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EPA

Cleaning the Air

EPA's Program for Air Pollution Control

/hat Is Air 'ollution?

'he air around us has never ɔeen completely pure. It has ɜlways contained some natural pollution: windblown dust, smoke from forest ires, salt particles from the oceans, gases generated by the decay of plant and animal life, and occasional torrents of gases and dust particles from volcanic eruptions.

For millions of years, scientists believe, nature's own air conditioning system kept the air fairly clean. Winds mixed and dispersed the pollutants. Rain and snow washed some of them to the ground. Plants absorbed carbon dioxide from the air and contributed fresh oxygen. The system ran itself.

With the coming of the industrial age and the vast increase in population, our ability to pollute began to overtake nature's ability to purify. The effects were first felt in areas of heavy industry, where thousands of factory smokestacks poured soot and sulfurous gases in the air. When stagnant weather conditions kept these pollutants close to the ground in one area for days on end, there were outbreaks of respiratory disease and increased deaths from lung and heart ailments. From the middle of the 19th century such episodes occurred with disturbing frequency in the industrial cities of Europe and America, accompanied each time with sharp rises in sickness and mortality.

The first air pollution control ordinance in the United States was enacted in Pittsburgh around 1815.

Other industrial cities also passed local ordinances to limit factory fumes and reduce smoke from the burning of coal and to control such smelly operations as glue factories and rendering plants. (Odor was regarded as a public nuisance rather than a health hazard.)

Smoke controls often seemed to be effective in improving the appearance and general cleanliness of cities, but much of this improvement was probably due to a widespread shift in fuels after World War II: from coal to oil and gas for electric power production, industrial and home heating; and from coal to diesel oil for railroads. Pittsburgh and St. Louis became noticeably less smokey in the 1950's, and household cleaning and maintenance costs were reduced. In London, after soft coal heating fires were banned early in the next decade, the traditional "peasoup" fogs disappeared; landmark buildings were cleaned of centuries of grime and stayed clean.

Despite scattered successes in smoke and soot cleanup after the war, air pollution continued to increase and its nature began to change. Pollution episodes occurred in cities like Los Angeles that had little heavy industry but lots of automobiles. The smoke-and-sulfur type of pollution, though still widespread, was no longer dominant. The principal pollutant was "photochemical smog," a complex assortment of gases that were formed in the air itself. Prof. A.J. Haagen-Smit of the California Institute of Technology in Pasadena was the first to demonstrate (in 1951) that photochemical smog was a product of the action of sunlight upon automobile exhausts primarily, plus gaseous wastes from industry, refineries, and incinerators.

Today there are more than two and a half times as many motor vehicles in the country as there were when Dr. Haagen-Smit pointed the finger at them as a major source of modern air pollution.

Two-Thirds of One-Tenth of One Percent

To understand the air pollution problem, we must realize that all pollution makes up a very small fraction of the air itself. The air that is near the earth's surface is called the troposphere. It is about 30 kilometers (18 miles) thick and is kept pretty thoroughly mixed by winds and convection currents. This is the air we breathe.

Industrial pollutants frequently dim the air for nearby residents.

What is it made up of?

Seventy-eight percent is nitrogen, a gaseous element that is very hard to burn, that is, it doesn't unite readily with oxygen. Twenty-one percent is oxygen, a gaseous element whose ability to unite with other elements, like carbon, releasing energy in the form of heat, constitutes the engine that runs all animal life and almost all plant life.

These two gases make up 99 percent of the air we breathe. Only one percent is left. Nine-tenths of this one percent is argon, a very inert gas, which is simply there. It never does anything.

Now we have only one-tenth of one percent for all the other ingredients of air and all the pollution. What's in this 1/10 of 1 percent, or 1,000 parts per million?

Carbon dioxide (CO_2) is about a third of it, 330 parts per million. This seems like a small amount for such an important constituent of the atmosphere. All green plants that make food for themselves and for animals by photosynthesis depend on this carbon dioxide. And carbon dioxide helps to keep the earth warm by being transparent to the sun's visible-light radiation and opaque to the infrared, or heat, energy radiating from the earth. Carbon dioxide is the earth's greenhouse window.

The last two-thirds of one-tenth of one percent contains all the remaining ingredients of dry air: neon, helium, and krypton (all inert gases like argon) plus all the pollutants: ozone (a form of oxygen), carbon monoxide, hydrocarbons, and particles of solid or liquid substances so small that they float around suspended in air.

All these percentages are for "dry" air, ignoring the water vapor which is so important in Nature's weather machine. The water content can vary a thousandfold, from about half again as much as argon (9/10ths of 1 percent, 900 ppm) to 0.9 ppm. Air that is saturated with water vapor, all the water it can hold, never has much more than 1 percent water.

We are concerned, therefore, with a tiny fraction of the atmosphere, a thin, chemical soup that is constantly changing in a complex of actions and reactions, influenced by the energy of sunlight and the presence or absence of water vapor.

Sulfur oxide gases can combine with some of the water to form particles of sulfur acids and salts. Oxides of nitrogen combine with hydrocarbons to form ozone and other photochemical oxidants. Carbon monoxide seems to disappear in ways not yet understood; probably it converts to carbon dioxide. Particles are lifted into the air by the wind.

Most of the chemical reactions in air are reversible, and Nature tends to maintain a rough balance, an equilibrium, which may vary with the hour of the day, the season of the year, and with weather conditions: air temperature, pressure, and humidity.

Small Percentages, Big Amounts

When air pollution is considered as a fraction of all the air, it seems very small, but the total *amounts* of pollution in the air over the United States at any given time add up to *hundreds of millions of tons.*

The U.S. Environmental Protection Agency (EPA) and its predecessor, the National Air Pollution Control Administration, have been keeping track of man-made pollutant emissions for more than a decade.

The total pollution figures are estimates, of course, but they are based on careful and conservative accounting of fuel consumption, records of industrial production, and similar official statistics related to pollutant emissions. Table 1, shows total emissions over a seven-year period. Notice that the figures are in millions of metric tons (a metric ton is 1,000 kilograms or about 2,200 pounds). The five most pervasive pollutants spewed into the air each year in the United States totalled from 175 million to more than 200 million metric tons, nearly a ton for every man, woman, and child in the country.

Table 2 shows emission estimates for 1977, the latest year for which the figures are available, according to where the pollution came from. Internal combustion engines (automobiles and trucks) account for 80 percent of the carbon monoxide and 51 percent of total emissions. Stationary fuel burning produced 23 percent of total emissions, and industrial processes 16 percent.

But total emissions are of little use in planning and carrying out the reductiion of emissioins. Adding particulates and nitrogen oxides and carbon monoxide is a little like adding apples and newspapers and brake shoes; the total is essentially meaningless. Reducing emissions depends on actions that can be taken with each type of pollutant; each requires different methods of control.

A glance at the separate columns in Table 2 will show that certain types of sources predominate for different types of pollution. Stationary fuel burning and industrial processes account for 81 percent of particle emissions, fuel burning for 82 percent for sulfur oxides, transportation and fuel burning for 96 percent of nitrogen oxides, transportation and industrial processing for 72 percent of hydrocarbons, and transportation for 80 percent of carbon monoxide.

Therefore, measures taken to reduce emissions from principal sources — automobiles, for instance, or electric power plants — presumably could bring about substantial reductions in the levels in ambient air of several kinds of pollution. That's a key aspect of EPA's pollution control strategy.

Emissions are estimated by carefully noting the statistics of automotive mileage driven and fuel consumption, industrial fuel consumption and the pro-

Table 1. Estimated pollutant emissions in the United States
1970 through 1977 (millions of metric tons)

Year	*Suspended Particles*		*Sulfur Oxides*		*Nitrogen Oxides*		*Hydro-carbons**		*Carbon Monoxide*		**Total**
1970	22.2	11%	29.8	15%	19.6	9%	29 5	15%	102.2	50%	**203.3**
1971	20.9	10%	28.3	14%	20.2	10%	29.1	15%	102.5	51%	**201.0**
1972	19.6	10%	29.6	14%	21 6	11%	29.6	14%	103.8	51%	**204.2**
1973	19.2	10%	30 2	14%	22.3	11%	29 7	14%	103.5	51%	**204.9**
1974	17 0	9%	28.4	15%	21.7	11%	28.6	15%	99.7	50%	**195.4**
1975	13.7	7%	26.1	14%	21.0	11%	26 9	15%	96.9	53%	**184.6**
1976	13.2	7%	27.2	14%	22.8	11%	28.7	15%	102.9	53%	**193.8**
1977	12.4	6%	27.4	14%	23.1	12%	28 3	15%	102 7	53%	**193.9**

*Volatile hydrocarbons only; methane and other nonreactive compounds omitted so far as possible.

National Air Quality, Monitoring, and Emission Trends Report, 1977 EPA, December 1978

Table 2. Estimated pollutant emissions by source, 1977
(millions of metric tons)

Source	*Suspended Particles*		*Sulfur Oxides*		*Nigrogen Oxides*		*Volatile Hydro-carbons*		*Carbon Monoxide*	
Transportation (autos, trucks)	1.1	9%	0.8	3%	9.2	40%	11.5	41%	85.7	83%
Combustion (power, heating)	4.8	39%	22.4	82%	13.0	56%	1.5	5%	1.2	1%
Industrial processes	5.4	43%	4.2	15%	0.7	4%	10.1	36%	8.3	8%
Solid Waste (incinerators)	0.4	3%			0.1		0.7	2%	2.6	3%
Miscellaneous (fires, solvents)	0.7	6%			0.1		4.5	16%	4.9	5%
Total	**12.4**		**27.4**		**23.1**		**28.3**		**102.7**	

National Air Quality, Monitoring and Emissions Trends Report, 1977 EPA December 1978

duction figures for various industries — steelmaking and other metal smelting, cement plants, petrochemical plants, etc., all the principal stationary sources of various pollutants — the numbers and output figures of incinerators, burning dumps; and records of windstorms; fires, both accidental and natural; and volcanic eruptions.

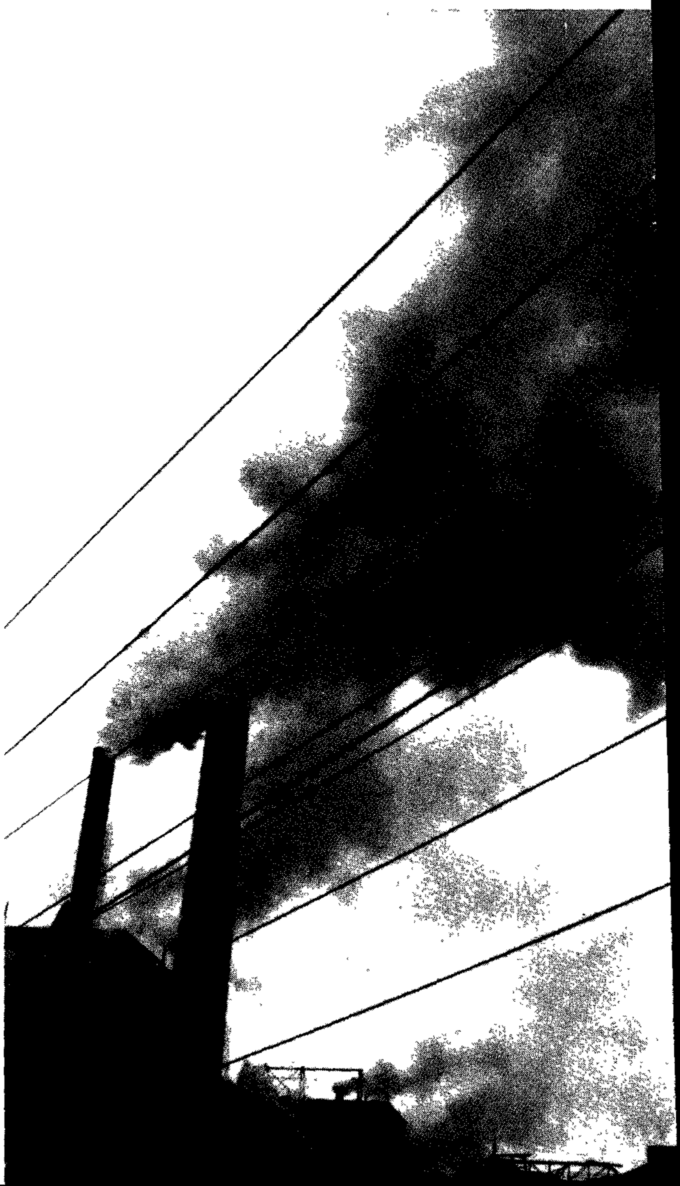
The amounts of pollution known to be emitted by such sources are not always reflected in the pollution levels found in ambient air measurements. The discrepancy is due to several factors. First, measurement methods are not perfect, either for monitoring the air or for estimating emissions. Second, changing weather conditions can vary the rates at which pollutants are transported from one area to another and dispersed. Third, certain important pollutants — ozone and other photochemical oxidants — are not emitted directly by human activities; they are formed in air when sunlight spurs chemical combinations among two kinds of emitted pollutants: hydrocarbons and nitrogen oxides.

Smoke from brush fires can add to pollution problems.

Principal Air Pollutants, Their Sources and Effects

Particulates
These are solid particles or liquid droplets small enough to remain suspended in air. They range widely in size, from particles visible as soot or smoke to those too small to detect except with an electron microscope. Smaller sizes may remain suspended for a long time and be carried great distances by winds. Particulates are produced primarily by industrial process (47 percent) and combustion (34 percent). About 7 percent come from natural, and largely uncontrollable, sources such as windblown dust, forest fires, volcanoes, etc.

The health hazard of particulates may be physical, from the clogging of the lung sacs by the particles, or chemical, from reactions of the body to very small substances that can pass through the lung membranes into the blood and thence to other body organs. Many kinds of particles are hazardous in themselves: asbestos, certain metal salts and acids, and some complex organic compounds.



Sulfur Dioxide
This is a corrosive and poisonous gas produced mainly from the burning of sulfur-containing fuel (82 percent) and from certain industrial processes (15 percent). Most sulfurous coal and oil is burned in urban areas, where population and industry are concentrated, but sources that produce several hundred tons of the gases each year may be located in rural areas also.

Sulfur dioxide affects human breathing in direct relation to the amount of the gas in the air breathed. Many types of respiratory disease, such as coughs and colds, asthma and bronchitis, are associated with sulfur pollution. Sulfur dioxide and particulates often occur together, and the two pollutants combined have a greatly increased effect on the body.

Carbon Monoxide
This is a colorless, odorless, poison gas produced by the incomplete burning of the carbon in fuels (carbon being the element supplying most of the energy from combustion). About 80 percent of the carbon monoxide put into the air is from gasoline and diesel engines, i.e., autos and trucks. It is by far the most plentiful air pollutant: more than 87 million tons per year in the United States. Fortunately it

usually disperses and apparently is slowly converted or absorbed by natural processes. Its danger comes from localized concentrations, as in traffic-filled city streets.

Carbon monoxide replaces oxygen in the red blood cells, reducing the amount of oxygen that can reach the body cells and maintain life. Continued lack of oxygen affects the brain and the heart, in that order, and death can result from deep or prolonged inhalation of carbon monoxide.

Hydrocarbons
These gases, like carbon monoxide, represent unburned and wasted fuel. They come from incomplete combustion of gasoline and from evaporation of petroleum fuels, industrial solvents, painting and dry cleaning.

Although some individual hydrocarbons are poisonous, most are not. Their harm comes from the ozone and other oxidants they help to form by reacting with nitrogen oxides in sunlight.

Nitrogen Dioxide
This poisonous and highly reactive gas is produced when fuel is burned at high temperatures, about 650°C (1200°F), causing some of the abundant nitrogen in the air to burn also. Most emissions come from industries (52 percent) and autos (44 percent). Control depends on careful adjustment of the combustion process.

Nitrogen irritates and causes structural and chemical changes in the lungs. It lowers the body's resistance to respiratory infections like influenza. Its principal harm, however, comes from the ozone that it helps to form by reacting in sunlit air with hydrocarbons.

Ozone
It is the principal constituent of modern smog and serves as an indicator of all the other photochemical oxidants — peroxyacetal nitrates (PAN), formaldehydes, and other organic compounds of nitrogen. Ozone is a poisonous form of oxygen that irritates the mucous membranes of the breathing system, causing coughing, choking, and impaired lung function. It aggravates chronic respiratory diseases like asthma and bronchitis.

Ozone causes structural and chemical changes in the lungs and some alterations of blood components. PAN and other photochemical oxidants that accompany ozone are powerful eye irritants. All oxidants are formed in the air, by chemical combination of nitrogen oxides and hydrocarbons, using the energy of sunlight. They are almost never emitted by human activities and sources.

Emissions from both industry and automobiles obscure the skyline of many urban areas.

Lead
An ambient standard for lead in air was adopted by EPA in 1978, seven years after the other six. Lead is a poison when ingested or inhaled. It accumulates in the body, in bone and soft tissue, and affects the bloodforming organs, the kidneys, and the nervous system. About 90 percent of airborne lead (in particles of lead salts and other compounds, not the pure metal) comes from lead-containing anti-knock agents in gasoline. The rest comes from industries that smelt or process the metal.

The Strategy for Reducing Air Pollution

The national strategy for reducing pollution and improving air quality is set by Congress in considerable detail. There is not much room for discretion or choice of action by EPA in carrying out the Congressional mandates.

These mandates are embodied in legislation originally passed in 1955 and strengthened in 1963, 1965, 1967. Strong national control legislation came with the 1970 and 1977 amendments to the Clean Air Act.

Before 1970 the Act provided for national control of motor vehicle emissions studies of the air pollution problem, for nationwide planning of possible control methods, and for States to set pollution control goals. Funds were appropriated to help the various States accomplish these tasks and for Federal oversight, research, and technical assistance.

Nationwide Standards

The 1970 amendments required the Federal government to set standards for ambient air quality, that is, to define the principal types of pollution and the levels of each that should not be exceeded for the protection of public health and welfare. EPA formally adopted the first ambient air quality standards in the summer of 1971. (They are listed in Table 3.)

Air Quality Control Regions

In the late 1960's, the study and planning efforts had been based on individual air quality regions, on the sensible presumption that air pollution problems (and their solutions) would vary from place to place throughout the country. An air quality region was defined as an area with definite pollution problems, common pollution sources, and characteristic weather. Though the geographical boundaries were seldom as exact as for water sheds, the air quality regions were useful units for management and control; each region had individual problems and individual characteristics.

The regional concept is still in use in the planning and control measures being carried out by EPA and the various States, and the 1977 amendments require the States to rate each region for its attainment of each air quality standard.

Emissions of all new car models are tested in EPA's Ann Arbor testing facility

Table 3. National Quality Standards for Ambient Air
(in micrograms or milligrams per cubic meter — ug/m^3 and mg/m^3 — and in parts per million — ppm)

Pollutant	*Averaging Time*	*Primary Standards (health)*	*Secondary Standards (welfare, materials)*
Particulates	annual	75 ug/m^3	60 ug/m^3
	24-hour	260 ug/m^3	150 ug/m^3
Sulfur dioxide	annual	80 ug/m^3 (.03 ppm)	
	24-hour	365 ug/m^3 (.14 ppm)	
	3-hour		1300 ug/m^3 (.5 ppm)
Carbon monoxide	8-hour	10 mg/m^3 (9 ppm)	same as primary
	1-hour	40 mg/m^3 (35 ppm)	
Hydrocarbons (nonmethane)	3-hour (6-9 am)	160 ug/m^3 (.24 ppm)	same as primary
Nitrogen dioxide	annual	100 ug/m^3 (.05 ppm)	same as primary
Ozone	1-hour	240 ug/m^3 (.12 ppm)	same as primary
Lead	3-month	1.5 ug/m^3 (.006 ppm)	

State Implementation Plans

Under the 1977 amendments each State is required to draw up specific plans for bringing each non-attainment region up to the standards and for maintaining the purity of the air in regions that already meet the standards.

The implementation plans are ambitious and rather formidable. The law specifies what each plan should contain:

- An "inventory" of pollution sources: each power plant, factory, or other stationary source of pollutant emissions, with careful estimates of how much of each kind of pollutant is emitted each year.
- Data on "mobile sources" — i.e., motor vehicles — including the number of vehicles, miles traveled, and

emission estimates per year based on these studies.

- Specific enforceable proposals for reducing both stationary and mobile emissions according to a reasonable schedule, with target dates for attaining each stage of reduction.
- Assurance that the State has the legal power to carry out the plan through local legislation and enforcement authority.

EPA's Guidance and Back-up Functions

As the central Federal agency charged with carrying out the Clean Air Act, EPA assists the States in the technical work of pollution measurement, planning, and control, and EPA distributes the Federal funds appropriated by Congress to help the States make and carry out their pollution plans.

The law requires that, if a State fails to implement and enforce the Act, EPA must step in and do it. This is the pattern of many Federal laws, in which Congress seeks to preserve and enhance the authority of State and local governments, while setting specific requirements for State actions.

Reduction of Automotive Pollution

Early in the environmental movement Congress recognized the importance of automotive pollution. The 1965 amendments to the Clean Air Act required manufacturers to reduce the pollution emitted by all new cars and trucks. Federal regulations set 1968 as the model year for the first controls. Later amendments increased the reductions required for later-model cars. By 1978 all new cars sold in the United States were producing less than 17 percent as much carbon monoxide and hydrocarbons as did the average 1967 car, and nitrogen oxides had been cut to less than 53 percent.

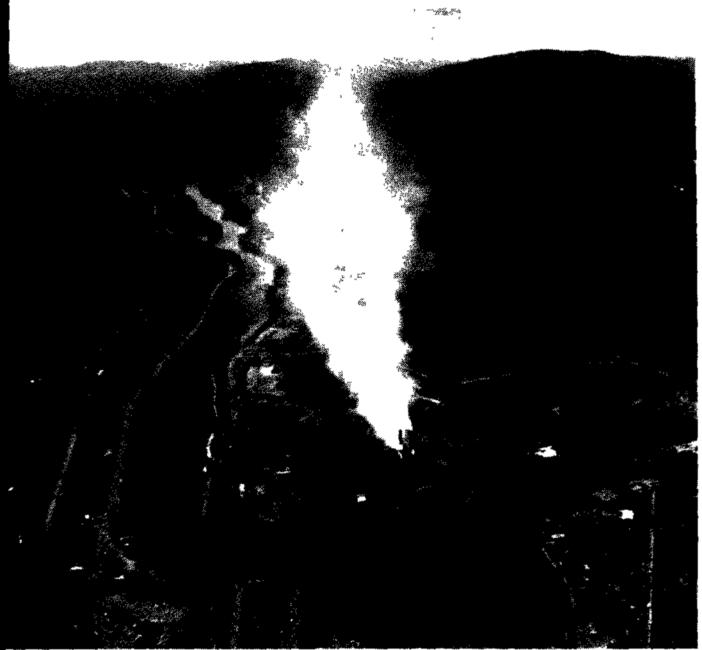
The reduction levels are set by law and enforced by EPA, which tests prototype models of all new cars and trucks and certifies that they do not exceed the legal standards. Only models meeting legal standards may be manufactured.

Neither the law nor any EPA regulation says how these reductions are to be achieved. That is up to the auto manufacturers, who have used two general approaches.

- Designing and tuning the engine so that it produces less pollution. This includes carburetor and cylinder compression adjustments to assure more complete combustion of fuel, with corresponding reductions in the output of carbon monoxide and hydrocarbons, and the routing of crankcase oil vapor through the engine or through an afterburner.
- Adding devices to the exhaust system to remove pollutants from the exhaust gases before discharging them to the air. These include afterburners and catalytic converters which change unburned fuel in the exhaust stream (carbon monoxide and hydrocabons) to harmless carbon dioxide and water vapor.

Most manufacturers employ more than one method in combination to achieve pollution control.

Stationary Sources



Air pollution is not solely an urban problem, small towns such as this one in Maine suffer similar problems.

Power plant and factory smokestacks, industrial vents for gases and dust, coke ovens, incinerators and burning dumps, and all large furnaces are typical stationary sources of air pollution. The control of existing stationary sources is primarily under State control; each State's implementation plan must inventory these sources and determine how they should be reduced to bring the region into conformance with the ambient air quality standards. Each State's plan is tailored to the region's needs and to the technical and economic feasibility of controlling the emissions.

For selected categories of new industrial plants and foı those that are substantially modified, the law makes EPA set emission limits for certain designated pollutants. EPA is to set standards for all major stationar new sources by 1981.

These limits — called "new source performance standards," not to be confused with ambient air quali ty standards — are specific to each industry. They set the maximum amounts of each kind of pollutant (sulfur dioxide, particulates hydrocarbons, etc.) that ca be emitted from that new plant's stacks for each unit of the plant's production: heat input for a power station, tons of cement for a cement mill, and so on. Tŀ limits are based on the bes engineering knowledge of the industry's processing methods.

Having nationwide standards for new sources helr to discourage an industrial plant from moving to a State with less stringent regulations; the industry would have to build a new plant, under the Federal standard.

Hazardous Pollutants

All air pollutants are hazardous to some degree, but some are so dangerous to health that they are limited individually, under a separate section of the law. Any discharges of asbestos, beryllium, mercury, and vinyl chloride have been so limited, and EPA is considering adding others, including benzene and coke oven emissions.

Local Rules and Schedules

While the ambient air standards apply uniformly to all areas of the country, the specific strategies for achieving the standards in individual States and localities depend on local conditions: the types and levels of pollution existing and projections of future problems. The more severe the pollution in a certain area, the more stringent the abatement program must be.

In the 1977 amendments Congress strengthened efforts to maintain air quality in regions where the air is already clean. There cannot be any "significant deterioration" of air quality in such regions. The law specifies how sulfur oxides and particulates will first be regulated in clean-air regions, and anticipates later regulation of other pollutants.

Controls added to industrial facilities are effective in reducing harmful emissions.

Research and Development

Three kinds of clean-air regions are defined. Class I must include all national parks and wilderness areas and may include further areas named by the States to remain unsullied; no major additional sulfur or particulate sources permitted. Class II areas can have some industrial development, up to specified levels. Class III areas can have about twice as much pollution from additional new sources, sometimes up to the minimum federal standards.

Any potential pollution source — factory, power plant, or other — that is proposed must first obtain a permit and meet a number of conditions, which include using the best available control methods for the new source.

Industrial development is also permitted in polluted regions as long as offsetting reductions are made in that region's existing sources. A new tire factory, for instance, although it meets the new source performance standards for the rubber industry, would still add more pollution to the region. Under the new amendments, a factory can be built if existing sources reduce their emissions more than enough to compensate for the new plant. This innovative approach is working: local citizens and officials, wanting the economic stimulus of a new employer, arrange for the reduction, or the new employer himself may help pay for them. An example is Oklahoma City, where several oil firms agreed to put floating tops on large storage tanks to reduce hydrocarbon emissions in that area so General Motors can build an auto-painting plant there.

A large portion of EPA's research and development funds go to support the air pollution control program. About $334 million is being spent annually for research, both in the Agency's own laboratories and in those of other Federal agencies, universities, and private institutions.

Of this sum, more than $53 million annually goes for air pollution research: the effects on human health of pollutants like particulates, ozone, and nitrogen dioxide; development of methods for controlling emissions, including auto exhausts, nitrogen oxides, and coke-oven dusts; and studies of better ways to measure pollutants in air.

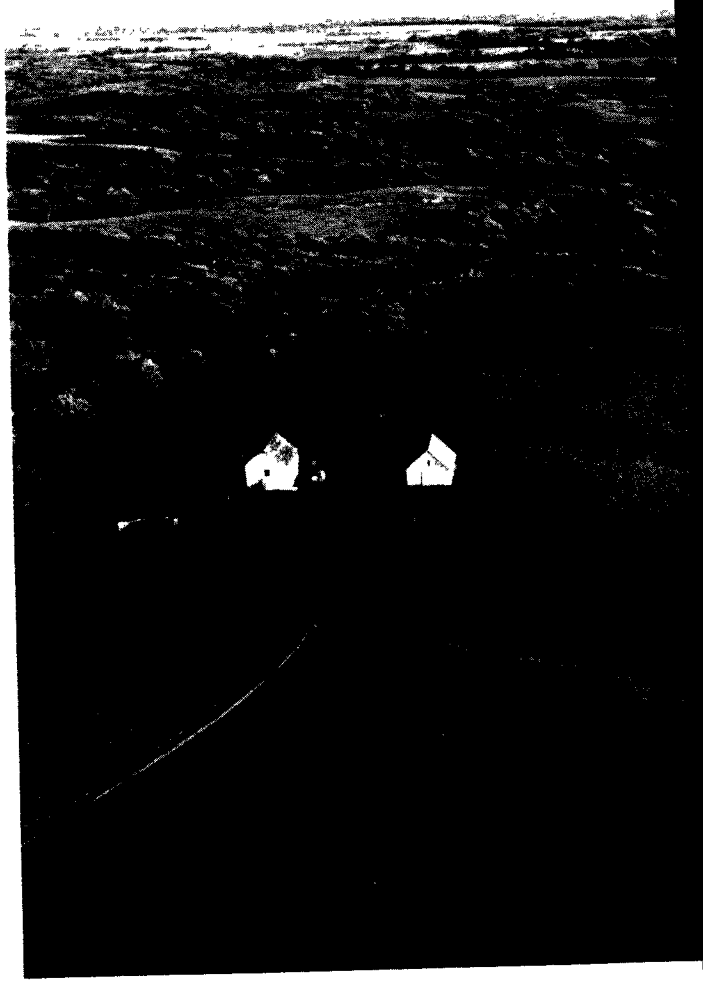
Other EPA research — in energy use and toxic substances, for instance — is indirectly related to air pollution control.

The Agency's research and development program provides scientific and technical support for determining EPA regulations, and it supplies basic information needed for State and local enforcement efforts.

Evidences of Improvements

Although there is still much to be done, and a great majority of the Nation's air quality control regions have not achieved the EPA standards, there has been encouraging progress. Some highlights:

- There has been a general long-term improvement in particulate pollution (dust, soot, and smoke), although some areas had increased particulates in 1976 probably due to wind-blown dust in areas of drought.
- There has been a marked improvement in the average number of days in the year when people in the Los Angeles Basin were exposed to high oxidant levels: from 176 days in the late 1960's to 112 days in recent years.
- Sulfur dioxide levels decreased dramatically in the first four years of this decade and have become fairly stable, with most violations confined to areas near specific sources of sulfur pollution.



Public Participation

The control of air pollution depends, ultimately, upon people. Ordinary people must be aware of the problem and accept the methods developed to solve it. Public interest in clean air led Congress to pass the Clean Air Act and its amendments, and Congress built into the law provisions for citizens to take part in making the decisions and setting the rules to carry out the law.

Hearings must be held on all new regulations before they are formally adopted. The public is encouraged to attend such hearings, along with the local officials, business groups, and organizations directly affected.

EPA officials welcome public participation in all phases of the clean air program. The Agency sponsors many conferences, workshops, and similar meetings to gather citizens criticism and suggestions.

The advisory committees and review groups appointed to help determine EPA policies include members representing the public as well as members chosen for their scientific and technical competence.

EPA also develops information programs to help make all people aware of air pollution hazards, the law's requirements, actions and trends in pollution control, and ways in which individuals can help solve air pollution problems. This involves making as clear as possible the scientific basis for the clean air program, the effects on health and on the economy, the benefits, and the costs.

All photographs in this publication from EPA's Documerica collection

Summing Up

The basic objective of EPA's air pollution control program is to achieve, nationwide, the standards for air quality set under the Clean Air Act to protect public health and welfare.

Controlling pollutant emissions so these standards can be achieved is being carried out in two ways:

- By State plans and enforcement that limit specific kinds of pollution from specific polluting activities, and
- By Federal regulation of new motor vehicles, new industrial sources, and any sources of extremely hazardous pollutant substances.

Implementation plans have been developed by all the States with funding support from EPA, and the further requirement that EPA must approve, in detail, the State plans for pollution control.

Each plan for each region must have a definite timetable for accomplishment in step-by-step fashion.

Whenever a State fails to take action, or when especially difficult problems are encountered, the law requires that EPA step in and handle the planning, regulating, and enforcing.

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EPA is charged by Congress to protect the Nation's land, air and water systems Under a mandate of national environmental laws focused on air and water quality, solid waste management and the control of toxic substances, pesticides, noise and radiation, the Agency strives to formulate and implement actions which lead to a compatible balance between human activities and the ability of natural systems to support and nurture life.

If you have suggestions, questions or requests for further information, they may be directed to your nearest EPA Regional public information office

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