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The Plain English Guide To The Clean Air Act

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The Clean Air Act: The promise of cleaner air for all Americans.

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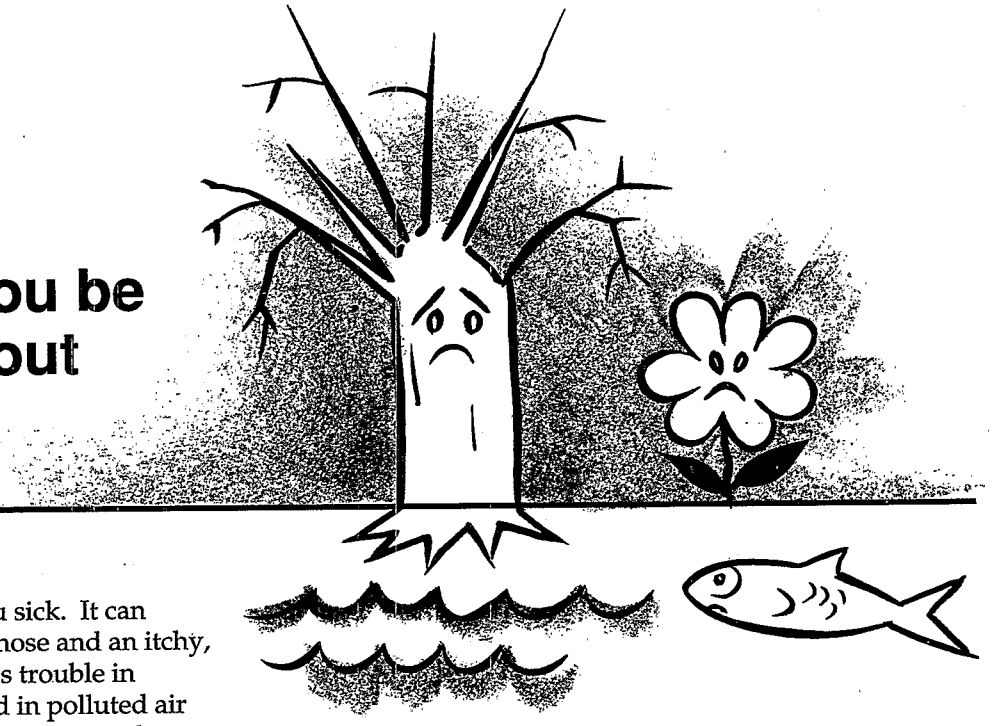
Why should you be concerned about air pollution?



Air pollution can make you sick. It can cause burning eyes and nose and an itchy, irritated throat, as well as trouble in breathing. Some chemicals found in polluted air cause cancer, birth defects, brain and nerve damage and long-term injury to the lungs and breathing passages. Some air pollutants are so dangerous that accidental releases can cause serious injury or even death.

Air pollution can damage the environment. Trees, lakes and animals have been harmed by air pollution. Air pollutants have thinned the protective ozone layer above the Earth; this loss of ozone could cause changes in the environment as well as more skin cancer and cataracts (eye damage) in people.

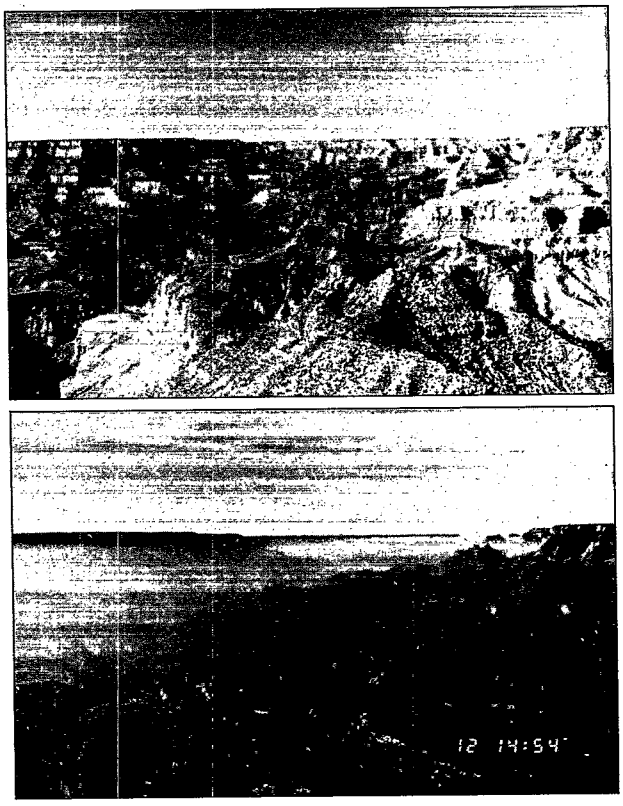
Air pollution can damage property. It can dirty buildings and other structures. Some common pollutants eat away stone, damaging buildings, monuments and statues.

Air pollution can cause haze, reducing visibility in national parks and sometimes interfering with aviation.

The Clean Air Act will improve air quality in the United States, a good thing for your health, your property and the environment. The 1990 Act[1] could change the way you work or do business, and it could, in some ways, change the way you live. The 1990 Clean Air Act is lengthy—about 800 pages—because it tackles many difficult and complicated air pollution problems.

We have prepared this summary of the 1990 version of the Clean Air Act because we think everyone should understand what is in the law and how it may affect them.

This summary is only a brief introduction to the 1990 Clean Air Act. If you want more information, please contact your regional office of the Environmental Protection Agency (EPA) or your state, city, regional or local air pollution control agency. You'll find a list of addresses and telephone numbers of EPA regional offices and state and other air pollution control agencies at the end of this summary.



Grand Canyon National Park. Top: A clear day. Bottom: Haze.

[1] The 1990 Clean Air Act is the most recent version of a law first passed in 1970. The 1990 ammendments made major changes in the Clean Air Act. This summary covers some of the important provisions of the 1990 Clean Air Act.

Features of the 1990 Clean Air Act

The role of the federal government and the role of the states

Although the 1990 Clean Air Act is a federal law covering the entire country, the states do much of the work to carry out the Act. For example, a state air pollution agency holds a hearing on a permit application by a power or chemical plant or fines a company for violating air pollution limits.

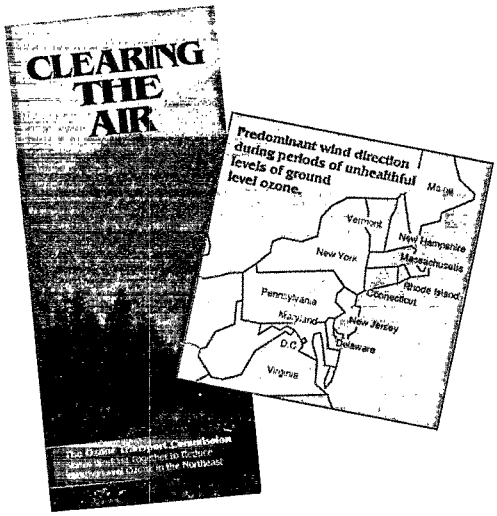
Under this law, EPA sets limits on how much of a pollutant can be in the air anywhere in the United States. This ensures that all Americans have the same basic health and environmental protections. The law allows individual states to have stronger pollution controls, but states are not allowed to have weaker pollution controls than those set for the whole country.

The law recognizes that it makes sense for states to take the lead in carrying out the Clean Air Act, because pollution control problems often require special understanding of local industries, geography, housing patterns, etc.

States have to develop **state implementation plans (SIPs)** that explain how each state will do its job under the Clean Air Act. A state implementation plan is a collection of the regulations a state will use to clean up polluted areas. The states must involve the public, through hearings and opportunities to comment, in the development of each state implementation plan.

EPA must approve each SIP, and if a SIP isn't acceptable, EPA can take over enforcing the Clean Air Act in that state.

The United States government, through EPA, assists the states by providing scientific research, expert studies, engineering designs and money to support clean air programs.



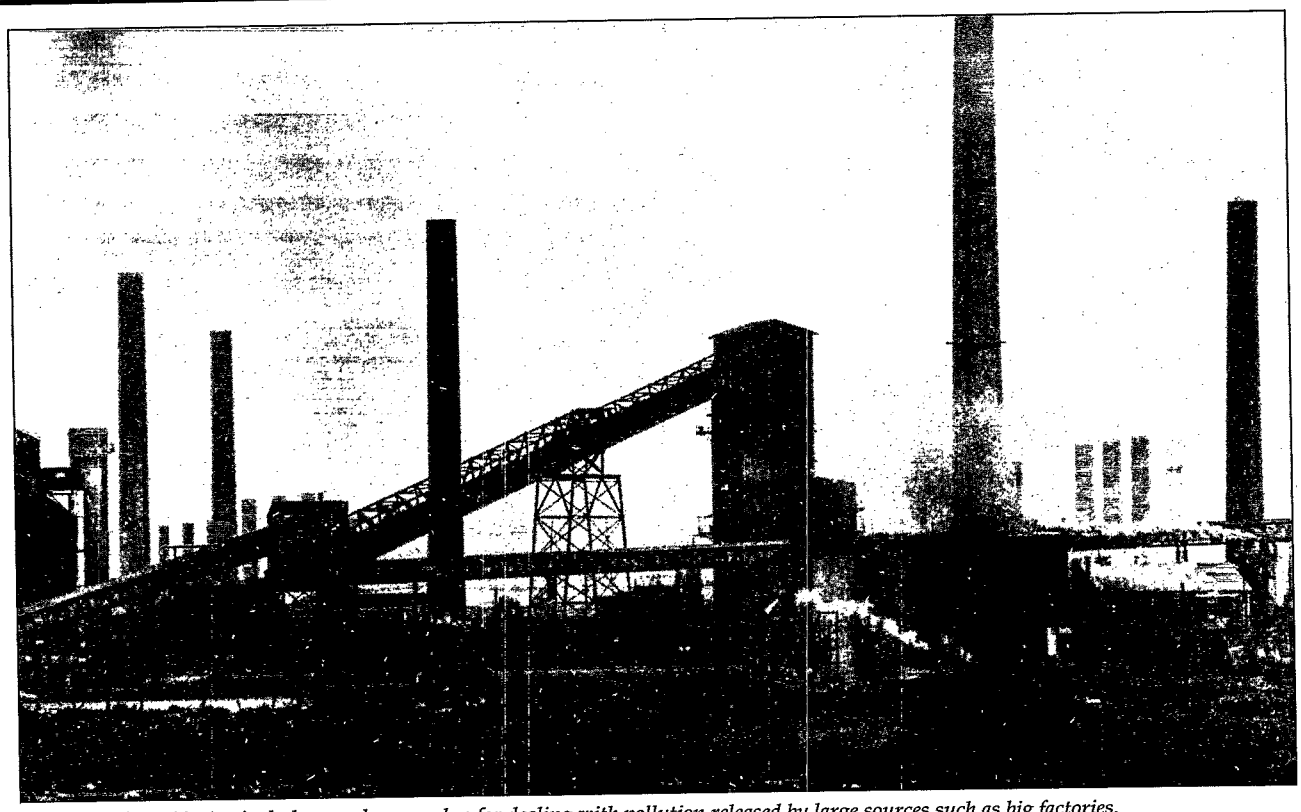
State governments from Maine to Virginia, the government of the District of Columbia, and the U.S. Environmental Protection Agency are working together through the Ozone Transport Commission to reduce smog on the East Coast.

Interstate air pollution

Air pollution often travels from its source in one state to another state. In many metropolitan areas, people live in one state and work or shop in another; air pollution from cars and trucks may spread throughout the interstate area. The 1990 Clean Air Act provides for interstate commissions on air pollution control, which are to develop regional strategies for cleaning up air pollution. The 1990 Clean Air Act includes other provisions to reduce interstate air pollution.

International air pollution

Air pollution moves across national borders. The 1990 law covers pollution that originates in Mexico and Canada and drifts into the United States and pollution from the United States that reaches Canada and Mexico.



The 1990 Clean Air Act includes novel approaches for dealing with pollution released by large sources such as big factories.

Permits

One of the major breakthroughs in the 1990 Clean Air Act is a **permit** program for larger **sources** that release pollutants into the air. [2]

Requiring polluters to apply for a permit is not a new idea. Approximately 35 states have had statewide permit programs for air pollution. The Clean Water Act requires permits to release pollutants into lakes, rivers or other waterways. Now air pollution is also going to be managed by a national permit system. Under the new program, permits are issued by states or, when a state fails to carry out the Clean Air Act satisfactorily, by EPA. The permit includes information on which pollutants are being released, how much may be released, and what kinds of steps the source's owner or operator is taking to reduce pollution, including plans to **monitor** (measure) the pollution. The permit system is especially useful for businesses covered by more than one part of the law, since information about all of a source's air pollution will now be in one place. The permit system simplifies and clarifies businesses' obligations for cleaning up air pollution and, over time, can reduce paperwork. For instance, an electric power plant may be covered by the acid rain, hazardous air pollutant and non-attainment (smog) parts of the Clean Air Act; the detailed information required by all these separate sections will be in one place—on the permit.

Permit applications and permits are available to the public; contact your state or regional air pollution control agency or EPA for information on access to these documents.

Businesses seeking permits have to pay **permit fees** much like car owners paying for car registrations. The money from the fees will help pay for state air pollution control activities.

[2] A source can be a power plant, factory or anything that releases pollutants into the air. Cars, trucks and other motor vehicles are sources, and consumer products and machines used in industry can be sources too. Sources that stay in one place are referred to as **stationary sources**; sources that move around, like cars or planes, are called **mobile sources**.

Enforcement

The 1990 Clean Air Act gives important new **enforcement** powers to EPA.

It used to be very difficult for EPA to penalize a company for violating the Clean Air Act. EPA had to go to court for even minor violations. The 1990 law enables EPA to fine violators, much like a police officer giving traffic tickets. Other parts of the 1990 law increase penalties for violating the Act and bring the Clean Air Act's enforcement powers in line with other environmental laws.

Deadlines

The 1990 Clean Air Act sets **deadlines** for EPA, states, local governments and businesses to reduce air pollution. The deadlines in the 1990 Clean Air Act were designed to be more realistic than deadlines in previous versions of the law, so it is more likely that these deadlines will be met.

Public participation

Public participation is a very important part of the 1990 Clean Air Act. Throughout the Act, the public is given opportunities to take part in determining how the law will be carried out. For instance, you can take part in hearings on the state and local plans for cleaning up air pollution. You can sue the government or a source's owner or operator to get action when EPA or your state has not enforced the Act. You can request action by the state or EPA against violators.

The reports required by the Act are public documents. A great deal of information will be collected on just how much pollution is being released; these **monitoring (measuring) data** will be available to the public. The 1990 Clean Air Act ordered EPA to set up **clearinghouses** to collect and give out technical information. Typically, these clearinghouses will serve the public as well as state and other air pollution control agencies.

See the list at the end of this summary for organizations to contact for additional information about air pollution and the Clean Air Act.

Market approaches for reducing air pollution; economic incentives

The 1990 Clean Air Act has many features designed to clean up air pollution as efficiently and inexpensively as possible, letting businesses make choices on the best way to reach pollution clean-up goals. These new flexible programs are called **market** or **market-based** approaches. For instance, the acid rain clean-up program offers businesses choices as to how they reach their pollution reduction goals and includes pollution allowances that can be traded, bought and sold.

The 1990 Clean Air Act provides **economic incentives** for cleaning up pollution. For instance, gasoline refiners can get **credits** if they produce cleaner gasoline than required, and they can use those credits when their gasoline doesn't quite meet clean-up requirements.

How Smog is Formed...

Next page: Many sources, including cars, factories, and products used in homes, release smog-forming pollutants. Wind blows the pollutants away from their sources and, while the pollutants are being blown along, they undergo chemical reactions. Heat and sunlight increase the reactions. These reactions form ground-level ozone, the principal component of smog.

Hours after the smog-forming pollutants were released from their sources, smog pollutes the air, often miles away from where the smog-forming pollutants were released.

Cleaning up air pollution: the programs in the 1990 Clean Air Act

Smog and other "criteria" air pollutants

A few common air pollutants are found all over the United States. These pollutants can injure health, harm the environment and cause property damage.

EPA calls these pollutants **criteria air pollutants** because the agency has regulated them by first developing health-based **criteria** (science-based guidelines) as the basis for setting permissible levels. One set of limits **(primary standard)** protects health; another set of limits **(secondary standard)** is intended to prevent environmental and property damage. A geographic area that meets or does better than the primary standard is called an **attainment area;** areas that don't meet the primary standard are called **nonattainment** areas.

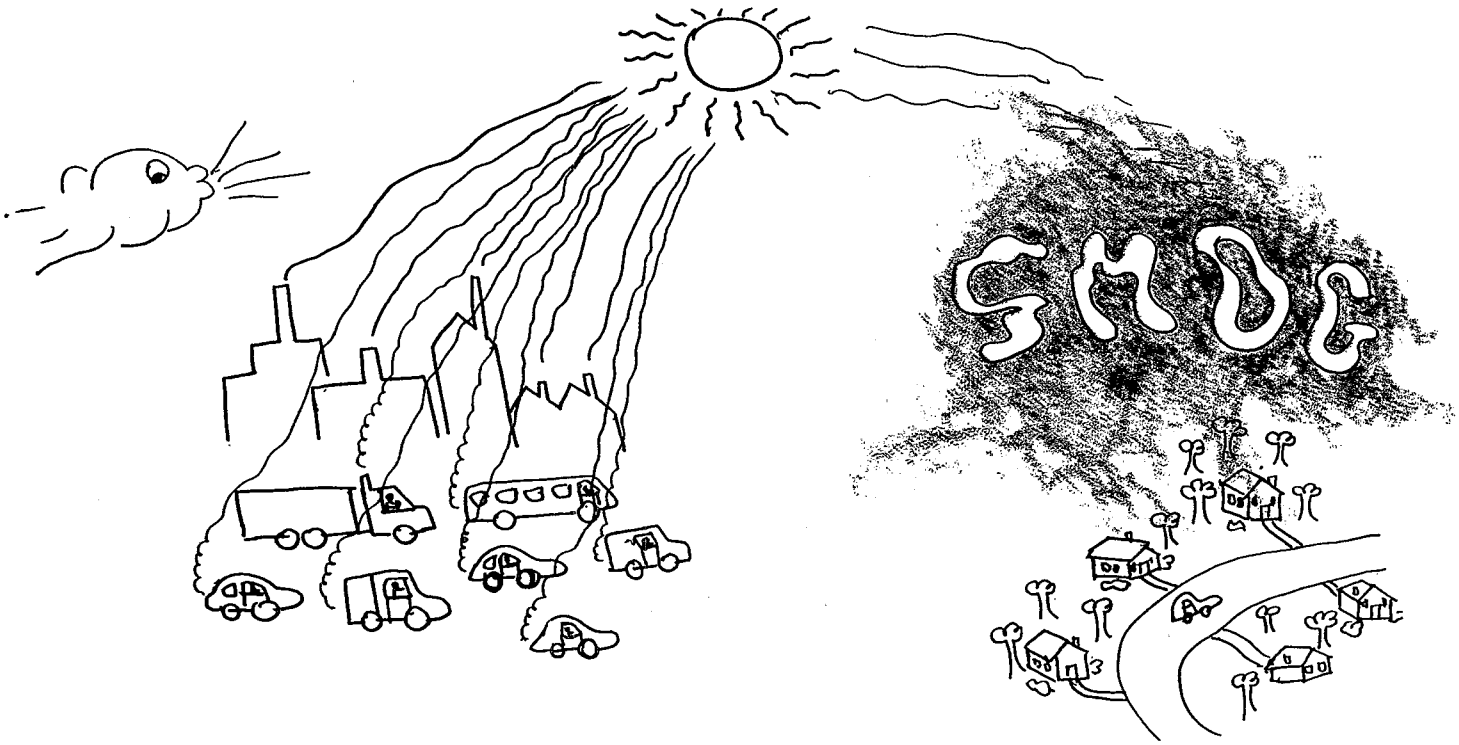
Although EPA has been regulating criteria air pollutants since the 1970 CAA was passed, many urban areas are classified as nonattainment for at least one criteria air pollutant. It has been estimated that about 90 million Americans live in nonattainment areas.

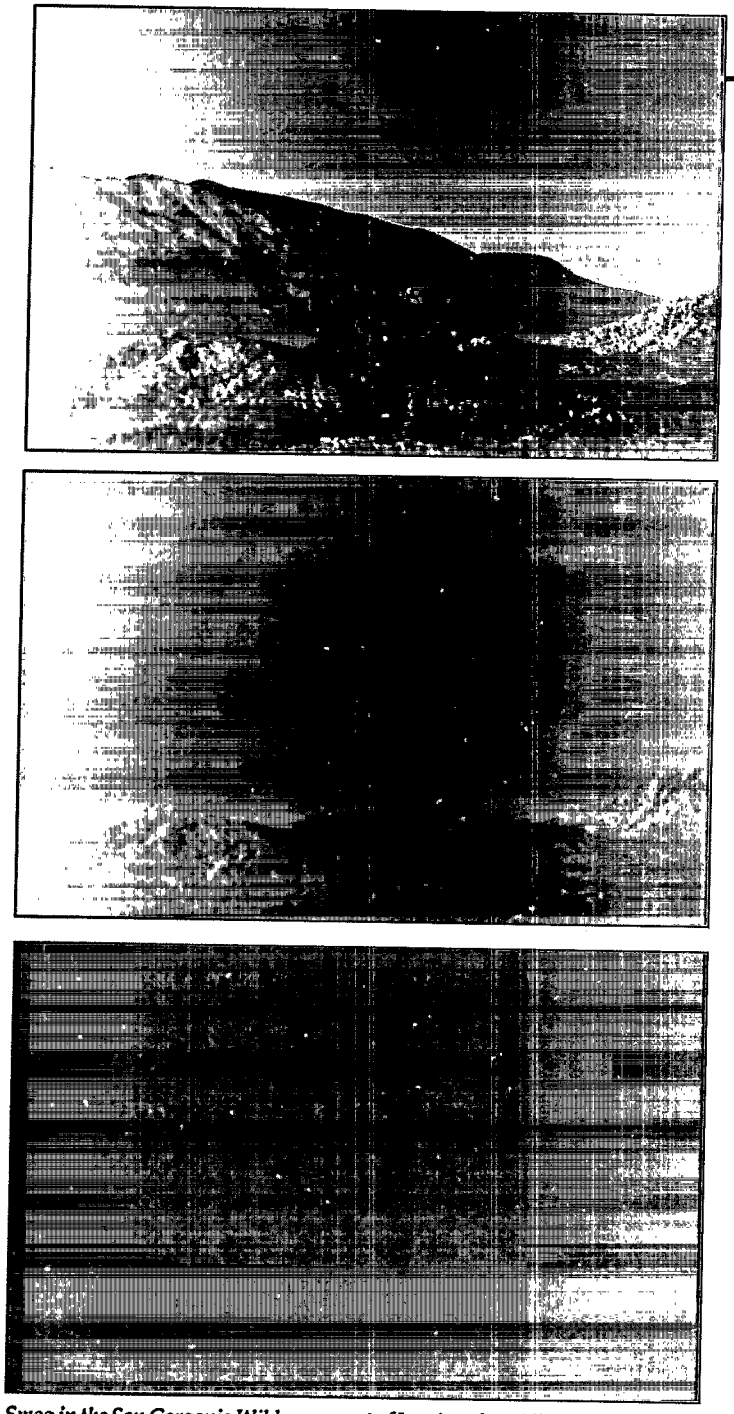
Smog

What we typically call **smog** is primarily made up of **ground-level ozone.** Ozone can be good or bad depending on where it is located. Ozone in the **stratosphere** high above the Earth protects human health and the environment, but ground-level ozone is the main harmful ingredient in smog.

Ground-level ozone is produced by the combination of pollutants from many sources, including smokestacks, cars, paints and solvents. When a car burns gasoline, releasing exhaust fumes, or a painter paints a house, smog-forming pollutants rise into the sky.

Often, wind blows smog-forming pollutants away from their sources. The smog-forming reactions take place while the pollutants are being blown through the air by the wind. This explains why smog is often more severe miles away from the source of smog-forming pollutants than it is at the source.





Smog in the San Gorgonio Wilderness east of Los Angeles. All photos were taken at 3 p.m. Top: Good visibility. Center: Haze. Bottom: Intense haze.

The smog-forming pollutants literally cook in the sky, and if it's hot and sunny, smog forms more easily. Just as it takes time to bake a cake, it takes time to cook up smog—several hours from the time pollutants get into the air until the smog gets really bad.

Weather and geography determine where smog goes and how bad it is. When **temperature inversions** occur (warm air stays near the ground instead of rising) and winds are calm, smog may stay in place for days at a time. As traffic and other sources add more pollutants to the air, the smog gets worse.

Since smog travels across county and state lines, when a metropolitan area covers more than one state (for instance, the New York metropolitan area includes parts of New Jersey and Connecticut), their governments and air pollution control agencies must cooperate to solve their problem. Governments on the East Coast from Maine to Washington, D.C., will have to work together in a **multistate** effort to reduce the area's smog problem.

Here's how the 1990 Clean Air Act reduces pollution from criteria air pollutants, including smog.

First, EPA and state governors cooperated to **identify** nonattainment areas for each criteria air pollutant. Then, EPA **classified** the nonattainment areas according to how badly polluted the areas are. There are five classes of nonattainment areas for smog, ranging from **marginal** (relatively easy to clean up quickly) to **extreme** (will take a lot of work and a long time to clean up).

The 1990 Clean Air Act uses this new classification system to tailor clean-up requirements to the severity of the pollution and set realistic deadlines for reaching clean-up goals. If deadlines are missed, the law allows more time to clean up, but usually a nonattainment area that has missed a clean-up deadline will have to meet the stricter clean-up requirements set for more polluted areas.

Not only must nonattainment areas meet deadlines, states with nonattainment areas must show EPA that they are moving on clean-up before the deadline—making **reasonable further progress.**

States will usually do most of the planning for cleaning up criteria air pollutants, using the permit system to make sure power plants, factories and other pollution sources meet their clean-up goals.

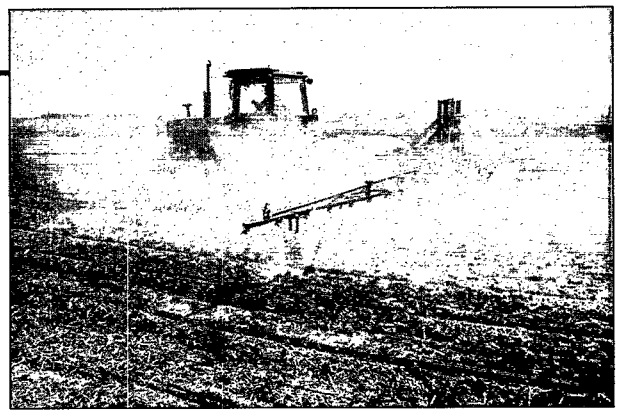
The comprehensive approach to reducing criteria air pollutants taken by the 1990 Act covers many different sources and a variety of clean-up methods. Many of the smog clean-up requirements involve motor vehicles (cars, trucks, buses). Also, as the pollution gets worse, pollution controls are required for smaller sources.

Other criteria pollutants: carbon monoxide and particulates

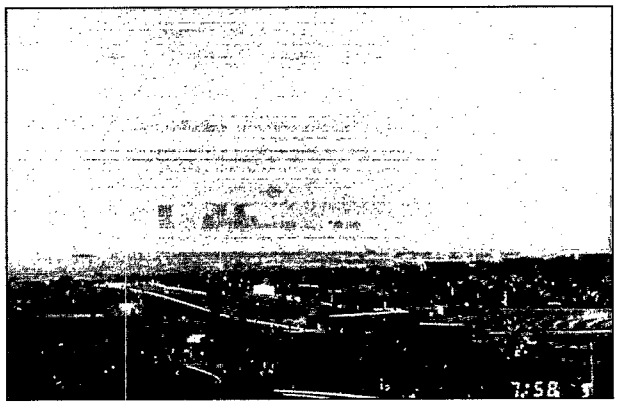
The carbon monoxide (CO) and particulate matter (PM-10) clean-up plans are set up like the plan for smog, but only two pollution classes are identified for each (instead of the five for ozone). Getting rid of **particulates** (soots, dusts, smoke) will require pollution controls on power plants and restrictions on smaller sources such as wood stoves, agricultural burning, and dust from fields and roads. Because so many homes have woodstoves and fireplaces, this summary of the Clean Air Act includes a section on **Woodstoves and fireplaces,** providing information on how the Clean Air Act will affect these home heating systems.

Offsets

What if a company wants to expand or change a production process or otherwise increase its output of a criteria air pollutant? If an owner or operator of a major source wants to release more of a criteria air pollutant, an **offset** (a reduction of the criteria air pollutant by an amount somewhat greater than the planned increase) must be obtained somewhere else, so that permit requirements are met and the nonattainment area keeps moving toward attainment. The company must also install tight pollution controls. An increase in a criteria air pollutant can be offset with a reduction of the pollutant from some other stack at the same plant or at another plant owned by the same or some other company in the nonattainment area. Since total pollution will continue to go down, trading offsets among companies is allowed. This is one of the market approaches to cleaning up air pollution in the Clean Air Act.



Dusty farm operations, such as soil tillage and pesticide application, can pollute the air.



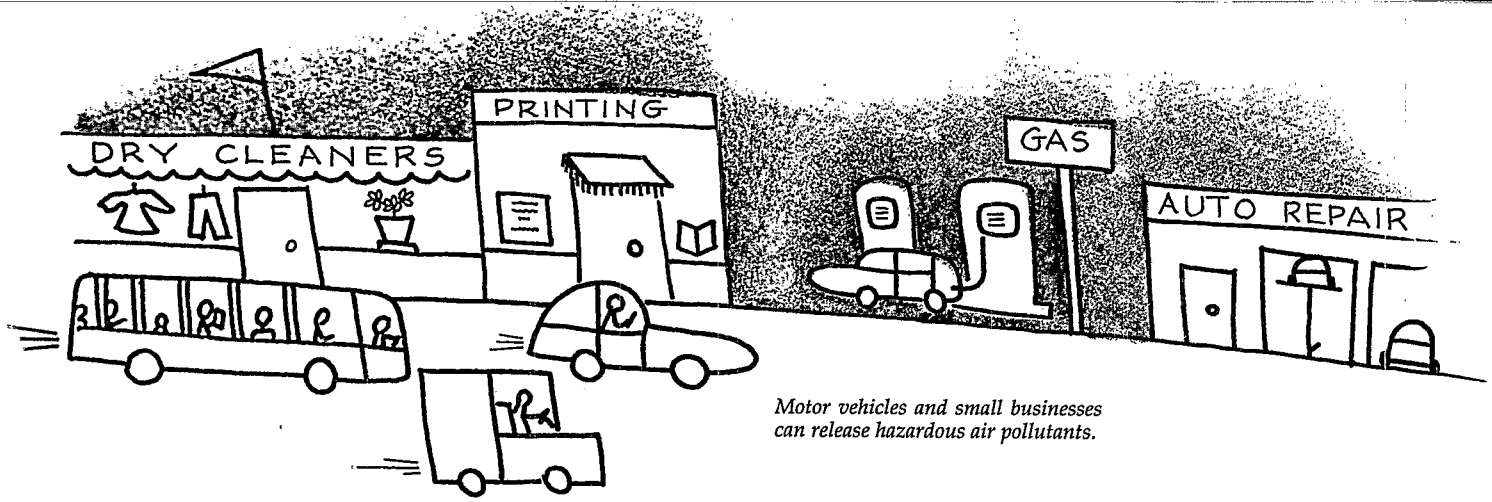
Air pollution in Denver, Colorado, sometimes causes hazy "brown cloud". Denver has also had problems with carbon monoxide pollution.

Criteria air pollutants in gasoline and consumer products

Volatile organic compounds (VOCs), important smog-forming chemicals, are found in gasoline and many consumer products, from hair spray to charcoal starter fluid to plastic popcorn packaging. This summary includes a section on **Consumer Products;** see that section for information on how the Clean Air Act will affect products you use every day. Information on changes in gasoline will be found in the section on **Mobile Sources.**

Hazardous air pollutants

Some air pollutants can cause cancer, problems with having children and other very serious illnesses as well as environmental damage. Air pollutants have killed people swiftly when large quantities were released; the 1984 release of methyl isocyanate at a pesticide-manufacturing plant in Bhopal, India, killed approximately 4,000 people and injured more than 200,000.

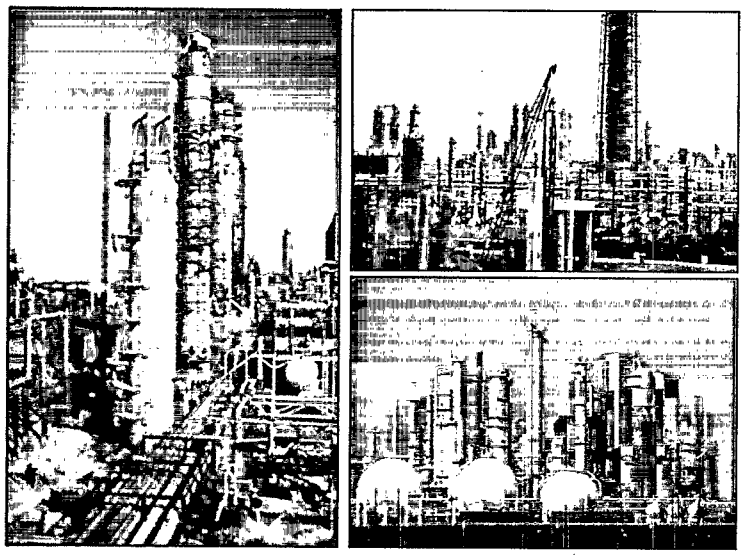


Motor vehicles and small businesses can release hazardous air pollutants.

EPA refers to chemicals that cause serious health and environmental hazards as **hazardous air pollutants (HAPs)** or **air toxics.**

Air toxics are released from sources throughout the country and from motor vehicles. For example, gasoline contains toxic chemicals. Gases escape from liquid gasoline and form a **vapor** in a process called **vaporization** or **evaporation.** When you put gas in your car, you can often see wavy lines in the air at the pump nozzle and you can smell gasoline; that tells you gasoline vapors are in the air.

When cars and trucks burn gasoline, air toxics come out of the tailpipes. (These air toxics are **combustion products**—chemicals that are produced when a substance is burned.)



Petrochemical plants can release hazardous air pollutants. A. A Texaco, Inc., plant at Port Neches, Texas, which manufactures a fuel additive; B. Construction at a Phillips Petroleum refinery in Sweeny, Texas (1985); C. The Texaco, Inc., refinery at Convent, Louisiana (1983).

Air toxics are released from small stationary sources, such as dry cleaners and auto paint shops. Large stationary sources, such as chemical factories and incinerators, also release hazardous air pollutants. The 1990 Clean Air Act deals more strictly with large sources than small ones, but EPA must regulate small sources of hazardous air pollutants as well.

To reduce air toxics pollution, EPA must first identify the toxic pollutants whose release should be reduced. The 1970 Clean Air Act gave EPA authority to list air toxics for regulation and then to regulate the chemicals. The agency listed and regulated seven chemicals through 1990. The 1990 Act includes a list of 189 hazardous air pollutants selected by Congress on the basis of potential health and/or environmental hazard; EPA must regulate these listed air toxics. The 1990 Act allows EPA to add new chemicals to the list as necessary.

To regulate hazardous air pollutants, EPA must identify **categories of sources** that release the 189 chemicals listed by Congress in the 1990 Clean Air Act. Categories could be gasoline service stations, electrical repair shops, coal-burning power plants, chemical plants, etc. The air toxics producers are to be identified as **major** (large) or **area** (small) sources.

Once the categories of sources are listed, EPA will issue regulations. In some cases, EPA may have to specify exactly how to reduce pollutant releases, but wherever possible companies will have flexibility to choose how they meet requirements. Sources are to use **Maximum Available Control Technology (MACT)** to reduce pollutant releases; this is a very high level of pollution control.

EPA must issue regulations for major sources first, and must then issue regulations to reduce pollution from small sources, setting priorities for which small sources to tackle first, based on health and environmental hazards, production volume, etc.

Mobile sources
(cars, trucks, buses, off-road vehicles, planes, etc.)

If a company wishes to increase the amount of air toxics coming out of an operating plant, the company may choose to **offset** the increases so that total hazardous air pollutant releases from the plant do not go up. Otherwise, they may choose to install pollution controls to keep pollutants at the required level.

If a company reduces its releases of a hazardous air pollutant by about 90 percent before EPA regulates the chemical, the company will get extra time to finish cleaning up the remaining 10 percent. This **early reduction** program is expected to result in a speedy reduction of the levels of several important hazardous air pollutants.

Under the 1990 Clean Air Act, EPA is required to study whether and how to reduce hazardous air pollutants from small neighborhood polluters such as auto paint shops, print shops, etc. The agency will also have to look at air toxics pollution after the first round of regulations to see whether the remaining health hazards require further regulatory action.

Cars, trucks, buses and other mobile sources release large amounts of hazardous air pollutants like formaldehyde and benzene. Cleaner fuels and engines and making sure that pollution control devices work should reduce hazardous air pollutants from mobile sources.

The Bhopal tragedy inspired the 1990 Clean Air Act requirement that factories and other businesses develop plans to prevent **accidental releases** of highly toxic chemicals. The Act establishes the **Chemical Safety Board** to investigate and report on accidental releases of hazardous air pollutants from industrial plants. The Chemical Safety Board will operate like the National Transportation Safety Board (NTSB), which investigates plane and train crashes.

Each of today's cars produces 60 to 80 percent less pollution than cars in the 1960s. More people are using mass transit. Leaded gas is being phased out, resulting in dramatic declines in air levels of lead, a very toxic chemical.

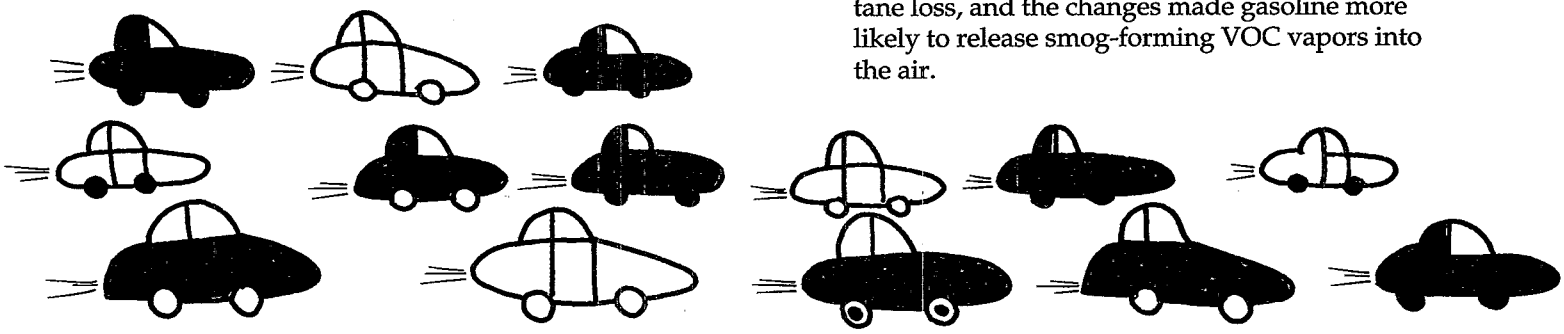
Despite this progress, most types of air pollution from mobile sources have not improved significantly.

At present in the United States:

- Motor vehicles are responsible for up to half of the smog-forming VOCs and nitrogen oxides (NOx).
- Motor vehicles release more than 50 percent of the hazardous air pollutants.
- Motor vehicles release up to 90 percent of the carbon monoxide found in urban air.

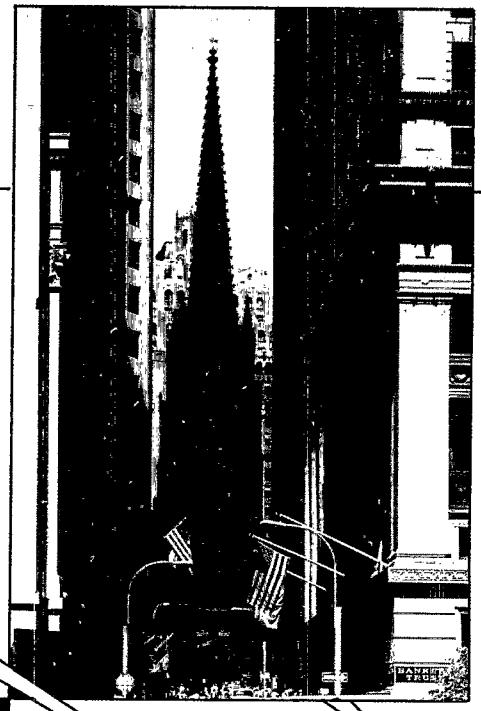
What went wrong?

- More people are driving more cars more miles on more trips. In 1970, Americans traveled 1 trillion miles in motor vehicles, and we are expected to drive 4 trillion miles each year by 2000.
- Many people live far from where they work; in many areas, buses, subways and commuter trains are not available. Also, most people still drive to work alone, even when van pools, HOV (high-occupancy vehicle) lanes and other alternatives to one-person-per-car commuting are available.
- Buses and trucks, which produce a lot of pollution, haven't had to clean up their engines and exhaust systems as much as cars.
- Auto fuel has become more polluting. As lead was being phased out, gasoline refiners changed gasoline formulas to make up for octane loss, and the changes made gasoline more likely to release smog-forming VOC vapors into the air.



More cars driving more miles! This is why air pollution from cars has gotten worse even though individual cars produce less pollution than they used to.

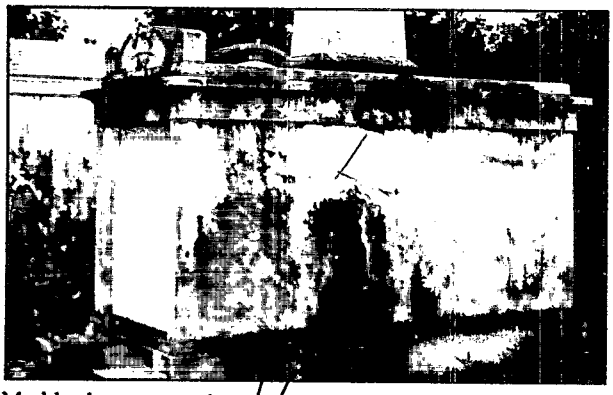
Detail of New Jersey Monument, Valley Forge National Historic Park



Trinity Church (located on Wall Street in Manhattan). The church appears black in the photo, due to many years exposure to soot. Recent cleaning restored the church's stone to its original pinkish color.

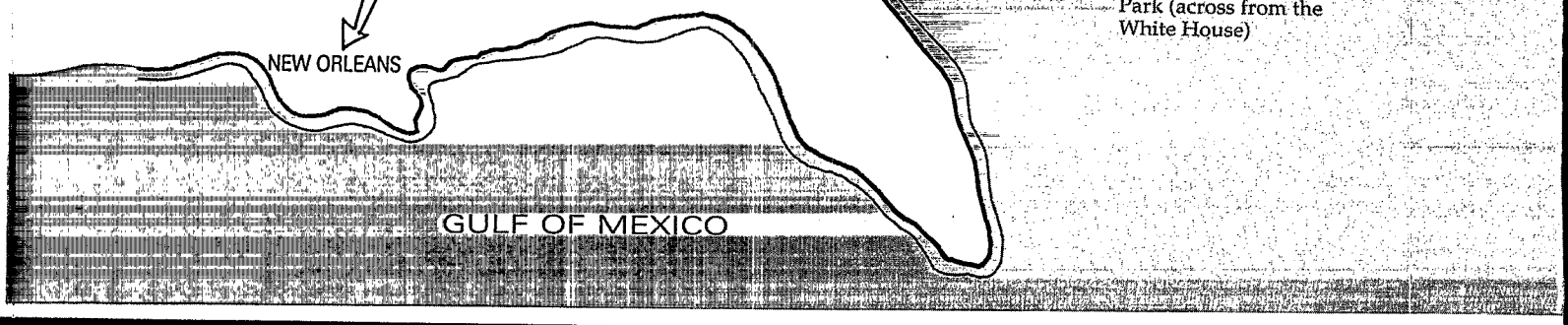
Detail of "Fame", by Isaac Bloom

Detail of Union Soldiers and Sailors Monument

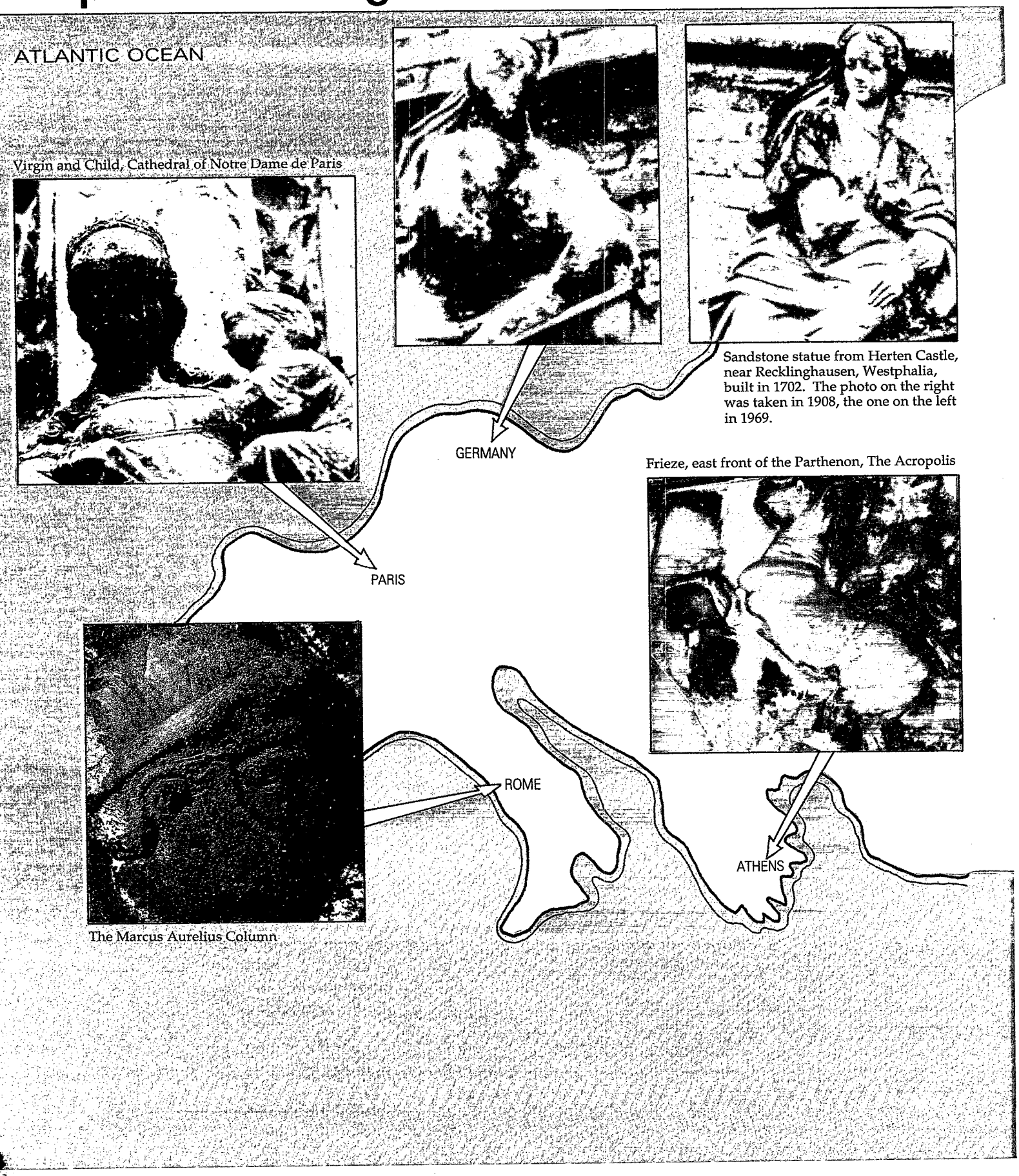


Marble above-ground burial crypt

Detail of Von Steuben Monument in Lafayette Park (across from the White House)



Air pollution damage to statues and monuments



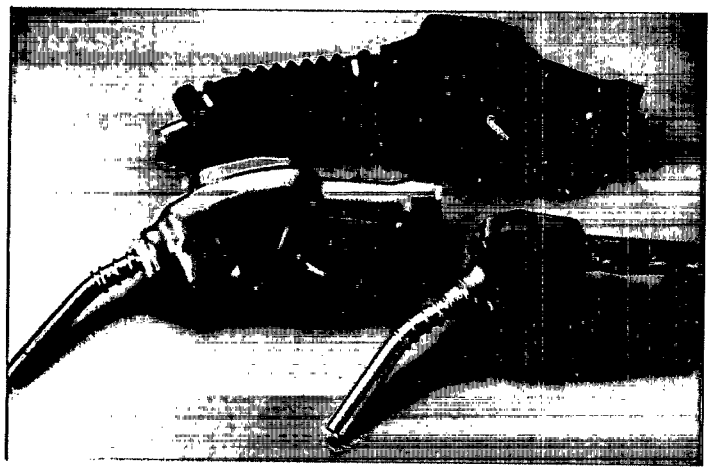
• Although cars have had pollution control devices since the 1970s, the devices only had to work for 50,000 miles, while a car in the United States is usually driven for 100,000 miles.

The 1990 Clean Air Act takes a **comprehensive** approach to reducing pollution from motor vehicles. The Act provides for cleaning up fuels, cars, trucks, buses and other motor vehicles. Auto inspection provisions were included in the law to make sure cars are well maintained. The 1990 law also includes transportation policy changes that can help reduce air pollution.

Cleaner fuels

It will be very difficult to obtain a significant reduction in pollution from motor vehicles unless fuels are cleaned up. The 1990 Clean Air Act will clean up fuels. The phaseout of lead from gasoline will be completed by January 1, 1996. Diesel fuel refining must be changed so that the fuels contain less sulfur, which contributes to acid rain and smog.

Gasoline refiners will have to **reformulate** gasoline sold in the smoggiest areas; this gasoline will contain less volatile organic compounds (VOCs) such as benzene (which is also a hazardous air pollutant that causes cancer and aplastic anemia, a potentially fatal blood disease). Other polluted areas can ask EPA to include them in the reformulated gasoline marketing program. In some areas, wintertime carbon monoxide (CO) pollution is caused by people starting their cars. In these areas, refiners will have to sell **oxyfuel**, gasoline with oxygen added to make the fuel burn more efficiently, thereby reducing carbon monoxide release.



There are several kinds of vapor recovery nozzles. The two nozzles in the left side of the photograph are both vapor recovery nozzles; the nozzle on the right is not.

All gasolines will have to contain **detergents**, which, by preventing build-up of engine deposits, keep engines working smoothly and burning fuel cleanly. Low VOC, oxyfuel and detergent gasolines are already sold in several parts of the country.

The 1990 Clean Air Act encourages development and sale of **alternative fuels** such as alcohols, liquefied petroleum gas (LPG) and natural gas.

Gas stations in smoggy areas will install **vapor recovery nozzles** on gas pumps. These nozzles cut down on vapor release when you put gas in your car.

Cleaner cars

The 1990 Clean Air Act requires cars to have under-the-hood systems and dashboard warning lights that check whether pollution control devices are working properly. Pollution control devices must work for 100,000 miles, rather than the current 50,000 miles. Auto makers must build some cars that use **clean fuels**, including alcohol, and that release less pollution from the tailpipe through advanced engine design. Electric cars, which are low-pollution vehicles, will also be built. Since California, especially southern California, has the worst smog problems, manufacturers will first sell **clean fuel cars** in a **pilot project** in California. By 1999, at least 500,000 of these clean fuel cars are to be manufactured for sale in California each year. Other states can require that cars meeting the California standards be sold in their states.

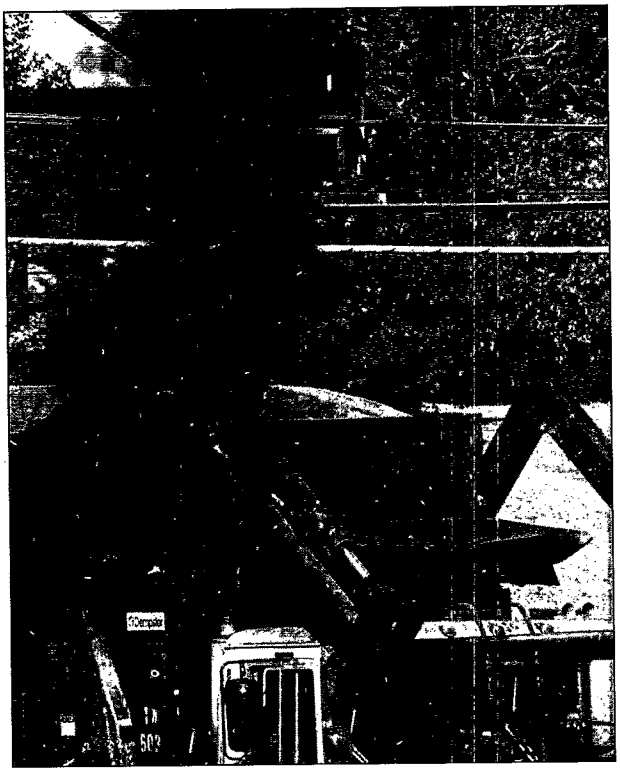
Many companies and government agencies have **fleets** of cars. Fleet-owners in very smoggy areas must buy the new cleaner cars starting in the late 1990s.

Inspection and maintenance (I/M) programs

Under the 1990 Clean Air Act, auto manufacturers will build cleaner cars, and cars will use cleaner fuels. However, to get air pollution down and keep it down, a third program is needed; vehicle **inspection and maintenance** (I/M), which makes sure cars are being maintained adequately to keep pollution **emissions** (releases) low. The 1990 Clean Air Act includes very specific requirements for inspection and maintenance programs.

Before the 1990 Clean Air Act went into effect, seventy United States cities and several states already had auto emission inspection programs. The 1990 law requires inspection and maintenance programs in more areas: forty metropolitan areas, including many in the northeastern United States, are required to start emission inspection and maintenance programs.

Some areas that already have inspection and maintenance programs are required to **enhance** (improve) their emission inspection machines and procedures. Enhanced inspection and maintenance machines and procedures will give a better measurement of the pollution a car releases when it is actually being driven, rather than just sitting parked at the inspection station. Enhanced inspection and maintenance programs may result in changes in where cars are inspected in your local area. Since the enhanced emission inspection and maintenance machines are expensive, some of the private stations now conducting inspection and maintenance programs may not want to buy the enhanced machinery. But the added expense for the new machinery will be more than made up for by air pollution reductions: **emission inspection and maintenance programs are expected to have a big payoff in reducing air pollution from cars.**



Pollution from trucks burning diesel fuel can be especially noticeable. Requirements in the 1990 Clean Air Act will result in much less air pollution from trucks.

Cleaner trucks and buses

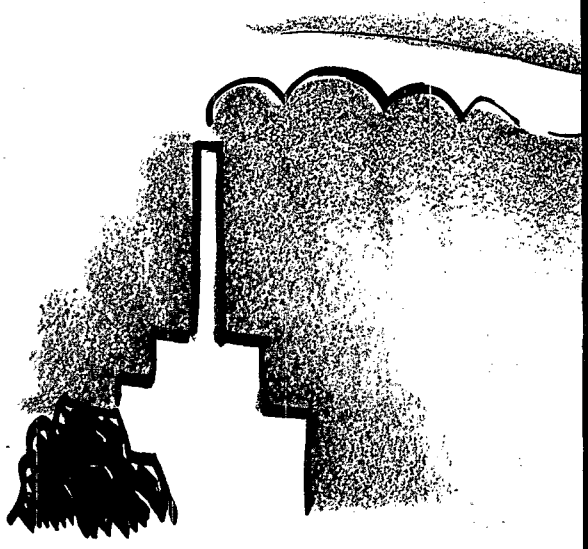
Starting with model year 1994, engines for new big diesel trucks will have to be built to reduce **particulate** (dust, soot) releases by 90 percent. Buses will have to reduce particulate releases even more than trucks. To reduce pollution, companies and governments that own buses or trucks will need to buy new clean models. Small trucks will be cleaned up by requirements similar to those for cars.

Non-road vehicles

Locomotives, construction equipment and even riding mowers may be regulated under the 1990 Clean Air Act. Air pollution from locomotives must be reduced. For the other non-road vehicles, EPA must issue regulations if a study shows that controls would help cut pollution.

Transportation policies

The smoggiest metropolitan areas will have to change their transportation policies to discourage unnecessary auto use, and to encourage efficient commuting (van pools, HOV [high-occupancy vehicle] lanes, etc.). States carrying out the 1990 Clean Air Act may add **surcharges** to parking fees.



Acid rain

You've probably heard of "acid rain". But you may not have heard of acid snow, acid fog or mist, acid gas and acid dust. All of these "acids" are related air pollutants, and can harm your health, cause hazy skies and damage the environment and your property. The 1990 Clean Air Act includes an innovative program to reduce acid air pollutants (all referred to here as "acid rain").

The acid rain that has received the most attention is caused mainly by pollutants from big coal-burning power plants in the Midwest. These plants burn Midwestern and Appalachian coal, some of which contains a lot of sulfur compared to Western coal. Sulfur in coal becomes sulfur dioxide (SO2) when coal is burned. Big power plants burn large quantities of coal, so they release large amounts of sulfur dioxide, as well as NOx (nitrogen oxides). These are acid chemicals, related to two strong acids: sulfuric acid and nitric acid.

The sulfur dioxide and nitrogen oxides released from the Midwestern power plants rise high into the air and are carried by winds toward the East Coast of the U.S. and Canada. When winds blow the acid chemicals into areas where there is wet weather, the acids become part of the rain, snow or fog. In areas where the weather is dry, the acid chemicals may fall to Earth in gases or dusts.

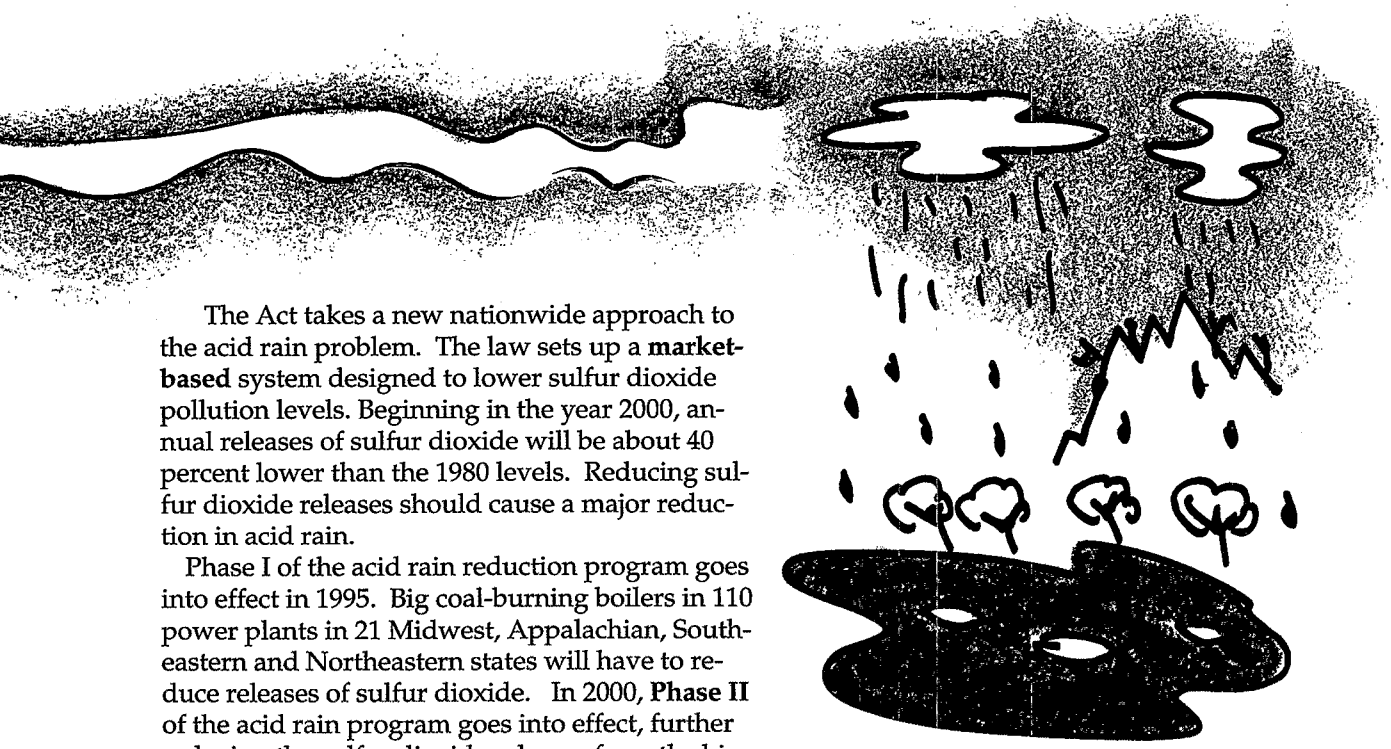
Lakes and streams are normally slightly acid, but acid rain can make them very acid. Very acid conditions can damage plant and animal life.

Acid lakes and streams have been found all over the country. For instance, lakes in Acadia National Park on Maine's Mt. Desert Island have been very acidic, due to pollution from the Midwest and the East Coast. Streams in Maryland and West Virginia, lakes in the Upper Peninsula of Michigan, and lakes and streams in Florida have also been affected by acid rain. Heavy rainstorms and melting snow can cause temporary increases in acidity in lakes and streams in the eastern and western United States. These temporary increases may last for days or even weeks.

Acid rain has damaged trees in the mountains of Vermont and other states. Red spruce trees at high altitudes appear to be especially sensitive to acid rain. The pollutants that cause acid rain can make the air hazy or foggy; this has occurred in the eastern United States, including some mountain areas popular with vacationers, such as the Great Smokies.

Acid rain does more than environmental damage; it can damage health and property as well. Acid air pollution has been linked to breathing and lung problems in children and in people who have asthma. Even healthy people can have their lungs damaged by acid air pollutants. Acid air pollution can eat away stone buildings and statues.

Health, environmental and property damage can also occur when sulfur dioxide pollutes areas close to its source. Sulfur dioxide pollution has been found in towns where paper and wood pulp are processed and in areas close to some power plants. The 1990 Clean Air Act's sulfur dioxide reduction program will complement health-based sulfur dioxide pollution limits already in place to protect the public and the environment from both nearby and distant sources of sulfur dioxide.



How Acid Rain is Formed...

Burning fuels release acid pollutants. These pollutants are carried far from their sources by wind. Depending on the weather, the acid pollutants fall to Earth in wet form (acid rain, snow, mist or fog) or dry form (acid gases or dusts).

The Act takes a new nationwide approach to the acid rain problem. The law sets up a **market-based** system designed to lower sulfur dioxide pollution levels. Beginning in the year 2000, annual releases of sulfur dioxide will be about 40 percent lower than the 1980 levels. Reducing sulfur dioxide releases should cause a major reduction in acid rain.

Phase I of the acid rain reduction program goes into effect in 1995. Big coal-burning boilers in 110 power plants in 21 Midwest, Appalachian, Southeastern and Northeastern states will have to reduce releases of sulfur dioxide. In 2000, **Phase II** of the acid rain program goes into effect, further reducing the sulfur dioxide releases from the big coal-burning power plants and covering other smaller polluters. Total sulfur dioxide releases for the country's power plants will be permanently limited to the level set by the Clean Air Act for the year 2000.

Reductions in sulfur dioxide releases will be obtained through a program of **emission** (release) **allowances**. EPA will issue allowances to power plants covered by the acid rain program; each allowance is worth one ton of sulfur dioxide released from the smokestack. To obtain reductions in sulfur dioxide pollution, allowances are set below the current level of sulfur dioxide releases. Plants may only release as much sulfur dioxide as they have allowances. If a plant expects to release more sulfur dioxide than it has allowances, it has to get more allowances, perhaps by buying them from another power plant that has reduced its sulfur dioxide releases below its number of allowances and therefore has allowances to sell or trade. Allowances can also be bought and sold by "middlemen", such as brokers, or by anyone who wants to take part in the allowances market. Allowances can be traded and sold nationwide. There are stiff penalties for plants which release more pollutants than their allowances cover.

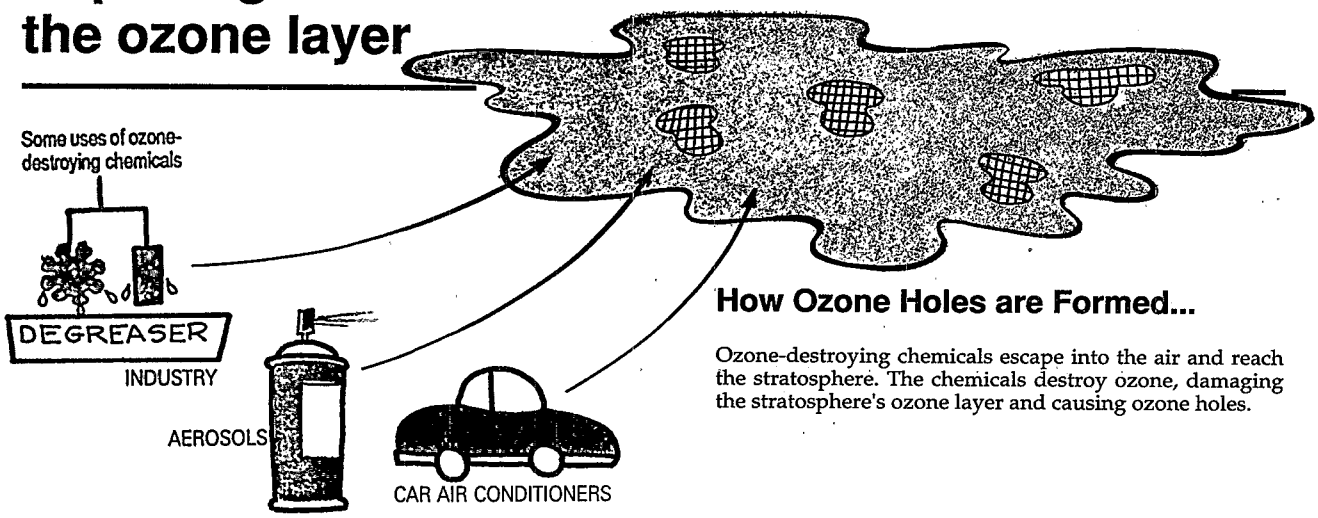
The acid rain program provides bonus allowances to power plants for (among other things) installing **clean coal** technology that reduces sulfur dioxide releases, using renewable energy sources (solar, wind etc.) or encouraging energy conservation by customers so that less power needs to be produced.

All power plants under the acid rain program will have to install **continuous emission monitoring systems (CEMS)**, machines that keep track of how much sulfur dioxide and nitrogen oxides the plant is releasing. A power plant's program for meeting its sulfur dioxide and nitrogen oxide limit will appear on the plant's **permit**, which will be filed with the state and EPA.

To cut down on nitrogen oxide pollution, EPA will require power plants to reduce their nitrogen oxide releases, and will require reductions in nitrogen oxide releases from new cars. Reducing nitrogen oxide releases will reduce both acid rain and smog formation.

The flexible market-based acid rain reduction program is expected to be a model for pollution control efforts in the United States and other countries.

Repairing the ozone layer



How Ozone Holes are Formed...

Ozone-destroying chemicals escape into the air and reach the stratosphere. The chemicals destroy ozone, damaging the stratosphere's ozone layer and causing ozone holes.

Scientists have found "holes"[3] in the ozone layer high above the Earth. The 1990 Clean Air Act has provisions for fixing the holes, but repairs will take a long time.

Ozone in the **stratosphere**, a layer of the atmosphere nine to 31 miles above the Earth, serves as a protective shield, filtering out harmful sun rays, including a type of sunlight called **ultraviolet B**. Exposure to ultraviolet B has been linked to development of cataracts (eye damage) and skin cancer.

In the mid-1970s, scientists suggested that chlorofluorocarbons (CFCs) could destroy stratospheric ozone. CFCs were widely used then as aerosol propellants in consumer products such as hairsprays and deodorants, and for many uses in industry. Because of concern about the possible effects of CFCs on the ozone layer, in 1978 the U.S. government banned CFCs as propellants in aerosol cans.

Since the aerosol ban, scientists have been measuring the ozone layer. A few years ago, an ozone hole was found above Antarctica, including the area of the South Pole. This hole, which has been appearing each year during the Antarctic winter (our summer), is bigger than the continental United States. More recently, ozone thinning has been found in the stratosphere above the northern half of the United States; the hole extends over Canada and up into the Arctic regions (the area of the North Pole). The hole was first found only in winter and spring, but more recently has continued into summer. Between 1978 and 1991, there was a 4-5 percent loss of ozone in the stratosphere over the United States; this is a significant loss of ozone. Ozone holes have also been found over northern Europe.

What could a thinned-out ozone layer do to people's lives? There could be more skin cancers and cataracts. Scientists are looking into possible harm to agriculture, and there is already some evidence of damage to plant life in Antarctic seas.

Evidence that the ozone layer is dwindling led 93 nations, including the major industrialized nations, to agree to cooperate in reducing production and use of chemicals that destroy the ozone layer. As it became clear that the ozone layer was thinning even more quickly than first thought, the agreement was revised to speed up the phase-out of ozone-destroying chemicals.

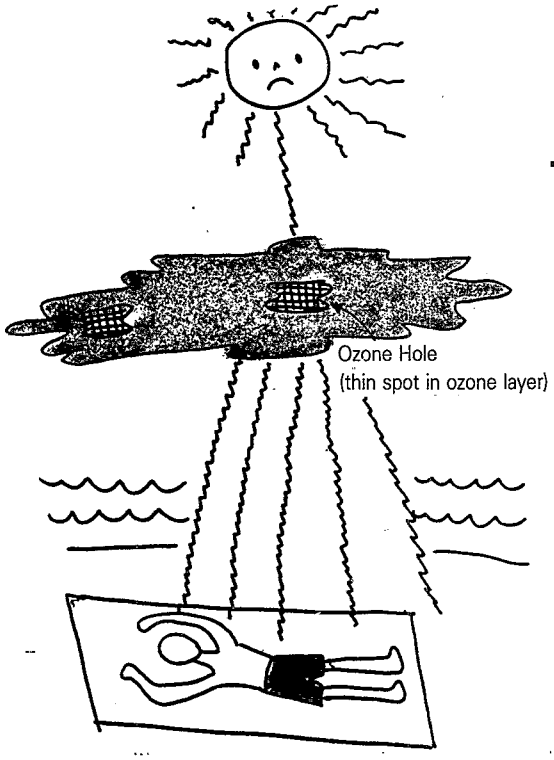
Ozone-destroying chemicals

Name	Use	When U.S. production ends*
CFCs (chlorofluorocarbons)	solvents, aerosol sprays (most spray can uses banned in 1970s), foaming agents in plastic manufacture	January 1, 1996
Halons	fire extinguishers	January 1, 1994
Carbon tetrachloride	solvents, chemical manufacture; carbon tetrachloride causes cancer in animals	January 1, 1996
Methyl chloroform (1,1,1-trichloroethane)	very widely-used solvent; in many workplace and consumer solvents, including auto repair and maintenance products	January 1, 1996
HCFCs (hydro CFCs)	CFC substitutes; chemicals slightly different from CFCs	January 1, 2003**

*The 1990 Clean Air Act includes a schedule for ending United States production of ozone-destroying chemicals, and provisions for speeding up the phase-out schedule if that is necessary. The dates in this table are "speeded-up" dates, proposed by EPA in early 1993.

**Production of the HCFC with the most severe ozone-destroying effects will end by January 1, 2003. Production of the rest of the HCFCs will end by January 1, 2030.

[3] Ozone holes aren't like doughnut holes; they're not empty spaces in the sky. Ozone holes are much like the worn-out places in an old sock or sweater: there are still threads covering the worn-out area, but the fabric can be so thin you can see right through it.



When the ozone layer is damaged, there is an increase in harmful rays from the sunreaching the Earth. These rays can harm both human health and the environment.

Unfortunately, it will be a long time before we see the ozone layer repaired. Because of the ozone-destroying chemicals already in the stratosphere and those that will arrive within the next few years, ozone destruction will likely continue for another twenty years.

The 1990 Clean Air Act sets a schedule for ending production of chemicals that destroy stratospheric ozone. Chemicals that cause the most damage will be phased out first. The phase-out schedule can be speeded up if an earlier end to production of ozone-destroying substances is needed to protect the ozone layer. The table on this page on **Ozone-destroying chemicals** includes "speeded-up" phase-out dates which were proposed by EPA in early 1993.

CFCs, Halons, HCFCs (hydrochlorofluorocarbons)[4] and other ozone-destroying chemicals were listed by Congress in the 1990 Clean Air Act and must be phased out. The Act also lets EPA list other chemicals that destroy ozone.

EPA issues **allowances** to control manufacture of chemicals being phased out. Companies can also sell unused allowances to companies still making the chemicals or can use the allowances, within certain limits, to make a different, less ozone-destroying chemical on the phase-out list.

In addition to requiring the phasing out of production of ozone-destroying chemicals, the Clean Air Act takes other steps to protect the ozone layer. The law requires recycling of CFCs and labeling of products containing ozone-destroying chemicals. The 1990 Clean Air Act also encourages the development of "ozone-friendly" substitutes for ozone-destroying chemicals.

CFCs from car air conditioners are the biggest single source of ozone-destroying chemicals. By the end of 1993, all car air conditioner systems must be serviced using equipment that **recycles** CFCs and prevents their release into the air. Larger auto service shops were required to start using this special equipment in January 1992. Only specially-trained and certified repair persons will be allowed to buy the small cans of CFCs used in servicing auto air conditioners.

As CFCs and related chemicals are phased out, appliances and industrial processes that now use the chemicals will change. For example, industrial and home refrigerators will be changed to use refrigerants that don't destroy ozone. In the meantime, refrigerator servicing and disposal will have to be done in ways that don't release CFCs. Methyl chloroform, also called 1,1,1-trichloroethane, which will be phased out by 1996, is a very widely-used solvent found in products such as automobile brake cleaners (often sold as aerosol sprays) and spot removers used to take greasy stains off fabrics. Replacing methyl chloroform in workplace and consumer products will lead to changes in many products and processes.

As substitutes are developed for ozone-destroying substances, before the chemicals can be produced and sold, EPA must determine that the replacements will be safe for health and the environment.

Consumer products containing CFCs and other ozone-destroying chemicals will have to be reformulated; these are discussed in the following section on **Consumer products**.

[4] HCFCs and Halons are chemicals much like CFCs. HCFCs may be somewhat less harmful to the ozone layer than are CFCs.

Consumer products

Hair sprays, paints, foam plastic products (such as disposable styrofoam coffee cups), carburetor and choke sprays–all are consumer products that may be regulated under the 1990 Clean Air Act. These products will be regulated to reduce releases of smog-forming VOCs and ozone-destroying chemicals (CFCs and related chemicals).

By May 1993, consumer products containing CFCs and related chemicals identified in the 1990 Clean Air Act as most damaging to the ozone layer have this label:

> WARNING: contains or manufactured with (name of chemical), a substance which harms public health and the environment by destroying ozone in the upper atmosphere.

All products containing less destructive ozone-destroying chemicals identified in the 1990 Act must be labeled by 2015.

Consumers should be aware of product changes and any safety or health problems that may be caused by the new ozone-safe formulations. **Material safety data sheets** for the products should be read for health and safety information and information on how to use and dispose of the product.[5]

The 1990 Clean Air Act orders EPA to study VOC releases from consumer products and report to Congress by 1993 on whether these products should be regulated. If they are to be regulated, EPA is to list the consumer products that account for at least 80 percent of VOC releases, and issue regulations for product categories, starting with the worst polluters. Labeling, repackaging, chemical formula changes, fees or other procedures may be used to reduce VOC releases.

[5] Material safety data sheets are product safety information sheets prepared by manufacturers and marketers. These sheets can be obtained by requesting them from the manufacturer. Some stores, such as hardware stores, may have material safety data sheets on hand for products they sell.

Home woodstoves

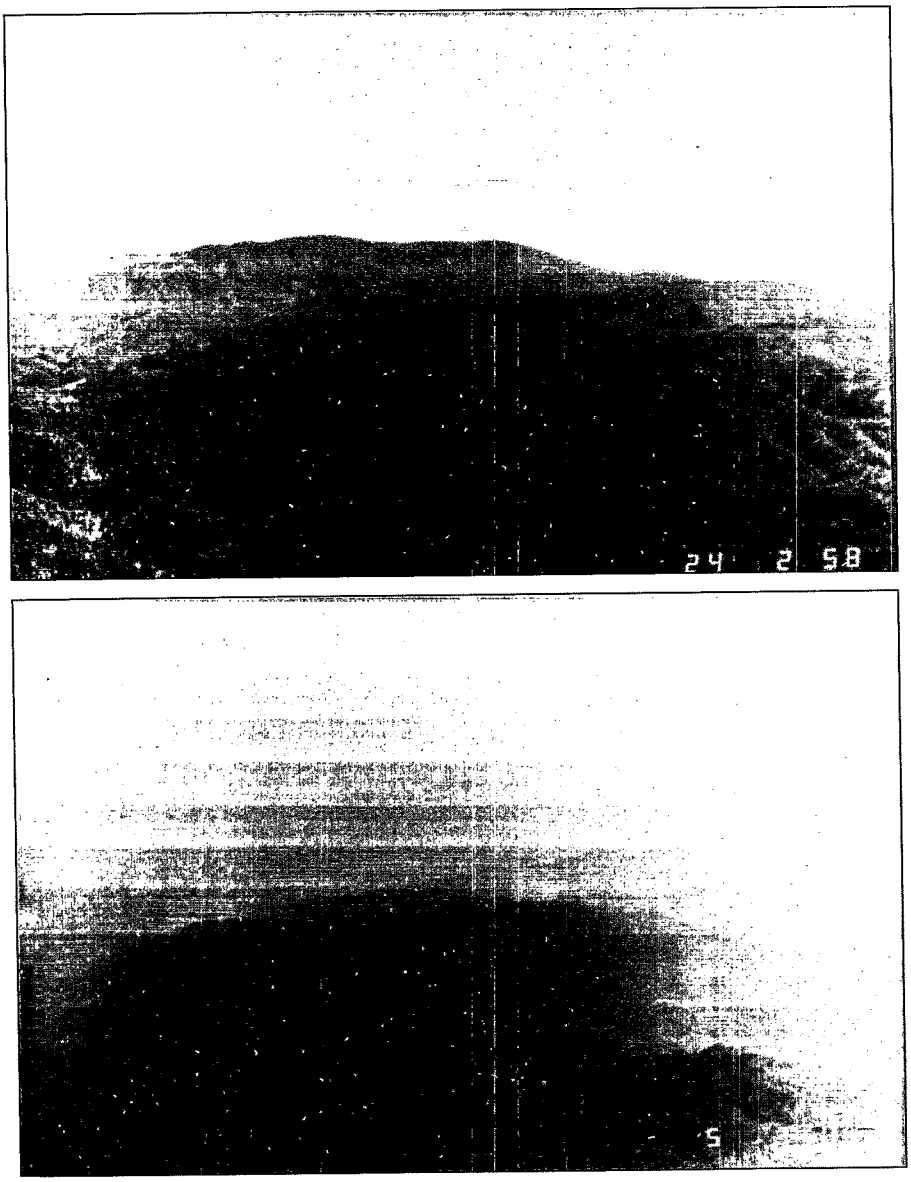
Woodstoves and fireplace inserts have become very popular in the past twenty years. Although these wood-burning heat suppliers are relatively cheap to operate, they have some disadvantages, including polluting the air. In some areas of the country, wintertime air pollution from wood smoke has become so bad that governments have had to **curtail** the use of woodstoves and fireplaces under certain weather and pollution conditions.

Wood smoke often contains a lot of **particulates** (dust, soot) and much higher levels of hazardous air pollutants, including some cancer-causing chemicals, than smoke from oil- or gas-fired furnaces. Steps to clean up wood smoke pollution have included redesigning the burning system in woodstoves; newer woodstoves put out much less pollution than older models.

Under the 1990 Act, EPA has issued guidelines for reducing pollution from home wood-burning. These guidelines, which are not requirements, include design information for less-polluting stoves and fireplaces.

New wood stoves must meet pollution reduction requirements issued by EPA.

How do you know the Clean Air Act is working?



Great Smoky Mountains National Park. Top: Clear day (photo taken at 7 p.m.). Bottom: haze (photo taken at 3 p.m.).

Everyone in the United States has a role to play to make the Clean Air Act a success. One of the most important things Americans can do is to keep track of how the law is working.

There are several ways you'll be able to tell how well the Clean Air Act is working.

EPA, state, regional and local air pollution control agencies have to issue regulations (rules), give out permits, enforce the Act against violators and do other things described in the Clean Air Act.

Many groups with an interest in how the Clean Air Act works are watching EPA and the other air pollution control agencies. These groups include local and national business and trade organizations (from state associations of dry cleaners to the United States Chamber of Commerce), local community organizations (such as neighborhood associations), and local and national environmental and public health organizations (such as the Clean Air Network of the Natural Resources Defense Council and the American Lung Association). If

you belong to one or more of these groups, their bulletins or newsletters will keep you informed.

Newspapers, radio and television will report on how the Act is being carried out, both nationally and in your local area.

You can also contact EPA and your state, regional or local air pollution control agencies to receive information directly on Clean Air Act activities.

The United States Congress monitors how federal agencies are carrying out the laws. Contact your Congressional representative or your Senator to get more information on Congressional hearings and reports on how EPA is carrying out the Clean Air Act. You can also request reports from the United States General Accounting Office (GAO), the Congressional investigative agency which reviews how EPA carries out the Clean Air Act.

State legislatures review how state agencies carry out air pollution control laws. Ask your state representative for more information.

Over time, the Clean Air Act will reduce air pollution. How will you know this is happening?

Sometimes reduced pollution causes changes so great you can literally see the difference: the air is much cleaner and clearer than it was! But you can only be sure there has been a permanent change for the better if the good air continues for a long time—weeks, months or years, during different weather conditions.

Monitoring air quality is the best way to know if the air is getting cleaner, because monitoring produces numbers that tell how much of a pollutant is in the air. You can request EPA, state or local monitoring reports that show changes over time. For example, sulfur dioxide levels will drop as power plants and other sources are cleaned up. This clean-up will happen in stages through the year 2000, so monitoring reports will tell you how the cleanup is going. Your eyes, nose and throat may also detect the change as smoggy areas clean up, but monitoring data remain the best way to check on overall improvement in air quality over time.

Monitoring will be carried out by EPA, state and regional air pollution control agencies, and by the owners of individual sources. Air pollution monitoring stations are set up all over the country, collecting information on various pollutants. Contact EPA, your state, regional or local air pollution control agency, for information on monitoring programs and monitoring reports.

How will you know the Clean Air Act is improving the environment?

Some environmental improvements will be relatively easy to detect. People who live in the eastern United States should see much less summertime haze. Also, we'll know the ozone level is increasing in the stratosphere because scientists measure ozone content. What about lakes and streams harmed by acid rain and acid aerosols? We should see improvement as sulfur dioxide and nitrogen oxide levels decline, resulting in decreased acid rain and acid aerosols, but we don't know exactly how long it will take to restore lakes and streams and we don't know exactly what the lakes and streams and their inhabitants, including fish, will be like when air pollution is reduced.

What will be the benefits for human health of reductions in air pollution?

People who now live in smoggy areas will have less eye, nose and throat irritation as smog levels are reduced. Reductions in air pollution will also lead to declines in cancer and other serious health problems.

Keep an eye on the Clean Air Act; it could change your life!

Glossary

This glossary has definitions for technical words used in the Clean Air Act summary. For the most part, the glossary provides fuller definitions than those given in the summary itself. When a word or group of words is printed in italics within a definition, that tells you that you'll find a definition of the word or group of words elsewhere in the glossary.

Acid rain — Air *pollution* produced when acid chemicals are incorporated into rain, snow, fog or mist. The "acid" in acid rain comes from sulfur oxides and *nitrogen oxides*, products of burning coal and other fuels and from certain industrial processes. The sulfur oxides and nitrogen oxides are related to two strong acids: sulfuric acid and nitric acid. When sulfur dioxide and nitrogen oxides are released from power plants and other *sources*, winds blow them far from their source. If the acid chemicals in the air are blown into areas where the weather is wet, the acids can fall to Earth in the rain, snow, fog or mist. In areas where the weather is dry, the acid chemicals may become incorporated into dusts or smokes. Acid rain can damage the environment, human health and property.

Alternative fuels — Fuels that can replace ordinary gasoline. Alternative fuels may have particularly desirable energy efficiency and *pollution* reduction features. Alternative fuels include compressed natural gas, alcohols, liquefied petroleum gas (LPG), and electricity. The 1990 *Clean Air Act* encourages development and sale of alternative fuels.

Attainment area — A geographic area in which levels of a criteria air pollutant meet the health-based primary standard (national ambient air quality standard, or NAAQS) for the pollutant. An area may have on acceptable level for one criteria air pollutant, but may have unacceptable levels for others. Thus, an area could be both attainment and nonattainment at the same time. Attainment areas are defined using federal pollutant limits set by EPA.

Carbon monoxide **(CO)** — A colorless, odorless, poisonous gas, produced by incomplete burning of carbon-based fuels, including gasoline, oil and wood. Carbon monoxide is also produced from incomplete *combustion* of many natural and synthetic products. For instance, cigarette smoke contains carbon monoxide. When carbon monoxide gets into the body, the carbon monoxide combines with chemicals in the blood and prevents the blood from bringing oxygen to cells, tissues and organs. The body's parts need oxygen for energy, so high-level exposures to carbon monoxide can cause serious health effects, with death possible from massive exposures. Symptoms of exposure to carbon monoxide can include vision problems, reduced alertness, and general reduction in mental and physical functions. Carbon monoxide exposures are especially harmful to people with heart, lung and circulatory system diseases.

CFCs **(chlorofluorocarbons)**— These chemicals and some related chemicals have been used in great quantities in industry, for refrigeration and air conditioning, and in consumer products. CFCs and their relatives, when released into the air, rise into the *stratosphere*, a layer of the atmosphere high above the Earth. In the stratosphere, CFCs and their relatives take part in chemical reactions which result in reduction of the stratospheric *ozone* layer, which protects the Earth's surface from harmful effects of radiation from the sun. The 1990 *Clean Air Act* includes provisions for reducing releases (emissions) and eliminating production and use of these ozone-destroying chemicals.

Clean Air Act — The original Clean Air Act was passed in 1963, but our national air pollution control program is actually based on the 1970 version of the law. The 1990 Clean Air Act Amendments are the most far-reaching revisions of the 1970 law. In this summary, we refer to the 1990 amendments as the 1990 Clean Air Act.

Clean fuels — Low-pollution fuels that can replace ordinary gasoline. These are *alternative* fuels, including gasohol (gasoline-alcohol mixtures), natural gas and LPG (liquefied petroleum gas).

Combustion — burning. Many important pollutants, such as *sulfur dioxide, nitrogen oxides*, and *particulates* (PM-1O) are combustion products, often products of the burning of fuels such as coal, oil, gas and wood.

Continuous emission monitoring systems **(CEMS)**— machines which measure, on a continuous basis, *pollutants* released by a *source*. The 1990 *Clean Air Act* requires continuous emission monitoring systems for certain large sources.

Control technology; control measures — equipment, processes or actions used to reduce air pollution. The extent of pollution reduction varies among technologies and measures. In general, control technologies and measures that do the best job of reducing pollution will be required in the areas with the worst pollution. For example, the *best available control technology/best available control measures* (BACT, BACM) will be required in serious *nonattainment areas* for *particulates*, a *criteria air pollutant*. A similar high level of pollution reduction will be achieved with *maximum achievable control technology* (MACT) which will be required for *sources* releasing *hazardous air pollutants*.

Criteria air pollutants — a group of very common air *pollutants* regulated by EPA on the basis of criteria (information on health and/or environmental effects of pollution). Criteria air pollutants are widely distributed all over the country.

Curtailment programs — restrictions on operation of fireplaces and woodstoves in areas where these home heat sources make major contributions to *pollution*.

Emission — release of *pollutants* into the air from a *source*. We say sources *emit* pollutants. *Continuous emission monitoring systems* (CEMS) are machines which some large sources are required to install, to make continuous measurements of pollutant release.

Enforcement — the legal methods used to make polluters obey the *Clean Air Act*. Enforcement methods include citations of polluters for violations of the law (citations are much like traffic tickets), fines and even jail terms. EPA and the state and local governments are responsible for enforcement of the *Clean Air Act*, but if they don't enforce the law, members of the public can sue EPA or the states to get action. Citizens can also sue violating *sources*, apart from any action EPA or state or local governments have taken. Before the 1990 Clean Air Act, all enforcement actions had to be handled through the courts. The 1990 *Clean Air Act* gave EPA authority so that, in some cases, EPA can fine violators without going to court first. The purpose of this new authority is to speed up violating sources' compliance with the law and reduce court time and cost.

Hazardous air pollutants **(HAPs)** — chemicals that cause serious health and environmental effects. Health effects include cancer, birth defects, nervous system problems and death due to massive accidental releases such as occurred at the pesticide plant in Bhopal, India. Hazardous air pollutants are released by *sources* such as chemical plants, dry cleaners, printing plants, and motor vehicles (cars, trucks, buses, etc.)

Inspection and maintenance program (I/M program) — Auto inspection programs are required for some polluted areas. These periodic inspections, usually done once a year or once every two years, check whether a car is being maintained to keep *pollution* down and whether emission control systems are working properly. Vehicles which do not pass inspection must be repaired. As of 1992, 111 urban areas in 35 states already had I/M programs. Under the 1990 *Clean Air Act*, some especially polluted areas will have to have *enhanced inspection and maintenance programs*, using special machines that can check for such things as how much pollution a car produces during actual driving conditions.

International air pollution — Canada and Mexico, the United States' neighbors, share the air at our borders. *Pollution* moves across the national borders; this international pollution can be serious. The 1990 *Clean Air Act* includes provisions for cooperative efforts to reduce pollution that originates in one country and affects another.

Interstate air pollution — In many areas, two or more states share the same air. We say these states are in the same air basin defined by geography and wind patterns. Often, air *pollution* moves out of the state in which it is produced into another state. Some pollutants, such as the power plant *combustion* products that cause *acid rain*, may travel over several states before affecting health, the environment and property. The 1990 *Clean Air Act* includes many provisions, such as interstate compacts, to help states work together to protect the air they share. Reducing interstate air pollution is very important since many Americans live and work in areas where more than one state is part of a single metropolitan area.

Material safety data sheets (MSDS) — product safety information sheets prepared by manufacturers and marketers of products containing toxic chemicals. These sheets can be obtained by requesting them from the manufacturer or marketer. Some stores, such as hardware stores, may have material safety data sheets on hand for products they sell.

Mobile sources — moving objects that release *pollution*; mobile sources include cars, trucks, buses, planes, trains, motorcycles and gasoline-powered lawn mowers. Mobile sources are divided into two groups: road vehicles, which includes cars, trucks and buses, and non-road vehicles, which includes trains, planes and lawn mowers.

Monitoring (monitor) — Measurement of air *pollution* is referred to as monitoring. EPA, state and local agencies measure the types and amounts of pollutants in community air. The 1990 *Clean Air Act* requires certain large polluters to perform enhanced monitoring to provide an accurate picture of their pollutant releases. Enhanced monitoring programs may include keeping records on materials used by the *source*, periodic inspections, and installation of *continuous emission monitoring systems* (CEMS). Continuous emission monitoring systems will measure, on a continuous basis, how much pollution is being released into the air. The 1990 *Clean Air Act* requires states to monitor community air in polluted areas to check on whether the areas are being cleaned up according to schedules set out in the law.

Nitrogen oxides (NOx) — a *criteria air pollutant*. Nitrogen oxides are produced from burning fuels, including gasoline and coal. Nitrogen oxides are smog-formers, which react with volatile organic compounds to form smog. Nitrogen oxides are also major components of acid rain.

Nonattainment area — a geographic area in which the level of a *criteria air pollutant* is higher than the level allowed by the federal standards. A single geographic area may have acceptable levels of one criteria air pollutant but unacceptable levels of one or more other criteria air pollutants; thus, an area can be both attainment and nonattainment at the same time. It has been estimated that 60% of Americans live in nonattainment areas.

Offset — a method used in the 1990 *Clean Air Act* to give companies which own or operate large (major) *sources* in *nonattainment areas* flexibility in meeting overall pollution reduction requirements when changing production processes. If the owner or operator of the source wishes to increase release of a *criteria air pollutant*, an *offset* (reduction of a somewhat greater amount of the same pollutant) must be obtained either at the same plant or by purchasing offsets from another company.

Oxygenated fuel (oxyfuel) — special type of gasoline, which burns more completely than regular gasoline in cold start conditions; more complete burning results in reduced production of *carbon monoxide*, a *criteria air pollutant*. In some parts of the country, carbon monoxide release from cars starting up in cold weather makes a major contribution to pollution. In these areas, gasoline refiners must market oxygenated fuels, which contain a higher oxygen content than regular gasoline. Some gasoline companies started selling oxyfuels in cities with carbon monoxide problems before the 1990 *Clean Air Act* was passed.

Ozone — a gas which is a variety of oxygen. The oxygen gas found in the air consists of two oxygen atoms stuck together; this is molecular oxygen. Ozone consists of three oxygen atoms stuck together into an ozone molecule. Ozone occurs in nature; it produces the sharp smell you notice near a lightning strike. High concentrations of ozone gas are found in a layer of the atmosphere—the *stratosphere*—high above the Earth. Stratospheric ozone shields the Earth against harmful rays from the sun, particularly *ultraviolet B*. *Smog*'s main component is ozone; this ground-level ozone is a product of reactions among chemicals produced by burning coal, gasoline and other fuels, and chemicals found in products including solvents, paints, hairsprays, etc.

Ozone hole — thin place in the ozone layer located in the *stratosphere* high above the Earth. Stratospheric ozone thinning has been linked to destruction of stratospheric ozone by *CFCs* and related chemicals. The 1990 *Clean Air Act* has provisions to reduce and eliminate ozone-destroying chemicals' production and use. Ozone holes have been found above Antarctica and above Canada and northern parts of the United States, as well as above northern Europe.

Particulates; particulate matter (PM-10) — a *criteria air pollutant*. Particulate matter includes dust, soot and other tiny bits of solid materials that are released into and move around in the air. Particulates are produced by many sources, including burning of diesel fuels by trucks and buses, incineration of garbage, mixing and application of fertilizers and pesticides, road construction, industrial processes such as steelmaking, mining operations, agricultural burning (field and slash burning), and operation of fireplaces and woodstoves. Particulate pollution can cause eye, nose and throat irritation and other health problems.

Permit — a document that resembles a license, required by the *Clean Air Act* for big (major) sources of air pollution, such as power plants, chemical factories and, in some cases, smaller polluters. Usually permits will be given out by states, but if EPA has disapproved part or all of a state permit program, EPA will give out the permits in that state. The 1990 *Clean Air Act* includes requirements for permit applications, including provisions for members of the public to participate in

state and EPA reviews of permit applications. Permits will have, in one place, information on all the regulated pollutants at a source. Permits include information on which pollutants are being released, how much the source is allowed to release, and the program that will be used to meet pollutant release requirements. Permits are required both for the operation of plants (operating permits) and for the construction of new plants. The 1990 *Clean Air Act* introduced a nationwide permit system for air pollution control.

Permit fees — fees paid by businesses required to have a *permit*. Permit fees are like the fees drivers pay to register their cars. The money from permit fees will help pay for state air pollution control activities.

***Pollutants* (pollution)** — unwanted chemicals or other materials found in the air. Pollutants can harm health, the environment and property. Many air pollutants occur as gases or vapors, but some are very tiny solid particles: dust, smoke or soot.

Primary standard — a *pollution* limit based on health effects. Primary standards are set for *criteria air pollutants*.

Reformulated gasoline — specially-refined gasoline with low levels of *smog*-forming *volatile organic compounds* (VOCs) and low levels of *hazardous air pollutants*. The 1990 *Clean Air Act* requires sale of reformulated gasoline in the nine smoggiest areas. Reformulated gasolines were sold in several smoggy areas even before the 1990 *Clean Air Act* was passed.

Secondary standard — a *pollution* limit based on environmental effects such as damage to property, plants, visibility, etc. Secondary standards are set for *criteria air pollutants*.

Smog — a mixture of *pollutants*, principally ground-level *ozone*, produced by chemical reactions in the air involving smog-forming chemicals. A major portion of smog-formers come from burning of petroleum-based fuels such as gasoline. Other smog-formers, *volatile organic compounds*, are found in products such as paints and solvents. Smog can harm health, damage the environment and cause poor visibility. Major smog occurrences are often linked to heavy motor vehicle traffic, sunshine, high temperatures and calm winds or *temperature inversion* (weather condition in which warm air is trapped close to the ground instead of rising). Smog is often worse away from the source of the smog-forming chemicals, since the chemical reactions that result in smog occur in the sky while the reacting chemicals are being blown away from their sources by winds.

Source — any place or object from which *pollutants* are released. A source can be a power plant, factory, dry cleaning business, gas station or farm. Cars, trucks and other motor vehicles are sources, and consumer products and machines used in industry can be sources too. Sources that stay in one place are referred to as *stationary sources*; sources that move around, such as cars or planes, are called *mobile sources*.

***State implementation plan* (SIP)** — a detailed description of the programs a state will use to carry out its responsibilities under the *Clean Air Act*. State implementation plans are collections of the regulations used by a state to reduce air *pollution*. The *Clean Air Act* requires that EPA approve each state implementation plan. Members of the public are given opportunities to participate in review and approval of state implementation plans.

Stationary source — a place or object from which *pollutants* are released and which does not move around. Stationary sources include power plants, gas stations, incinerators, houses etc.

Stratosphere — part of the atmosphere, the gases that encircle the Earth. The stratosphere is a layer of the atmosphere 9-31 miles above the Earth. *Ozone* in the stratosphere filters out harmful sun rays, including a type of sunlight called *ultraviolet B*, which has been linked to health and environmental damage.

Sulfur dioxide — a *criteria air pollutant*. Sulfur dioxide is a gas produced by burning coal, most notably in power plants. Some industrial processes, such as production of paper and smelting of metals, produce sulfur dioxide. Sulfur dioxide is closely related to sulfuric acid, a strong acid. Sulfur dioxide plays an important role in the production of *acid rain*.

Temperature inversion — weather condition that as often associated with serious *smog*. In a temperature inversion, warm air doesn't rise because it is trapped near the ground by a layer of heavy colder air above it. *Pollutants* in the warm air, especially smog and smog-forming chemicals, including *volatile organic compounds*, are trapped close to the ground. As people continue driving, and sources other than motor vehicles continue to release smog-forming pollutants into the air, the smog level keeps getting worse.

***Ultraviolet B* (UVB)** — a type of sunlight. The *ozone* in the *stratosphere*, high above the Earth, filters out ultraviolet B rays and keeps them from reaching the Earth. Ultraviolet B exposure has been associated with skin cancer, eye cataracts and damage to the environment. Thinning of the ozone layer in the stratosphere results in increased amounts of ultraviolet B reaching the Earth.

Vapor recovery nozzles — special gas pump nozzles that will reduce release of gasoline vapor into the air when people put gas in their cars. There are several types of vapor recovery nozzles, so nozzles may look different at different gas stations. The 1990 *Clean Air Act* requires installation of vapor recovery nozzles at gas stations in *smoggy* areas.

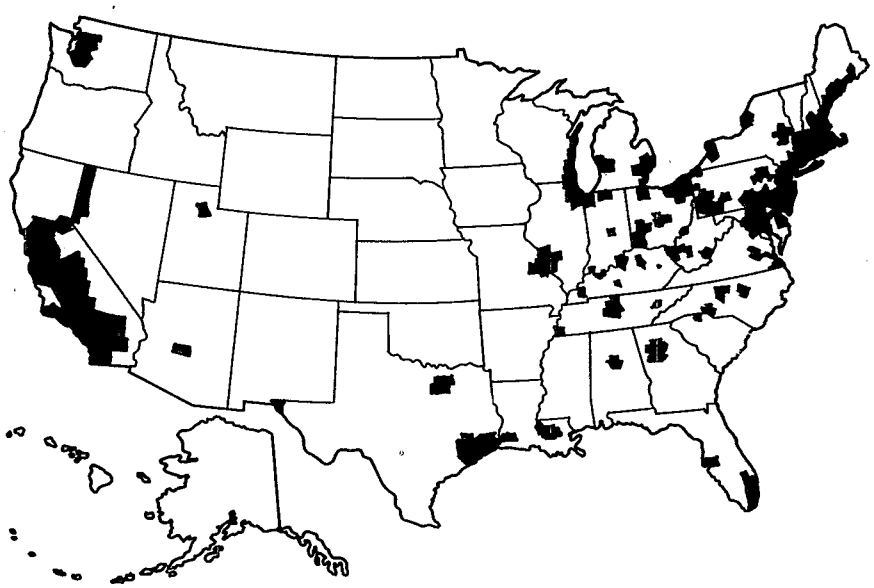
***Volatile organic compounds* (VOCs)** — Organic chemicals all contain the element carbon (C); organic chemicals are the basic chemicals found in living things and in products derived from living things, such as coal, petroleum and refined petroleum products. Many of the organic chemicals we use do not occur in Nature, but were synthesized by chemists in laboratories. *Volatile* chemicals produce *vapors* readily; at room temperature and normal atmospheric pressure, vapors escape easily from volatile liquid chemicals. Volatile organic chemicals include gasoline, industrial chemicals such as benzene, solvents such as toluene and xylene, and tetrachloroethylene (perchloroethylene, the principal dry cleaning solvent). Many volatile organic chemicals are also *hazardous air pollutants*; for example, benzene causes cancer.

The Common Air Pollutants (Criteria Air Pollutants)

Name	Source	Health Effects	Environmental Effects	Property Damage
Ozone (ground-level ozone is the principal component of smog)	chemical reaction of pollutants; VOCs and NOx	breathing problems, reduced lung function, asthma, irritates eyes, stuffy nose, reduced resistance to colds and other infections, may speed up aging of lung tissue	ozone can damage plants and trees; smog can cause reduced visibility	Damages rubber, fabrics, etc.
VOCs* (volatile organic compounds); smog-formers	VOCs are released from burning fuel (gasoline, oil, wood, coal, natural gas, etc.), solvents, paints glues and other products used at work or at home. Cars are an important source of VOCs. VOCs include chemicals such as benzene, toluene, methylene chloride and methyl chloroform	In addition to ozone (smog) effects, many VOCs can cause serious health problems such as cancer and other effects	In addition to ozone (smog) effects, some VOCs such as formaldehyde and ethylene may harm plants	
Nitrogen Dioxide (one of the NOx); smog-forming chemical	burning of gasoline, natural gas, coal, oil etc. Cars are an important source of NO^2.	lung damage, illnesses of breathing passages and lungs (respiratory system)	nitrogen dioxide is an ingredient of acid rain (acid aerosols), which can damage trees and lakes. Acid aerosols can reduce visibility.	acid aerosols can eat away stone used on buildings, statues, monuments, etc.
Carbon Monoxide (CO)	burning of gasoline, wood, natural gas, coal, oil, etc.	reduces ability of blood to bring oxygen to body cells and tissues; cells and tissues need oxygen to work. Carbon monoxide may be particularly hazardous to people who have heart or circulatory (blood vessel) problems and people who have damaged lungs or breathing passages		
Particulate Matter (PM-10); (dust, smoke, soot)	burning of wood, diesel and other fuels; industrial plants; agriculture (plowing, burning off fields); unpaved roads	nose and throat irritation, lung damage, bronchitis, early death	particulates are the main source of haze that reduces visibility	ashes, soots, smokes and dusts can dirty and discolor structures and other property, including clothes and furniture
Sulfur Dioxide	burning of coal and oil, especially high-sulfur coal from the Eastern United States; industrial processes (paper, metals)	breathing problems, may cause permanent damage to lungs	SO_2 is an ingredient in acid rain (acid aerosols), which can damage trees and lakes. Acid aerosols can also reduce visibility.	acid aerosols can eat away stone used in buildings, statues, monuments, etc.
Lead	leaded gasoline (being phased out), paint (houses, cars), smelters (metal refineries); manufacture of lead storage batteries	brain and other nervous system damage; children are at special risk. Some lead-containing chemicals cause cancer in animals. Lead causes digestive and other health problems.	Lead can harm wildlife.	

*All VOCs contain carbon (C), the basic chemical element found in living beings. Carbon-containing chemicals are called *organic*. *Volatile* chemicals escape into the air easily. Many VOCs, such as the chemicals listed in the table, are also *hazardous air pollutants*, which can cause very serious illnesses. EPA does not list VOCs as criteria air pollutants, but they are included in this list of pollutants because efforts to control smog target VOCs for reduction.

Ozone Nonattainment Areas



EXTREME

Ozone standard must be met by 2010

Los Angeles-South Coast Air Basin, CA

SEVERE

Ozone standard must be met by 2007

Chicago-Gary-Lake County, IL-IN
Houston-Galveston-Brazoria, TX
Milwaukee-Racine, WI
New York-N New Jer-Long Is, NY-NJ-CT
Southeast Desert Modified-Air Quality Maintenance Area, CA

SEVERE

Ozone standard must be met by 2005

Baltimore, MD
Philadelphia-Wilmington-Trenton, PA-NJ-DE-MD
San Diego, CA
Ventura Co, CA

SERIOUS

Ozone standard must be met by 1999

Atlanta, GA
Baton Rouge, LA
Beaumont-Port Arthur, TX
Boston-Lawrence-Worcester (E.MS), MA-NH
El Paso, TX
Greater Connecticut
Portsmouth-Dover-Rochester, NH
Providence (All RI), RI
Sacramento Metro, CA
San Joaquin Valley, CA
Springfield (Western MA), MA
Washington, DC-MD-VA

MODERATE

Ozone standard must be met by November 1996

Atlantic City,NJ
Charleston, WV
Charlotte-Gastonia, NC
Cincinnati-Hamilton, OH-KY
Cleveland-Akron-Lorain, OH
Dallas-Fort Worth, TX
Dayton-Springfield, OH
Detroit-Ann Arbor, MI
Grand Rapids, MI
Greensboro-Winston Salem-High Point, NC
Huntington-Ashland, WV-KY
Kewaunee Co, WI
Knox & Lincoln Cos, ME
Lewiston-Auburn, ME
Louisville, KY-IN
Manitowoc Co, WI
Miami-Fort Lauderdale-W.Palm Beach, FL
Monterey Bay, CA
Muskegon, MI
Nashville, TN
Parkersburg, WV
Phoenix, AZ
Pittsburgh-Beaver Valley, PA
Portland, ME
Raleigh-Durham, NC
Reading, PA
Richmond, VA
Salt Lake City, UT
San Francisco-Bay Area, CA
Santa Barbara-Santa Maria-Lompoc, CA
Sheboygan, WI
St. Louis, MO-IL
Toledo, OH

MARGINAL

Ozone standard must be met by 1993

Albany-Schenectady-Troy, NY
Allentown-Bethlehem-Easton, PA-NJ
Altoona, PA
Birmingham, AL
Buffalo-Niagara Falls, NY
Canton, OH
Columbus, OH
Door Co, WI
Edmonson Co, KY
Erie, PA
Essex Co (Whiteface Mtn), NY
Evansville, IN
Greenbrier Co, WV
Hancock & Waldo Cos, ME
Harrisburg-Lebanon-Carlisle, PA
Indianapolis, IN
Jefferson Co, NY
Jersey Co, IL
Johnstown, PA
Kent and Queen Anne's Cos, MD
Knoxville, TN
Lake Charles, LA
Lancaster, PA
Lexington-Fayette, KY
Manchester, NH
Memphis, TN
Norfolk-Virginia Beach-Newport News, VA
Owensboro, KY
Paducah, KY
Portland-Vancouver,OR-WA
Poughkeepsie, NY
Reno, NV
Scranton-Wilkes-Barre, PA
Seattle-Tacoma, WA
Smyth Co, VA (White Top Mtn)
South Bend-Elkhart, IN
Sussex Co, DE
Tampa-St.Petersburg-Clearwater, FL
Walworth Co,WI
York, PA
Youngstown-Warren-Sharon, OH-PA

(Table current as of April, 1993)

Carbon Monoxide Nonattinment Areas

State	City/area
Alaska	Anchorage area Fairbanks North Star
Arizona	Phoenix
California	Chico Fresno Lake Tahoe-South Shore Los Angeles South Coast Air Basin* Modesto Sacramento San Diego San Francisco-Oakland-San Jose Stockton
Colorado	Colorado Springs Denver-Boulder Fort Collins Longmont
Connecticut	Hartford-New Britain-Middletown
District of Columbia	Washington, D.C. D.C. Area, Maryland, Virginia
Massachusetts	Boston
Maryland	Baltimore Washington, D.C. area-Maryland, DC, Virginia
Minnesota	Duluth Minneapolis-St.Paul
Montana	Missoula
North Carolina	Raleigh-Durham Winston-Salem
New Jersey	New York Metropolitan area - Connecticut, New York, New Jersey Camden-Philadelphia, Pennsylvania
New Mexico	Albuquerque
Nevada	Las Vegas Reno
New York	New York metropolitan area-New York, Long Island, New Jersey, Connecticut Syracuse
Ohio	Cleveland
Oregon	Grant's Pass Klamath Falls Medford Portland-Vancouver Washington
Pennsylvania	Philadelphia-Camden, New Jersey
Tennesee	Memphis
Texas	El Paso
Utah	Ogden Provo-Orem
Virginia	Washington, D.C. metropolitan area-Virginia, D.C, Maryland
Washington	Vancouver, Washington-Portland, Oregon Seattle-Tacoma Spokane

*Los Angeles- South Coast Air Basin is the only carbon monoxide nonattainment area classified as "serious"; all others are classified as "moderate". All areas listed as "moderate" must meet the CO standard by December, 1995. The "serious" area must meet the CO standard by December, 2000.

Particulate (PM-10) Nonattainment Areas

MODERATE

Areas must meet PM-10 standards by December 31, 1994

Alaska	Anchorage, Juneau
Arizona	Santa Cruz, Pima, Maricopa; Pinal and Gila counties; Yuma Paul's Spur, Nogales
California	Inyo, San Bernadino, Kern, Mono, Stanislaus, Madera, Riverside (eastern part), San Bernardino (part) counties
Colorado	Archuleta, Adams, Denver, Boulder, San Miguel, Prowers, Pitkin, Fremont counties
Idaho	Ada (Boise), Shoshone, Bannock, Power (Pocatello), Bonner counties
Illinois	Cook (Chicago), LaSalle, Oglesby, Madison counties
Indiana	Lake (Gary, Hammond, East Chicago) county
Maine	Arostook (Presque Isle) county
Michigan	Wayne (Detroit) county
Minnesota	Ramsey, Olmstead counties
Montana	Flathead, Lincoln, Lake Missoula. Libbey, Rosebud, Silver Bow, Butte counties
Nevada	Washoe (Reno) county
New Mexico	Dona Ana county
Ohio	Cuyahoga (Cleveland), Jefferson (Steubenville) counties
Oregon	Jackson (Ashland-Medford), Josephine (Grants Pass), Klamath Falls Lane (Eugene), Union (LaGrande) counties
Pennsylvania	Allegheny (includes Clairton) county Liberty-Lincoln-Portview-Glassport boroughs-Clairton
Texas	El Paso county
Utah	Salt Lake (Salt Lake City), Utah County
Washington	King (Seattle), Pierce (Tacoma), Spokane, Yakima, thurston (Olympia, Tumwater), Walla Walla counties
West Virginia	Brooke (near WV border at Steubenville) county
Wyoming	Sheridan county

SERIOUS

Areas must meet PM-10 standards by December 31, 2001

California	San Joaquin Valley, Owens Valley, South Coast Air Basin, Coachella Valley
Nevada	Las Vegas

State and Territorial Air Pollution Control Agencies

Alabama Department of Environmental Management
Air Division
1751 Dickenson Drive
Montgomery AL 36130
(205) 271-7861

Alaska Department of Environmental Conservation
Air Quality Management Program
3220 Hospital Drive, P.O. Box O
Juneau AL 99811-1800
(907) 465-5100

American Samoa
Environmental Quality Commission
Governor's Office
Pago Pago,
American Samoa 96799
011-(684) 633-4116

Arizona Department of Environmental Quality
Office of Air Quality
P.O. Box 600
Phoenix AZ 85001-0600
(602) 257-2308

Arkansas Department of Pollution Control and Ecology
Air Division
8001 National Drive,
P.O. Box 9583
Little Rock AR 72209
(501) 562-7444

Secretary of Environmental Affairs
California Air Resources Board
P.O. Box 2815
Sacramento CA 95812
(916) 445-4383

Colorado Department of Health
Air Pollution Control Division
4210 E 11th Avenue
Denver CO 80220
(303) 331-8500

Connecticut Department of Environmental Protection
Bureau of Air Management
165 Capitol Avenue
Hartford CT 06106
(203) 566-2506

Department of Natural Resources & Environmental Control
Division of Air and Waste Management
89 Kings Highway, P.O. Box 1401
Dover DE 19903
(302) 739-4791

District of Columbia
Air Quality Control and Monitoring Branch
2100 Martin Luther King Ave, SE
Washington DC 20020
(202) 404-1120

Florida Department of Environmental Regulation
Air Resources Management
2600 Blair Stone Road
Tallahassee FL 32399-2400
(904) 488-1344

Georgia Department of Natural Resources
Environmental Protection Division
205 Butler Street, SE
Atlanta GA 30344
(404) 656-6900

Guam Environmental Protection Agency
Complex Unit D-107
130 Rojas Street
Harmon, Guam 96911
011-(671) 646-8863

Hawaii State Department of Health
Environmental Management Division
Air Pollution Section
1270 Queen Emma St., Suite 900
Honolulu HI 96813
(808) 586-4019

Idaho Division of Environmental Quality
Air Quality Bureau
1410 North Hilton
Boise ID 83706
(208) 334-5898

Illinois Environmental Protection Agency
Division of Air Pollution Control
2200 Churchill Road
P.O. Box 19276
Springfield IL 62794-9276
(217) 782-7326

Indiana Department of Environmental Management
Air Pollution Control Board
105 S. Meridian Street
P.O. Box 6015
Indianapolis IN 46206-6015
(317) 232-8384

Iowa Department of Natural Resources
Air Quality Section
Henry A. Wallace Building, 900 E. Grand St.
Des Moines IA 50319
(515) 281-8852

Kansas Department of Health and Environment
Bureau of Air and Waste Management
Forbes Field, Building 740
Topeka KS 66620
(913) 296-1593

Kentucky Department for Environmental Protection
Division of Air Quality
316 St. Clair Mall
Frankfort KY 40601
(502) 564-3382

Louisiana Department of Environmental Quality
Office of Air Quality and Radiation Protection
Air Quality Division, P.O. Box 82135
Baton Rouge LA 70884-2135
(504) 765-0110

Maine Department of Environmental Protection
Bureau of Air Quality Control
State House, Station 17
Augusta ME 04333
(207) 289-2437

Maryland Department of the Environment
Air Management Administration
2500 Broening Highway
Baltimore MD 21224
(301) 631-3255

Massachusetts Department of Environmental Protection
Division of Air Quality Control
One Winter Street, 8th Floor
Boston MA 02108
(617) 292-5593

Michigan Department of Natural Resources
Air Quality Division
P.O. Box 30028
Lansing MI 48909
(517) 373-7023

Minnesota Pollution Control Agency
Air Quality Division
520 Lafayette Road
Saint Paul MN 55155
(612) 296-7331

Mississippi Department of Environmental Quality
Air Division, Office of Pollution Control
P.O. Box 10385
Jackson, MS 39289
(601) 961-5171

Missouri Department of Natural Resources
Division of Environmental Quality
Air Pollution Control
P.O. Box 176
Jefferson City MO 65102
(314) 751-4817

Montana Department of Health and Environmental Science
Air Quality Bureau
Cogswell Building, Room A116
Helena, MT 59620
(406) 444-3454

Nebraska Department of Environmental Control
Air Quality Division
P.O. Box 98922
Lincoln NE 68509-8922
(402) 471-2189

Nevada Division of Environmental Protection
Bureau of Air Quality
123 West Nye Lane
Carson City NV 89710
(702) 687-5065

New Hampshire Department of Environmental Services
Air Resources Division
64 N. Main Street, Box 2033
Concord NH 03301
(603) 271-1370

New Jersey Department of Environmental Protection
Division of Environmental Quality
Air Program
401 East State Street
Trenton NJ 08625
(609) 292-6710

New Mexico Environmental Improvement Division
Air Quality Bureau
P.O. Box 26110
Santa Fe NM 87502
(505) 827-0070

New York Department of Environmental Conservation
Division of Air Resources
50 Wolf Road
Albany NY 12223-3250
(518) 457-7230

North Carolina Division of Environmental Management
Air Quality Section
P.O. Box 27687
Raleigh NC 27611-7687
(919) 733-3340

North Dakota State Department of Health
Environmental Health Section
1200 Missouri Avenue
Bismarck ND 58502-5520
(701) 221-5188

Ohio Environmental Protection Agency
Divison of Air Pollution Control
1800 WaterMark Drive
Columbus, OH 43266-0149
(614) 644-2270

Oklahoma State Dept. of Health
Air Quality Service
1000 Northeast 10th Street, P.O. Box 53551
Oklahoma City, OK 73152
(405) 271-5220

Oregon Deptartment of Environmental Quality
Air Quality Control Division
811 SW 6th Avenue, 11th Floor
Portland OR 97204
(503) 229-5287

Pennsylvania Deptartment of Environmental Resources
Bureau of Air Quality Control
101 South Second St. P.O. Box 2357
Harrisburg PA 17105-2357
(717) 787-9702

Puerto Rico Environmental Quality Board
Edificio Banco National Plaza
431 Avenue Ponce DeLeon
Hato Rey PR 00917
(809) 767-8071

Rhode Island Department of Environmental Mgmt.
Division of Air and Hazardous Materials
291 Promenade Street
Providence RI 02908-5767
(401) 277-2808

South Carolina Department of Health and Environmental Control
Bureau of Air Quality Control
2600 Bull Street
Columbus SC 29201
(803) 734-4750

South Dakota Department of Environment and Natural Resources
Air Program
523 East Capitol Avenue
Pierre SD 57501
(605) 773-3153

Tennessee Department of Environment and Conservation
Division of Air Pollution Control
701 Broadway
Nashville TN 37243-1531
(615) 741-3931

State of Texas
Texas Air Control Board
12124 Park 35 Circle
Austin TX 78753
(512) 908-1000

Utah Department of Environmental Quality
Division of Air Quality
1950 West North Temple
Salt Lake City UT 84114-4820
(801) 536-4000

Vermont Agency of Natural Resources
Air Pollution Control Division
103 S. Main Street, Building 3 South
Waterbury VT 05676
(802) 244-8731

Virgin Islands Deptartment of Planning & Natural Resources
Division of Environmental Protection
1118 C'sted Stx.
St. Croix VI 00820-5065
(809) 773-0565

State of Virginia
Department of Air Pollution Control
P.O. Box 10089
Richmond VA 23240
(804) 786-2378

Washington State
Department of Ecology
P.O. Box 47600
Olympia WA 98504-7600
(206) 459-6632

State of West Virginia
Air Pollution Commission
1558 Washington Street East
Charleston WV 25311
(304) 348-2275

Wisconsin Department of Natural Resources
Bureau of Air Management
Box 7921
Madison WI 53707
(608) 266-7718

Wyoming Department of Environmental Quality
Air Quality Division
122 West 25th Street
Cheyenne WY 82002
(307) 777-7391

EPA Regional Offices

Region 1
Air, Pesticides and Toxics
Management Division (AAA)
U.S. EPA - Region 1
John F. Kennedy Federal Building
One Congress Street
Boston MA 02203
(617) 565-3800

(Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont)

Region 2
Air and Waste Management Division
Room 1000
U.S. EPA - Region 2
26 Federal Plaza
New York NY 10278
(212) 264-2301

(New Jersey, New York, Puerto Rico, Virgin Islands)

Region 3
Air, Radiation and Toxics Division
(3AT00)
U.S. EPA - Region 3
841 Chestnut Street
Philadelphia PA 19107
(215) 597-3025

(Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia)

Region 4
Air, Pesticides and Toxics
Management Division
U.S. EPA - Region 4
345 Courtland Street, N.E.
Atlanta GA 30365
(404) 347-3043

(Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee)

Region 5
Air and Radiation Division (A-18J)
U.S. EPA - Region 5
77 West Jackson Boulevard
Chicago IL 60604
(312) 353-2212

(Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin)

Region 6
Air, Pesticides and Toxics Division
U.S. EPA - Region 6
First Interstate Bank Tower at
Fountain Place
1445 Ross Avenue, 12th Floor, Suite
1200
Dallas TX 75202-2733
(214) 655-7200

(Arkansas, Louisiana, New Mexico, Oklahoma, Texas)

Region 7
Air and Toxics Division (ARTX)
U.S. EPA - Region 7
726 Minnesota Avenue
Kansas City KS 66101
(913) 551-7020

(Iowa, Kansas, Missouri, Nebraska)

Region 8
Air and Toxics Division
U.S. EPA - Region 8
999 18th Street, Suite 500
Denver CO 80202-2405
(303) 293-1438

(Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming

Region 9
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