229,000
MILTON R YOUNG STATION	CENTER	182,289	1,060,689	3,814,000
OTTER TAIL POWER CO. COYOTE STATION	BEULAH	159,919	1,493,659	2,424,660
R.M. HESKETT STATION	MANDAN	26,506	293,512	520,100
Ohio				
AMERICAN ELECTRIC POWER CO.MUSKINGUM RIVER PLANT	BEVERLY	7,930,873	8,905,292	10,306,700
AMERICAN ELECTRIC POWER CO.PICWAY PLANT	LOCKBOURNE	151,225	172,235	333,000
AMERICAN ELECTRIC POWER CONESVILLE PLANT	CONESVILLE	6,132,623	7,211,328	14,530,200
AMERICAN ELECTRIC POWER GAVIN PLANT	CHESHIRE	2,717,679	5,496,340	33,488,400
CARDINAL PLANT	BRILLIANT	11,323,277	13,178,247	15,301,300
CG&E BECKJORD GENERATING STATION	NEW RICHMOND	5,416,190	5,825,132	7,471,000
CG&E MIAMI FORT STATION	NORTH BEND	5,252,883	5,656,823	6,708,000
CINCINNATI GAS & ELEC. CO. W.H. ZIMMER GENERATING STATION	MOSCOW	1,572,805	2,950,205	12,019,000
CITY OF HAMILTON POWER PLANT	HAMILTON	375,003	375,006	427,800
CITY OF ORRVILLE DEPT. OF PUBLIC UTILITIES	ORRVILLE	456,260	456,260	650,900
CITY OF PAINESVILLE POWER PLANT	PAINESVILLE	220,010	220,010	288,800
DAYTON POWER & LIGHT CO.J.M STUART STATION	MANCHESTER	12,808,504	16,091,282	24,618,000
DAYTON POWER & LIGHT CO.KILLEN STATION	MANCHESTER	4,461,970	5,492,014	5,847,000
DAYTON POWER & LIGHT CO.O. H. HUTCHINGS STATION	MIAMISBURG	825,247	889,508	1,061,200
DOVER LIGHT & POWER	DOVER	116,500	116,500	127,830
FIRSTENERGY ASHTABULA PLANT	ASHTABULA	1,171,000	1,171,000	1,171,000
FIRSTENERGY CORP. EASTLAKE PLANT	WILLOUGHBY	6,346,570	6,350,357	6,966,000

Appendix 1: Electric Utility Releases and Production-Related Waste by State and Power Plant, 1998 TRI Data

Plant Name	City	Air Emissions (pounds)	Total Releaes (pounds)	Production-Related Waste (pounds)
FIRSTENERGY CORP. LAKE SHORE PLANT	CLEVELAND	267,000	267,001	288,000
FIRSTENERGY, AVON LAKE PLANT	AVON LAKE	2,493,460	2,495,753	2,809,700
FIRSTENERGY, BAY SHORE PLANT	OREGON	937,860	1,011,419	1,028,600
FIRSTENERGY, NILES PLANT	NILES	920,431	920,837	949,100
FIRSTENERGY, R.E. BURGER PLANT	SHADYSIDE	2,162,330	2,163,526	2,357,000
FIRSTENERGY, W.H. SAMMIS PLANT	STRATTON	12,115,408	12,128,827	14,742,700
OHIO VALLEY ELECTRIC CORP.KYGER CREEK STATION	GALLIPOLIS	7,707,645	8,731,076	10,538,000
RICHARD H. GORSUCH STATION	MARIETTA	1,137,050	1,139,770	3,020,600
SHELBY MUNICIPAL LIGHT PLANT	SHELBY	110,010	110,010	158,830
ST. MARYS MUNICIPAL POWER PLANT	SAINT MARYS	90,817	90,817	90,817
Oklahoma				
AES SHADY POINT INC.	PANAMA	140,472	140,472	914,000
GRAND RIVERR DAM AUTHORITY COAL FIRED COMPLEX	CHOUTEAU	176,118	1,325,475	2,215,000
MUSKOGEE GENERATING STATION	MUSKOGEE	376,549	391,269	1,555,800
NORTHEASTERN STATION	OOLOGAH	1,842,485	2,527,165	2,521,800
SOONER GENERATING STATION	RED ROCK	250,679	285,947	732,400
SOUTHWESTERN STATION	WASHITA	0	240	240
WESTERN FARMERS ELECTRIC COOP	HUGO	3,392,000	3,408,700	3,380,114
Oregon				
BOARDMAN PLANT	BOARDMAN	125,780	745,785	745,760
COYOTE SPRINGS PLANT	BOARDMAN	1,805	1,805	1,800
Pennsylvania				
AES BEAVER VALLEY INC.	MONACA	192,500	192,500	1,664,000
ARMSTRONG POWER STATION	KITTANNING	1,794,222	2,000,987	1,998,000
BRUNNER ISLAND STEAM ELECTRIC STATION	YORK HAVEN	5,458,051	5,458,051	5,456,650
CAMBRIA COGEN CO.	EBENSBURG	307,506	307,510	712,766
CHESWICK POWER STATION	CHESWICK	1,543,160	1,625,478	1,828,840
COLVER POWER PROJECT	COLVER	81,446	81,446	2,129,240
CONEMAUGH STATION	NEW FLORENCE	1,173,948	2,173,147	11,102,900

Appendix 1: Electric Utility Releases and Production-Related Waste by State and Power Plant, 1998 TRI Data

Plant Name	City	Air Emissions (pounds)	Total Releaes (pounds)	Production-Related Waste (pounds)
CROMBY GENERATING STATION	PHOENIXVILLE	272,272	272,772	272,445
CROYDON GENERATING STATION	CROYDON	0	0	0
DELAWARE GENERATING STATION	PHILADELPHIA	37,194	37,194	37,194
EBENSBURG POWER CO.	EBENSBURG	321,001	343,051	1,128,000
EDDYSTONE GENERATING STATION	CRUM LYNNE	494,933	562,036	497,020
ELRAMA POWER STATION	ELRAMA	1,543,160	1,625,478	1,828,800
EME HOMER CITY GENERATION L.P.	HOMER CITY	8,856,289	9,194,422	14,395,000
FIRSTENERGY, BRUCE MANSFIELD PLANT	SHIPPINGPORT	4,108,800	4,113,313	6,243,000
FIRSTENERGY, NEW CASTLE PLANT	WEST PITTSBURG	1,722,290	1,944,430	1,942,000
FOSTER WHEELER MT. CARMEL INC.	MARION HEIGHTS	84,988	84,988	2,313,452
GRAYS FERRY COGENERATION PTNR.	PHILADELPHIA	75,737	75,737	75,737
HATFIELD POWER STATION	MASONTOWN	5,558,952	6,361,612	6,366,200
HOLTWOOD OPS.	HOLTWOOD	384,520	412,459	412,355
KEYSTONE STATION	SHELOCTA	8,730,088	9,402,073	12,444,000
MARTINS CREEK STEAM ELECTRIC STATION	BANGOR	1,151,365	1,266,532	1,265,078
MITCHELL POWER STATION	COURTNEY	6,405	194,665	193,800
MONTOUR STEAM ELECTRIC STATION	DANVILLE	6,500,089	6,614,002	6,613,696
NORTHEASTERN POWER CO.	MC ADOO	755	219,755	219,000
PANTHER CREEK ENERGY FACILITY	NESQUEHONING	70,295	526,494	778,584
PG&E GENERATING NORTHAMPTON GENERATING PLANT	NORTHAMPTON	53,289	53,289	2,080,837
PINEY CREEK LTD. PTNR.	CLARION	120,800	171,000	472,000
PORTLAND STATION	PORTLAND	1,263,686	1,263,906	1,585,700
RICHMOND	PHILADELPHIA	0	0	0
SAINT NICHOLAS COGENERATION PROJECT	SHENANDOAH	5,310	831,318	826,184
SCHUYLKILL GENERATING STATION	PHILADELPHIA	0	0	0
SCRUBGRASS GENERATING PLANT	KENNERDELL	46,180	48,098	1,926,353
SEWARD STATION	NEW FLORENCE	865,113	865,181	1,132,500
SHAWVILLE STATION	SHAWVILLE	2,771,433	3,144,159	4,082,995
SUNBURY STEAM ELECTRIC STATION	SHAMOKIN DAM	1,867,022	1,867,022	1,867,330
TITUS STATION	BIRDSBORO	917,241	919,171	1,380,500
TRIGEN-PHILADELPHIA ENERGY CORP. EDISON PLANT	PHILADELPHIA	0	0	1
UGI UTILITIES INC. HUNLOCK POWER STATION	HUNLOCK CREEK	222,225	222,225	222,225
WARREN STATION	WARREN	255,010	255,010	327,940
WHEELABRATOR FRACKVILLE ENERGY CO. INC.	FRACKVILLE	25	25	236,550

Appendix 1: Electric Utility Releases and Production-Related Waste by State and Power Plant, 1998 TRI Data

Plant Name	City	Air Emissions (pounds)	Total Releaes (pounds)	Production-Related Waste (pounds)
Puerto Rico				
MAYAGUEZ GAS TURBINES POWER PLANT	MAYAGUEZ	0	0	0
PREPA - AGUIRRE POWER GENERATION COMPLEX	SALINAS	2,446,162	2,535,236	2,593,451
PREPA - JOBOS GAS TURBINES POWER PLANT	GUAYAMA	0	0	0
PREPA - PALO SECO POWER PLANT	LEVITTOWN	1,151,059	1,171,865	1,212,889
PREPA SOUTH COAST POWER PLANT	GUAYANILLA	3,426,160	3,505,896	3,554,940
PREPA CAMBALACHE COMBUSTION TURBINE PLANT	ARECIBO	874,454	874,454	874,444
PREPA SAN JUAN STEAM POWER PLANT	PUERTO NUEVO	1,959,243	1,986,491	2,041,484
PREPA-DAGUAO GAS TURBINES POWER PLANT	CEIBA	0	0	0
PREPA-VEGA BAJA GAS TURBINES POWER PLANT	VEGA BAJA	0	0	0
PREPA-YABUCOA GAS TURBINES POWER PLANT	HUMACAO	0	0	0
Rhode Island				
OCEAN STATE POWER	HARRISVILLE	366,400	366,400	366,400
PAWTUCKET POWER ASSOCIATES	PAWTUCKET	45,597	45,597	45,597
USGEN NEW ENGLAND INC.	PROVIDENCE	43,005	43,010	43,012
South Carolina				
CANADYS STATION SOUTH CAROLINA ELECTRIC & GAS CO.	CANADYS	1,157,878	1,332,891	1,332,892
COGEN SOUTH L.L.C.	NORTH CHARLESTON	16,394	16,394	16,548
CROSS GENERATING STATION	PINEVILLE	478,982	1,202,082	5,853,182
D-AREA SAVANNAH RIVER FACILITY - S.C. E. & G.	AIKEN	464,978	494,847	494,883
DUKE ENERGY LEE STEAM STATION	PELZER	478,320	563,525	569,300
GRAINGER GENERATING STATION	CONWAY	387,504	427,504	542,304
H.B. ROBINSON STEAM ELECTRIC PLT.	HARTSVILLE	978,560	1,088,560	1,088,000
JEFFERIES GENERATING STATION	MONCKS CORNER	1,091,000	1,091,000	1,404,900
MCMEEKIN STATION - SOUTH CAROLINA ELECTRIC & GAS CO.	COLUMBIA	1,315,420	1,408,455	1,408,454
SOUTH CAROLINA ELECTRIC & GAS CO. - COPE STATION	COPE	58,448	416,035	416,036
SOUTH CAROLINA ELECTRIC & GAS CO. - WATEREE STATION	EASTOVER	3,372,330	3,902,641	3,903,331
URQUHART STATION - SOUTH CAROLINA ELECTRIC & GAS CO.	BEECH ISLAND	859,606	904,194	904,193
WILLIAMS STATION - GENCO	GOOSE CREEK	1,402,829	1,402,829	1,422,566
WINYAH GENERATING STATION	GEORGETOWN	1,651,476	1,858,581	3,164,076

Appendix 1: Electric Utility Releases and Production-Related Waste by State and Power Plant, 1998 TRI Data

Plant Name	City	Air Emissions (pounds)	Total Releaes (pounds)	Production-Related Waste (pounds)
South Dakota				
BHPL--BEN FRENCH POWER PLANT	RAPID CITY	13,583	13,639	113,274
BIG STONE PLANT	BIG STONE CITY	176,149	1,801,149	2,065,000
Tennessee				
U.S. TVA ALLEN FOSSIL PLANT	MEMPHIS	410,530	1,091,040	2,998,103
U.S. TVA BULL RUN FOSSIL PLANT	CLINTON	3,935,150	4,342,700	5,549,020
U.S. TVA CUMBERLAND FOSSIL PLANT	CUMBERLAND CITY	2,172,450	4,485,500	23,134,120
U.S. TVA GALLATIN FOSSIL PLANT	GALLATIN	3,230,180	4,500,630	5,800,133
U.S. TVA JOHN SEVIER FOSSIL PLANT	ROGERSVILLE	4,044,640	4,446,445	5,449,000
U.S. TVA JOHNSONVILLE FOSSIL PLANT	NEW JOHNSONVILLE	5,046,315	6,484,620	9,596,705
U.S. TVA KINGSTON FOSSIL PLANT	HARRIMAN	7,817,950	9,423,200	11,226,052
U.S. TVA SEQUOYAH NUCLEAR PLANT	SODDY-DAISY	0	0	0
U.S. TVA WATTS BAR NUCLEAR PLANT	SPRING CITY	0	10,000	10,000
Texas				
AES DEEPWATER INC.	PASADENA	180,000	180,000	180,972
BIG BROWN STEAM ELECTRIC STATION & LIGNITE MINE	FAIRFIELD	141,110	2,359,730	2,460,225
COLETO CREEK POWER PLANT	FANNIN	765,030	1,981,870	2,101,640
GIBBONS CREEK STEAM ELECTRIC STATION	CARLOS	192,899	445,212	467,259
H.W. PIRKEY POWER PLANT	HALLSVILLE	122,867	1,807,852	2,761,420
L.C.R.A. FAYETTE POWER PROJECT	LA GRANGE	1,020,787	1,457,864	1,836,332
LIMESTONE ELECTRIC GENERATING STATION	JEWETT	312,471	5,494,516	6,777,000
MARTIN LAKE STEAM ELECTRIC STATION & LIGNITE	TATUM	290,120	5,260,340	5,789,215
MONTICELLO STEAM ELECTRIC STATION & LIGNITE MINE	MOUNT PLEASANT	1,380,720	5,195,880	13,602,100
O.W. SOMMERS/J.T. DEELY/J.K. SPRUCE GENERATING COMPLEX	SAN ANTONIO	511,630	736,270	1,420,030
OKLAUNION POWER STATION	VERNON	613,546	1,040,776	1,125,080
SAN MIGUEL ELECTRIC COOPERATIVE INC.	CHRISTINE	19,513	19,513	6,539,727
SANDOW STEAM ELECTRIC STATION	ROCKDALE	74,690	1,571,380	1,714,200
SOUTHWESTERN PUBLIC SERVICE CO. HARRINGTON STATION	AMARILLO	395,260	463,860	2,569,000
SOUTHWESTERN PUBLIC SERVICE CO. - TOLK STATION	SUDAN	270,842	341,172	1,584,800

Appendix 1: Electric Utility Releases and Production-Related Waste by State and Power Plant, 1998 TRI Data

Plant Name	City	Air Emissions (pounds)	Total Releaes (pounds)	Production-Related Waste (pounds)
TENASKA IV TEXAS PARTNERS CLEBURNE COGENERATION FAC.	CLEBURNE	46,600	46,600	46,600
TEXAS-NEW MEXICO POWER CO. TNP ONE GENERATING STATION	BREMOND	66,893	399,957	399,957
W.A. PARISH ELECTRIC GENERATING STATION	THOMPSON	566,401	1,803,666	3,013,000
WELSH POWER PLANT	PITTSBURG	1,167,030	2,846,225	3,050,600
Utah				
BONANZA POWER PLANT	VERNAL	90,151	1,910,370	1,910,365
INTERMOUNTAIN POWER STATION	DELTA	150,300	1,808,400	6,303,500
PACIFICORP CARBON PLANT	HELPER	178,206	328,384	327,000
PACIFICORP HUNTER POWER PLANT	CASTLE DALE	1,256,301	1,956,322	41,402,000
PACIFICORP HUNTINGTON PLANT	HUNTINGTON	937,249	2,003,619	3,063,000
SUNNYSIDE COGENERATION ASSOCIATES	SUNNYSIDE	369,250	1,006,306	1,147,368
Virginia				
AMERICAN ELECTRIC POWER, CLINCH RIVER PLANT	CLEVELAND	2,934,168	3,133,464	3,636,600
BELLEMEADE POWER STATION	RICHMOND	0	0	0
BIRCHWOOD POWER FACILITY	SEALSTON	8,607	8,607	905,416
BREMO POWER STATION	BREMO BLUFF	826,700	992,791	993,000
CHESAPEAKE ENERGY CENTER	CHESAPEAKE	2,456,601	2,510,164	2,510,100
CHESTERFIELD POWER STATION	CHESTER	3,936,278	4,866,722	4,863,000
CLOVER POWER STATION	CLOVER	426,770	1,372,659	2,368,900
COGENTRIX OF RICHMOND INC.	RICHMOND	77,817	78,207	1,127,255
COGENTRIX VIRGINIA LEASING CORP.	PORTSMOUTH	107,000	107,000	107,000
DOSWELL COMBINED CYCLE FACILITY	ASHLAND	57,000	57,000	57,000
GLEN LYN PLANT	GLEN LYN	1,022,386	1,296,069	1,530,000
GORDONSVILLE ENERGY L.P.	GORDONSVILLE	608	858	638
JAMES RIVER COGENERATION CO. INC.	HOPEWELL	160,000	160,000	160,000
LG&E-WESTMORELAND ALTAVISTA COGENERATION FACILITY	ALTAVISTA	13,310	13,310	95,300
LG&E-WESTMORELAND HOPEWELL COGENERATION FACILITY	HOPEWELL	13,710	13,710	60,700
LG&E-WESTMORELAND SOUTHAMPTON COGENERATION FACILITY	FRANKLIN	3,005	3,005	151,000
MECKLENBURG COGENERATION FACILITY	CLARKSVILLE	29,760	30,265	3,368,310
PEPCO POTOMAC RIVER GENERATING STATION	ALEXANDRIA	1,661,685	1,834,085	2,083,070
POSSUM POINT POWER STATION	DUMFRIES	1,476,600	1,783,050	1,612,000

Appendix 1: Electric Utility Releases and Production-Related Waste by State and Power Plant, 1998 TRI Data

Plant Name	City	Air Emissions (pounds)	Total Releaes (pounds)	Production-Related Waste (pounds)
VIRGINIA ELECTRIC & POWER CO.	SURRY	0	0	0
YORKTOWN POWER STATION	YORKTOWN	2,228,540	2,264,975	2,265,300
Washington				
CENTRALIA POWER PLANT	CENTRALIA	1,064,674	4,430,343	4,611,048
CITY OF TACOMA STEAM PLANT NO 2	TACOMA	12,762	12,767	57,149
ENCOGEN NORTHWEST COGENERATION PLANT	BELLINGHAM	59,005	59,005	59,004
TENASKA WASHINGTON PARTNERS FERNDALE COGENERATION FACIL	FERNDALE	3,500	3,500	3,500
West Virginia				
ALBRIGHT POWER STATION	ALBRIGHT	483,593	538,598	538,000
AMERICAN BITUMINOUS POWER PARTNERS	GRANT TOWN	1,338,797	2,845,295	2,929,700
AMERICAN ELECTRIC POWER. JOHN E. AMOS PLANT	WINFIELD	16,709,646	17,508,966	20,598,000
AMERICAN ELECTRIC POWER. KAMMER PLANT	MOUNDSVILLE	3,726,119	4,102,998	4,133,300
AMERICAN ELECTRIC POWER. KANAWHA RIVER PLANT	GLASGOW	2,981,636	2,982,480	3,498,200
AMERICAN ELECTRIC POWER. PHILIP SPORN PLANT	NEW HAVEN	5,071,756	6,131,566	7,335,206
AMERICAN ELECTRIC POWER.MITCHELL PLANT	MOUNDSVILLE	13,075,320	14,494,335	15,373,800
AMERICAN ELECTRIC POWER.MOUNTAINEER PLANT	NEW HAVEN	8,052,903	9,219,835	9,812,300
FORT MARTIN POWER STATION	MAIDSVILLE	3,685,621	4,045,576	4,040,670
HARRISON POWER STATION	HAYWOOD	264,375	2,299,175	2,296,000
MORGANTOWN ENERGY ASSOCIATES	MORGANTOWN	65,044	65,044	65,044
MT. STORM POWER STATION	MOUNT STORM	5,732,651	7,510,757	9,781,000
PLEASANTS/WILLOW ISLAND POWER STATIONS	WILLOW ISLAND	978,947	2,004,067	2,002,000
RIVESVILLE POWER STATION	RIVESVILLE	174,174	174,174	174,000
Wisconsin				
COLUMBIA ENERGY CENTER	PORTAGE	129,807	267,333	268,730
DAIRYLAND POWER COOPERATIVE - GENOA SITE	GENOA	2,131,520	2,131,541	2,153,000
DAIRYLAND POWER COOPRATIVE - ALMA SITE	ALMA	1,860,511	1,952,640	2,326,000
EDGEWATER GENERATING STATION	SHEBOYGAN	154,626	157,259	1,201,710
KAUKAUNA ELECTRIC & WATER DEPARTMENT	KAUKAUNA	0	0	0
LSP-WHITEWATER L.P.	WHITEWATER	140,005	140,005	140,000

Appendix 1: Electric Utility Releases and Production-Related Waste by State and Power Plant, 1998 TRI Data

Plant Name	City	Air Emissions (pounds)	Total Releaes (pounds)	Production-Related Waste (pounds)
MADISON GAS & ELECTRIC CO.	MADISON	223,546	288,556	318,760
MANITOWOC PUBLIC UTILITIES	MANITOWOC	311,238	311,238	1,022,118
MILWAUKEE COUNTY POWER PLANT	WAUWATOSA	62,000	62,000	62,000
NELSON DEWEY GENERATING STATION	CASSVILLE	118,060	501,360	501,492
NORTHERN STATES POWER CO. - WISCONSIN (FRENCH ISLAND)	LA CROSSE	356,772	357,022	526,734
NORTHERN STATES POWER CO. WISCONSIN BAY FRONT	ASHLAND	57,759	58,009	331,767
OAK CREEK POWER PLANT	OAK CREEK	3,770,630	4,168,808	4,168,400
PLEASANT PRAIRIE POWER PLANT	PLEASANT PRAIRIE	391,872	398,657	398,630
POINT BEACH NUCLEAR PLANT	TWO RIVERS	0	0	0
PORT WASHINGTON POWER PLANT	PORT WASHINGTON	1,689,027	1,692,527	1,708,800
PULLIAM POWER PLANT	GREEN BAY	107,644	523,710	1,779,100
ROCK RIVER GENERATING STATION	BELOIT	174,421	202,003	225,862
VALLEY POWER PLANT	MILWAUKEE	1,879,047	1,880,506	1,917,200
WESTON POWER PLANT	ROTHSCHILD	145,613	395,619	1,233,700
Wyoming				
BHPL--OSAGE POWER PLANT	OSAGE	26,724	188,622	242,100
JIM BRIDGER POWER PLANT/ BRIDGER COAL CO.	POINT OF ROCKS	272,838	3,263,115	4,506,000
LARAMIE RIVER STATION	WHEATLAND	1,428,098	4,353,838	4,372,000
NEIL SIMPSON COMPLEX	GILLETTE	17,129	1,699,139	1,922,563
PACIFICORP - DAVE JOHNSTON PLANT	GLENROCK	242,434	1,689,080	1,832,000
PACIFICORP, NAUGHTON POWER PLANT	KEMMERER	238,964	936,464	1,365,000
WYODAK PLANT	GILLETTE	44,431	44,524	1,386,000

Appendix 2: Data and Methodology

TRI Data

Data in this report come from the 1998 Toxics Release Inventory database released to the public in May 2000 by U.S. EPA, and were downloaded from the Right-to-Know Network (RTK-Net). Facilities designated as electric utilities reported SIC code 4911 as their primary SIC code. In most cases, no other SIC code was reported, although some facilities designated as electric utilities may have other subsidiary operations on site.

TRI Releases and Production-Related Waste

Facilities report their air emissions, surface water discharges, releases to land, and amounts of waste injected into on-site deep wells. These quantities were aggregated into total releases as used in this report. Air emissions are the total of stack air emissions and fugitive air emissions, which are reported separately.

Facilities also report amounts of waste managed on site by recycling, burning for energy recovery, and treatment, as well as amounts of waste shipped off site for recycling, energy recovery, treatment, or disposal. These quantities are summed with total releases to calculate production-related waste, which represents amounts of chemicals used on site that do not end up as product. Electric utilities reported some on-site treatment of waste, such as SO_2 controls, but the vast majority of production-related waste from electric power plants ends up as releases.

How Power Plants Estimate Their Emissions

Facilities reporting to TRI are not required to measure their emissions, but to use the best available information. If measurement data are available, facilities will use them to report to TRI. Facilities measure some of their emissions because of permitting requirements under other environmental statues, such as the Clean Air Act or Clean Water Act. In the 1998 TRI data, 13 percent of non-electric utility toxic air emissions were measured. However, since electric utilities do not have permits for toxic chemical releases, they generally don't measure emissions. Only four percent of power plant toxic chemical air emissions reported to TRI were measured in 1998.

The vast majority of electric utility toxic chemical releases are estimated by emission factors. An emission factor is essentially a multiplier used with known variables such as fuel consumption or amount of electricity generated. These variables combine to yield emission estimates for various chemicals. Some emission factors can be extremely accurate. For instance, if a facility monitors the amount of various impurities in coal burned, these data can be used to

develop emission factors that paint an accurate picture of the quantity of those impurities emitted to the air.

However, there is no requirement for facilities to develop and use such individualized emission factors, and they are just as likely to use national averages as emission factors for impurities in coal. Sixty-four percent of 1998 toxic chemical air emissions from power plants were estimated by emission factors, as compared to 33 percent for non-utility toxic air emissions.

Even if two plants have similar operations, they can report huge differences in releases depending on the emission factors they use. Although TRI requires plants to report that they used emission factors to estimate a given release quantity, they are not required to report which emission factors they used. And since such a large percentage of power plant releases are estimated by emission factors, it's difficult to compare any two power plants to one another. For this reason, this report does not rank emissions from individual plants, either nationally or within states.

Matching Electric Utility Data among Databases

Facilities reporting to TRI are assigned a unique TRI Facility Identification number. These facilities also report data to EPA's Acid Rain Program's Continuous Emission Monitoring (CEM), and various databases maintained by U.S. Department of Energy (in particular, EIA-759), containing information on emissions of SO_2 and NO_X, as well as heat input, power generation, and fuels burned for combustion. These databases use other identifiers that are not the same as the TRI identifier, and so facilities had to be matched by hand for comparisons among databases. In most cases, the match was obvious by name and location, but some power plants had to be contacted directly to secure a match.

Electric Utility/Utility Holding Company Aggregations

Facilities report parent company names to TRI, although not in standardized form suitable for aggregation. This report uses electric utility and utility holding company associations provided by the Clean Air Task Force, gathered from U.S. DOE data and other sources, and includes plants that report to EPA's Acid Rain Program. Given the lag time between reporting and when data are made available to the public, some of these associations may no longer be valid, but this report contains the latest information available to Clear the Air.

Acid Aerosol Emissions Reductions from SO_2 Controls

Although power plants report their total releases to TRI, most power plants are made up of individual boiler/generating units that may burn different fuels and have different capacities. If plants have SO_2 controls, these controls are on

individual units, rather than on the whole plant. A power plant can have controls on none, one, some, or all of its boiler units. In trying to assess the impact of SO_2 controls, it was necessary first to find the universe of coal-fired power plants in the TRI database that also have data on SO_2 emissions. From this set, the next step was to compare power plants with SO_2 controls on each boiler unit to plants with no controls on any units.

A coal-fired boiler unit was assumed to have SO_2 controls if its SO_2 emission rate was below 0.3 pounds per million BTUs of heat input, calculated from the EPA CEM data.[1] In theory, any boiler unit with an emission rate greater than 0.3 is uncontrolled, but some of those units may be controlled yet exceeding their allowed emission levels. For this report, boiler units with SO_2 emission rates greater than 0.6 were considered uncontrolled. In total, four matched plants were found to have SO_2 controls on every unit, and 39 were found to be totally uncontrolled.

The next step was to calculate emission rates for hydrochloric, hydrofluoric, and sulfuric acid for the controlled and uncontrolled plants. These were calculated by dividing the pounds of acid air emissions by the power generation in megawatt-hours. The controlled and uncontrolled rates were then calculated by averaging for each acid. Due to the wide variations in sulfur content of coal burned at power plants, there was much less variation between controlled and uncontrolled emissions of sulfuric acid than for hydrochloric and hydrofluoric acids (see tables, below).

[1] This is the emission level required for new sources under the Clean Air Act.

Power Generation and Emissions Data for Power Plants with and without SO_2 Controls

	Uncontrolled Power Plants	Controlled Power Plants
Number of Power Plants	39	4
Total Power Generation (MwH)	205,101,634	49,699,368
Total Heat Input (MBTU)	2,127,592,006	527,703,257
Total SO_2 Emissions (tons)	1,889,767	37,763
Average SO_2 Emission Rate (lb/MBTU)	1.776	0.143
Total Sulfuric Acid Emissions (pounds)	20,134,220	2,911,036
Total Hydrochloric Acid Emissions (pounds)	102,405,750	909,955
Total Hydrofluoric Acid Emissions (pounds)	11,386,559	118,271
Average Sulfuric Acid Emission Rate (lb/MwH)	0.098	0.059
Average Hydrochloric Acid Emission Rate (lb/MwH)	0.499	0.018
Average Hydrofluoric Acid Emission Rate (lb/MwH)	0.056	0.002

Acid Aerosol Emission Rate Comparison for Power Plants with and without SO_2 Controls

	Ratio of Emission Rates for Controlled vs. Uncontrolled Power Plants
Sulfuric Acid	0.6
Hydrochloric Acid	0.04
Hydrofluoric Acid	0.04

Appendix 3: Potential Human Health Effects of Some Chemicals Released by Electric Power Plants

Chemical(s)	High Exposure Effects	Longer and Lower Exposure Effects
Hydrochloric Acid	Inhalation can irritate the lungs, as well as mouth, nose and throat; higher exposures can lead to fluid buildup (pulmonary edema), a medical emergency. Dermal contact can cause severe, permanent eye and skin damage. (NJDOH)	Repeated inhalation can lead to bronchitis. Exposure to vapor may cause erosion of teeth. Some evidence of increased lung cancer in exposed workers. (NJDOH)
Sulfuric Acid	Inhalation can irritate the lungs; higher exposures can lead to fluid buildup (pulmonary edema), a medical emergency. Contact with skin and eyes can cause third-degree burns and blindness. (NJDOH)	Repeated inhalation can lead to bronchitis, and may lead to emphysema. Exposure to vapor may cause chronic runny nose, tearing of the eyes, nosebleeds and stomach upset, as well as erosion and pitting of the teeth. Some evidence of increased lung cancer in exposed workers. (NJDOH)
Hydrofluoric Acid	Inhalation effects include damage to lungs and heart, death. Dermal contact will burn skin and eyes. (ATSDR)	Irritation of eyes, skin, and lungs. (ATSDR)
Manganese and Manganese Compounds	Exposure to heated fumes can cause "metal fume fever" with symptoms similar to flu, as well as congestion and coughing (manganese "pneumonia"). (NJDOH)	Repeated exposure may cause brain damage, with ultimate effects resembling Parkinson's disease. May damage liver, kidney, lungs. (NJDOH) Too much manganese can cause serious effects on the central nervous system. Workers in certain industries who have been exposed to airborne dust containing manganese for many months or years may have mental or emotional disturbances and their body movements may become slow and clumsy. Some of these symptoms may be treated, but some may be caused by permanent brain injury. (EPA1)

Nickel and Nickel Compounds	Inhalation effects include bronchitis and reduced lung function. (ATSDR)	Allergic skin rashes. Cancer of lung and nasal sinus seen in nickel workers, inhalation of certain nickel compounds caused cancer in laboratory studies. (ATSDR)
Chromium and Chromium Compounds	Some forms are more toxic than others. Inhalation effects include irritation/damage to nose, lungs, stomach, and intestines. Some persons are allergic, and high exposure may trigger asthma. (ATSDR)	Some chromium compounds are known human carcinogens, based both on exposed workers and also on laboratory studies. Animal studies indicate reproductive effects and fetal toxicity. (ATSDR)
Toluene	Dizziness, fatigue, unconsciousness, and death. Permanent brain and nervous system damage from repeated high-level exposure, including speech damage, vision and hearing problems, loss of muscle control, and poor balance. Also affects kidneys and leads to fetal toxicity. (ATSDR)	Fatigue, confusion, weakness, appearance of intoxication, memory loss, nausea, loss of appetite, hearing loss. (ATSDR) Also considered a developmental toxicant under California's Proposition 65.
n-Hexane	Alterations in the respiratory tract of laboratory animals, also observed limb paralysis, liver damage, testicular damage. (EPA2)	Decrease in motor nerve conduction and other effects on the nervous system of exposed workers. (EPA2)
Selenium and Selenium Compounds	No data on inhalation available. For ingestion, walking becomes unsteady, labored breathing, possible death. Congestion of the liver, inflammation of the heart, degeneration of the lining of the digestive tract, and bone erosion. (EPA2)	No data on inhalation available. For ingestion, skin lesions, fatigue, anorexia, gastroenteritis, liver degeneration, enlarged spleen. (EPA2)

Main reference: *Taking Stock 1997: North American Pollutant Releases and Transfers.* Montreal: Commission for Environmental Cooperation (CEC), March 2000, Appendix C-1. CEC compiled from the New Jersey Department of Health and Senior Services (NJDOH) and the Agency Toxic Substance Disease Registry (ATSDR).

Additional data from EPA sources: *1997 Toxics Release Inventory*. EPA 745-R-99-003, April 1999 (EPA1); and Integrated Risk Information System (EPA2), available online at http://www.epa.gov/iris.