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Report to the Chairman, Subcommittee on Oversight and Investigations, Committee on Energy and Commerce, House of Representatives

September 1990

AIR POLLUTION

Improvements Needed in Detecting and Preventing Violations

5495

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Resources, Community, and
Economic Development Division

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September 27, 1990

The Honorable John D. Dingell
Chairman, Subcommittee on
Oversight and Investigations
Committee on Energy and Commerce
House of Representatives

Dear Mr. Chairman:

This report responds to your request that we examine the Environmental Protection Agency's (EPA) efforts to ensure that major stationary sources of air pollution do not exceed air pollution control requirements. The report discusses EPA's efforts to (1) require the use of the most effective methods to detect air pollution violations at major sources and (2) impose appropriate enforcement actions when violations are found.

Unless you publicly release its contents earlier, we plan no further distribution of this report until 30 days from the date of this letter. At that time, we will send copies of the report to appropriate congressional committees; the Administrator, EPA; and other interested parties. We will make copies available to others upon request.

This work was performed under the general direction of Richard L. Hembra, Director, Environmental Protection Issues (202) 275-6111. Major contributors to this report are listed in appendix I.

Sincerely yours,

J. Dexter Peach
Assistant Comptroller General

Executive Summary

Purpose

Exposure to unsafe levels of air pollution has been linked to incidences of cancer, lung disease, and other health problems, yet over one-third of the nation's population live in areas that exceeded one or more federal standards for air quality. The Environmental Protection Agency (EPA) estimates that nearly 40 percent of air pollution comes from about 33,500 of the nation's major stationary sources of pollution such as electric utilities, oil refineries, steel mills, and large factories.

Concerned about pollution from major stationary sources, the Chairman, Subcommittee on Oversight and Investigations, House Committee on Energy and Commerce, requested that GAO determine whether EPA (1) uses the most appropriate method for detecting violations at major stationary sources and (2) ensures that appropriate enforcement actions are taken when violations are found.

Background

Each major source has the potential to emit 100 tons or more of pollutants into the air annually, and some can emit that much daily. In light of the potential health risk posed by air pollution, the Clean Air Act provides for a federal/state partnership under which states develop, and EPA approves, State Implementation Plans specifying actions to regulate and control these sources of air pollution, including the issuance of permits specifying acceptable emission levels. EPA and authorized state and local agencies are responsible for detecting, and then abating, violations and for deterring their future occurrence. During 1989, these agencies detected violations of permit or other requirements at about 14 percent of the major stationary sources.

Two primary methods are used to detect violations: on-site inspections and emission monitors. On-site inspections, often lasting less than half a day, are periodic assessments of facility compliance that may include visual observation, review of operating equipment and records, and a check of pollution control equipment. Emission monitors—automated mechanical equipment usually placed in a facility's exhaust or smoke stack—provide direct, accurate measurements of emissions and can operate up to 24 hours per day.

Results in Brief

EPA estimates that emission monitors are 10 times more likely to detect air quality violations than on-site inspections because they measure emissions directly, provide nearly continuous coverage of facility operations, and detect violations that inspectors cannot. Although EPA issued a policy aimed at increasing the use of monitors where feasible, it has

not implemented this policy by developing regulations that (1) establish criteria for determining where monitors are feasible and (2) require monitor use at sources meeting the criteria. As a result, monitors have been installed at only about 1,065, or 11 percent, of the sources where EPA estimates that monitors could be installed. In order to better address the nation's acid rain problems, proposed Clean Air Act amendments call for the use of monitors at 1,100 sources, principally large utilities that emit large quantities of sulfur dioxide, but some of these sources already have monitors installed and EPA has no plans to require additional monitors beyond those called for in the legislation.

When violations are detected, EPA favors cash penalties calculated to offset the economic benefit that violators gained by not complying with air quality requirements. However, over half of the fiscal year 1988 and 1989 violations defined as significant—EPA's highest enforcement priority—were concluded with no cash penalty imposed. This occurred because most enforcement actions against major stationary sources are taken by state and local programs which, for the most part, operate under their own enforcement authority. Proposed changes to the Clean Air Act should improve EPA's ability to increase state and local penalty amounts and encourage state and local agencies to adopt economic benefit penalty policies.

Principal Findings

More Extensive Use of Emission Monitors Warranted

Conditions have changed since the 1970s when the concerns of industry and regulators over monitor cost and reliability caused EPA to limit its emission-monitoring regulations to the newest and biggest major stationary sources. Costs for monitors have become more reasonable for many major sources, to the point where monitor costs are small relative to other pollution control equipment, and monitor reliability has greatly improved. Monitors in Pennsylvania, for example, have collected reliable data over 90 percent of the time. Because of these changed conditions, and the greater detection potential of monitors as compared with inspections, EPA announced a policy in 1988 calling for monitor usage wherever feasible.

EPA, however, has not issued regulations implementing this policy nor has it developed criteria for making such feasibility determinations. Instead, EPA has tried to convince state and local programs to

voluntarily require the use of monitors under their own authorities, but with little success. As a result, only about 1,065 major stationary sources had monitors installed by the end of 1989. Senior EPA compliance officials estimate that monitors may be feasible at about 9,000 more major stationary sources, but they acknowledge the absence of clear criteria for evaluating sources for monitor feasibility.

Although proposed amendments to the Clean Air Act call for EPA to require monitors at about 1,100 major sulfur dioxide sources, some of these sources are among those that have already installed monitors. EPA has no plans to require additional monitors beyond those called for in the proposed legislation, citing insufficient resources to address new and emerging air quality problems and, at the same time, develop criteria and regulations to implement its emission-monitoring policy. Nevertheless, because emission monitors represent a significant improvement in ensuring compliance, GAO believes that EPA development of such regulations is warranted.

Penalties Often Insufficient to Deter Violations

Both the Clean Air Act's administrative penalty authority and EPA's own internal civil penalty settlement policy direct agency enforcement officials to seek cash penalties sufficient to remove the economic benefit to noncomplying sources. However, in fiscal years 1988 and 1989, no cash penalties were assessed in more than half of the significant violator cases at major stationary sources because EPA, in its review and approval of State Implementation Plans, has not required state and local agencies—which conduct the majority of enforcement actions—to assess penalties sufficient to eliminate the economic benefit. GAO's review of eight state and local programs disclosed that none regularly sought to recover economic benefit penalties. For example, GAO found that the $15,000 penalty assessed in one case was $200,000 lower than the estimated economic benefit gained by the violating source. Not collecting sufficient penalties in such cases may place sources that comply at an economic disadvantage to violators.

According to EPA, the primary reason that state and local programs generally do not assess economic benefit penalties is that they often seek only to correct the cause of the violation. EPA can "overfile" and impose larger penalties in such cases, but has generally not done so, citing unclear authority and insufficient resources. Proposed Clean Air Act amendments would broaden EPA's current authority to administratively assess penalties and would allow it to overfile in more cases to ensure that economic benefit penalties are sought. Nevertheless, EPA needs to

take actions to better ensure that state enforcement programs seek economic benefit penalties when violations are detected so that inequities do not occur between firms that comply and those that do not.

Recommendation to the Congress

Currently proposed amendments to the Clean Air Act contain provisions that would broaden EPA's administrative penalty authority to enable it to better ensure that appropriate cash penalties are assessed. GAO supports these proposals and recommends that the Congress include such penalty authority in the final Clean Air Act legislation.

Recommendations to the Environmental Protection Agency

GAO recommends that the Administrator, EPA

- implement EPA's emission-monitoring policy by developing regulations that (1) establish criteria for determining where monitors are feasible and (2) require monitor use at all sources meeting the criteria and
- require EPA enforcement staff to (1) use available enforcement authority to overfile to the maximum extent possible when states assess inadequate penalties and (2) undertake efforts to include specific standards for assessing economic benefit penalties in the next revisions to State Implementation Plans.

Agency Comments

GAO discussed the report's contents with appropriate EPA, state, and local officials, and their comments have been incorporated as appropriate. As directed by the Subcommittee Chairman, GAO did not obtain official agency comments on a draft of this report.

Contents

Figures

Abbreviations

CEM	continuous emissions monitors
EPA	Environmental Protection Agency
GAO	General Accounting Office
NAAQS	National Ambient Air Quality Standards
NESHAPS	National Emissions Standards for Hazardous Air Pollutants
NO_x	nitrogen oxides
NSPS	New Source Performance Standards
RACT	Reasonably Available Control Technology
SIP	State Implementation Plan
SO_2	sulfur dioxide
VOC	volatile organic compound

Introduction

As the Congress considers significant changes to the Clean Air Act, controlling air pollution continues to be a difficult task. Although significant progress has been made in reducing air pollution, the Environmental Protection Agency (EPA) reported in 1990 that more than 120 million Americans lived in areas that exceeded one or more federal standards for acceptable air quality. Increased incidences of cancer, lung disease, and other illnesses have been linked to air pollution.

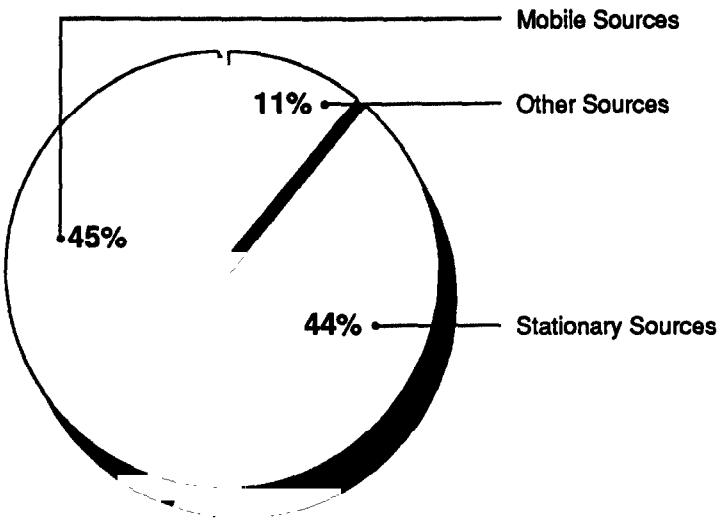
Whether the air we breathe is safe or not depends on many factors, but principally, it depends on the amount of emissions from over 170 million mobile sources and an estimated 300,000 stationary sources of air pollution. Mobile sources, such as cars, trucks, buses, and aircraft, are believed to account for nearly half of the emissions of the six criteria pollutants,[1] including over two-thirds of the carbon monoxide emissions and nearly one-third of the volatile organic compounds (VOCs). Stationary sources such as electric utilities, factories, and commercial buildings are responsible for most of the remaining emissions. These sources emit 96 percent of the sulfur dioxide (SO_2), 58 percent of the nitrogen oxides (NO_x), and 62 percent of the particulate matter, as well as contributing about 51 percent of total VOC emissions—a major contributor to the formation of ozone, generally referred to as "smog."

Emissions from most mobile and stationary sources are difficult to monitor and control because of their large numbers and diversity of operations. However, major stationary sources—comprising about 33,500 of the nation's largest facilities[2] —are more readily monitored and controlled. These sources include electric utilities, oil refineries, steel mills, and large factories and, according to EPA, account for nearly 40 percent of the emissions of criteria pollutants nationwide and nearly 85 percent of all stationary source emissions. Figure 1.1 shows the relative contributions of major stationary sources to the nation's air pollution problems.

[1]EPA established National Ambient Air Quality Standards for six health-related pollutants—ozone, carbon monoxide, sulfur dioxide, nitrogen dioxides, particulates, and lead. These pollutants are commonly called "criteria pollutants."

[2]The term "facility" is used throughout this report to describe a major stationary source of air pollution.

Figure 1.1: Contribution of Major Stationary Sources to Air Pollution Nationwide



Source: GAO illustration based on EPA data.

According to EPA officials, control of emissions at major stationary sources is especially important because of their ability to release great quantities of pollutants if uncontrolled. Major stationary sources can release more pollution into the air in one day than many other sources can in one year. Every major stationary source, by definition, has the potential to emit 100 tons of pollutants, or more, annually and some facilities can emit that much pollution daily. For example, SO_2 emissions from one large electric utility in Pennsylvania can reach 75,000 tons annually, or over 205 tons each day. Figure 1.2 shows two major stationary sources producing visible emissions.

EPA, State, and Local Agency Roles in Controlling Stationary Source Emissions

The Clean Air Act provides for a federal-state partnership to be used in addressing environmental problems. The act requires EPA to set national standards for air quality and provides for states and localities to assume the responsibility of designing and implementing control strategies to meet these standards. These control strategies are documented in the State Implementation Plans (SIPs). EPA is responsible for reviewing and approving the SIPs to ensure that they are adequate to attain and maintain compliance with national air quality standards, and for overseeing state and local implementation of these plans. In cases where state or local plans are not approved, EPA promulgates a federal implementation plan for the affected area. States and localities can propose revisions to SIPs for EPA approval at any time, as long as the revised plan will still attain or maintain the national standards.

An essential component of SIPs is the issuance of permits specifying acceptable emissions levels to owners and operators of major stationary sources. EPA and authorized state and local agencies are responsible for detecting violations of these permits and other requirements and, when a violation is discovered, for taking appropriate action to bring the facility back into compliance and to deter future violations. EPA relies heavily on state and local programs to detect and deter violations at major stationary sources. In 1988 and 1989, EPA authorized 107 state and local agencies to carry out provisions of the act. Under EPA approval, funding assistance, and oversight, these agencies carry out over 90 percent of the actions designed to detect and deter violations at stationary sources of air pollution. For example, state and local agencies performed 34,263 of 37,716 inspections, or about 91 percent of all inspections performed, in fiscal year 1988.

Ensuring Compliance Through Detecting and Deterring Violations

EPA, state, and local strategies for controlling stationary source emissions rely, in part, on educating facility owners and operators through the issuance of regulations and guidance, coupled with technical assistance and site-specific permits that translate and tailor these requirements to an individual source's operations. However, once permits spelling out how pollution is to be controlled at individual facilities have been issued, regulators generally rely on two methods to ensure that sources maintain compliance:[3]

[3]EPA also uses stack tests to assess compliance; however, these tests are not considered a primary detection method because they are scheduled by the facility, employ contractors paid by the facility, and are performed infrequently, often only once every 5 years during permit application or renewal, according to EPA.

- periodic on-site inspections, which compare facility emissions and practices with permit levels and conditions, and
- emission-monitoring devices, also known as "continuous emissions monitors" (CEMS), which are mechanical instruments that measure the amount of pollutants leaving a facility on a near-continuous basis.

Section 114 of the Clean Air Act gives EPA the authority to use either or both detection methods, in addition to others, to assess the compliance of any stationary source. The act does not require or prefer one detection method over another, but provides regulators with broad authority to inspect, monitor, test, sample, and review any facility operations that may reasonably be required to assess compliance.

Once violations are detected, bringing the facilities back into compliance and deterring future violations largely depends on regulators taking appropriate, timely actions. In 1977, the Congress added section 120 to the act, which provided EPA with an enforcement mechanism designed specifically to remove financial incentives to noncompliance. In adding this provision to the act, the Congress intended for noncomplying major sources to be penalized an amount equal to the economic value of the noncompliance to the polluter. Otherwise, sources not complying were viewed as obtaining a competitive advantage over firms that had already installed the needed control equipment or changed production processes to meet their emission limitations. This penalty was to be assessed in all cases where EPA found noncompliance to exist and can be waived only if the violation is de minimis or due to specific causes listed in the statute.

Objectives, Scope, and Methodology

Concerned with major stationary sources' potential to significantly contribute to unsafe levels of air pollution when operating in violation of the Clean Air Act's requirements, the Chairman, Subcommittee on Oversight and Investigations, House Committee on Energy and Commerce, requested that we determine

- whether EPA uses the most appropriate method of detecting violations at major stationary sources of air pollution and
- once discovered, whether EPA takes appropriate action to compel compliance at these sites.

To accomplish these objectives, in accordance with agreements with the Chairman's office, we performed work at the following EPA headquarters offices:

- Stationary Source Compliance Division, Office of Air Quality Planning and Standards, Office of Air and Radiation.
- Office of Air Enforcement Counsel, Office of Enforcement and Compliance Monitoring.
- Legal Enforcement Policy Branch, Office of Enforcement and Compliance Monitoring.
- Office of the Assistant Inspector General for Audit, Office of the Inspector General.

We also visited three EPA regions and eight authorized state and local programs within these regions as shown in table 1.1.

Table 1.1: State and Local Offices in EPA Regions III, IV, and IX Included in GAO's Review

EPA region	State agency	Local district
Region III	Pennsylvania Department of Environmental Resources	
Region IV	North Carolina Division of Environmental Management	Mecklenberg County Department of Environmental Protection
Region IX	California Air Resources Board	Bay Area Air Quality Management District
	Arizona Department of Environmental Quality, Office of Air Quality	Maricopa County Bureau of Air Pollution Control
		Pima County Air Quality Control District

We judgmentally selected these regions, states, and localities for geographical coverage, program size, and diversity of sources, and because each had a significant number of the more than 120 million Americans living in areas that exceeded one or more of the nation's air quality standards in 1988. For the agencies selected, we performed work at each organizational level responsible for establishing, interpreting, and implementing EPA policies for detecting and deterring air pollution violations. Region III was selected because, according to EPA, it contains some of the largest industrial sources in the nation, some of which are located in Pennsylvania. In addition to program size, Pennsylvania was selected because, according to EPA, it has one of the most advanced emission-monitoring programs in the nation. Region IV is EPA's largest region, responsible for overseeing 8 states, 17 local programs, and over 5,400 major stationary sources in 1988. North Carolina, with 1,462 major sources, has the largest single portion of this universe. Region IX was selected to provide west coast geographical coverage and also because

California has a large population potentially exposed to unsafe levels of pollutants.

To address our first objective, we reviewed agency regulations, policies, and selected source files, and interviewed air program officials in EPA headquarters and the above regions, states, and localities to determine the methods available for detecting violations, the successfulness and extent of the use of each, and the benefits and trade-offs of each method. We gave particular emphasis to Pennsylvania's use of emission-monitoring devices because EPA points to this state as having one of the most advanced programs for both detecting and deterring violations using continuous emissions monitors, and to Ohio since this state's CEM program was cited as one of the more comprehensive programs in EPA's 1988 Continuous Emission Monitoring policy. We also gave particular emphasis to EPA's stationary source inspection program because the effectiveness of this surveillance method was questioned in an earlier GAO report,[4] and because this is still the principal method used by EPA, state, and local programs to detect violations. Additionally, we discussed emission-monitoring technology with equipment manufacturers and selected users.

To address whether EPA and the states take appropriate action to ensure compliance at noncomplying major stationary sources, we interviewed EPA headquarters and regional compliance and enforcement program officials, as well as those in the states and localities listed above and obtained documents, where possible, describing their enforcement response policies and practices from January 1986 to the present. We compared and contrasted these policies and practices regarding major sources with Congress' intent in adding enforcement provisions to the 1977 act, and with EPA's national policies for the appropriate, timely resolution of violations. In addition, we judgmentally selected and reviewed enforcement case files with violations identified from January 1, 1986, to December 31, 1987, to illustrate EPA and EPA-approved enforcement policies and practices at work. We also reviewed relevant reports issued by EPA's Office of the Inspector General.

Our work was performed from February 1988 through December 1989. In conducting our work, we reviewed EPA's 1987 and 1988 Federal Managers' Financial Integrity Act reports to the Congress and the President for previously reported internal control weaknesses. Where possible, we

[4] Air Pollution: Environmental Protection Agency's Inspections of Stationary Sources (GAO/RCED-85-1BR, Oct. 24, 1985).

sought to identify the underlying causes of problems we found in EPA's programs for detecting and deterring Clean Air Act violations and the associated management controls that should have prevented these problems from occurring.

The views of EPA officials responsible for overseeing compliance and enforcement activities at major stationary sources were sought during our review and are incorporated into the report where appropriate. However, as requested by the Chairman's office, we did not obtain official agency comments on a draft of this report. Except as noted above, our work was performed in accordance with generally accepted government auditing standards.

Regulations Needed to Require Greater Emission Monitor Use at Major Stationary Sources

EPA compliance officials estimate that continuous emission monitors are 10 times more likely to detect air pollution violations than on-site inspections because they measure emissions directly, provide near-continuous coverage of facility operations, and detect violations which inspectors cannot. Although concerns existed over the reliability and cost of CEMs, their reliability has improved and the costs have become more reasonable. Monitors have been shown to be reliable over 90 percent of the time, and while costs may continue to be a concern for some, the economic burden of CEMs does not appear substantial for many major sources, and some sources may be able to reduce operating costs by using fuel more efficiently.

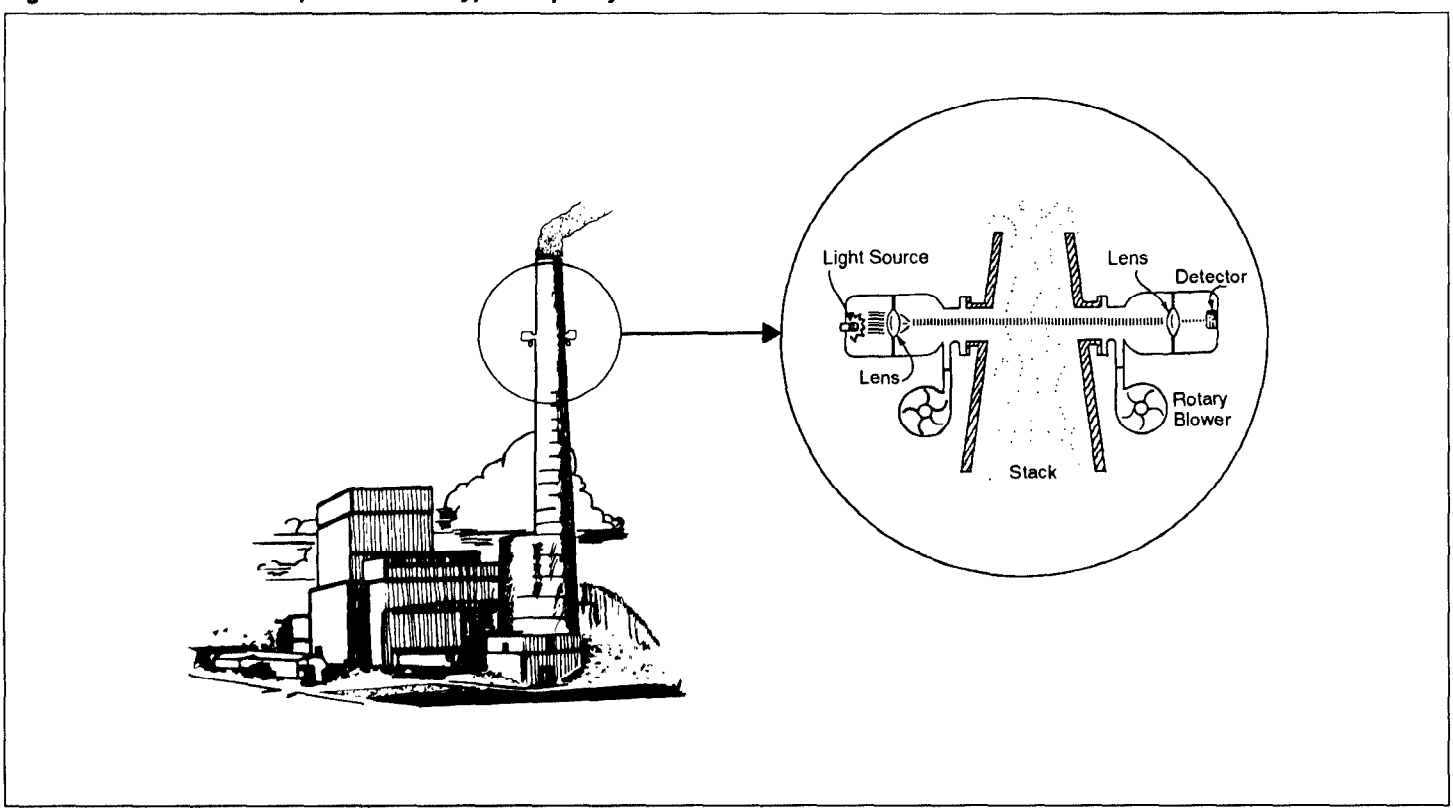
In 1988, recognizing that conditions for CEMs' use had become more favorable, EPA announced a policy encouraging the installation of monitors at any major stationary sources where their use is estimated to be feasible. However, EPA has not issued regulations that (1) establish criteria for determining where CEM use is feasible and (2) require CEM use at sources that meet the feasibility criteria. As a result, monitors have been installed at only 1,065 facilities, or about 11 percent of the 10,000 major sources where EPA estimates that CEMs are feasible, and EPA and states continue to rely primarily on inspections to detect violations.

Recent legislative proposals to amend the Clean Air Act recognize the value of emission monitors and—in an effort to help address the acid rain problem—call for the use of CEMs at about 1,100 of the nation's largest sources of SO_2. However, EPA compliance officials state that they have insufficient resources to develop regulations requiring CEMs at all sources where feasible, and consequently have no plans to require monitors beyond those called for in the proposed legislation.

Detection Capability of Emission Monitors

CEMs are electro-mechanical instruments, usually installed in the facility's exhaust or smoke stacks, which sample, analyze, measure, and record the amount of pollutants passing through the stack. CEMs have been developed to measure various types of pollutants emitted by stationary sources. For example, one type of CEM—opacity monitors—generally operates by measuring the amount of light displaced by visible emissions. This monitor, located in the stack, automatically determines when the amount of displaced light (or opacity) exceeds its permit conditions. Figure 2.1 shows the location and operation of a typical opacity monitor.

Figure 2.1: Location and Operation of a Typical Opacity Monitor



Similarly, other CEMs measure visible and nonvisible pollutants such as SO_2, NO_x, and VOCs by analyzing emission gases several times each hour. Both opacity and gaseous monitors automatically record emission levels.

Detection Potential of Monitors Greater Than Inspections

Senior EPA compliance officials told us that CEMs are 10 times more likely to detect violations than on-site inspections, unless the violations are blatant and ongoing at the time of inspection. Some state officials believe that CEMs are even more effective, with regulators in Pennsylvania—a state which has made substantial use of monitors since 1984—estimating that CEMs may be up to 50 times more effective than on-site inspections. While precise comparisons of the effectiveness of these different detection methods are difficult to make, both groups said that the detection potential of CEMs is much greater than that of inspections because monitors

- measure and record emissions directly and accurately,

- provide near-continuous coverage of facility emissions, and
- detect violations that periodic inspections cannot.

A 1988 EPA study of CEMs at large facilities in Pennsylvania demonstrated that monitors directly measured and recorded accurate opacity readings 98 percent of the time and accurate SO_2 readings over 92 percent of the time.[1] Conversely, in many situations the inspector, using his training and experience, judges a facility's compliance status without empirical evidence of the quantity, rate, or concentration of pollutants emitted. Inspectors often assess facility compliance by visually observing emissions and by reviewing operating equipment, records, and pollution control equipment. Because of the uncertainties involved in making these judgments, inspectors often are unable to determine whether sources are in compliance. For example, in one inspection report we examined, the inspector reported that although visible emissions from a major stationary source appeared to be about 60 to 80 percent opacity—well in excess of the 20-percent permit limit—he "could not do a visible emission evaluation because of the angle of the sun" and therefore no violation was officially recorded.

Unlike inspections, CEMs can operate 24 hours a day and have been shown to measure more than 90 percent of a facility's annual emissions. Inspections often cover less than 1 percent of a facility's annual emissions, usually take 2 to 4 hours to perform and, because inspection resources are limited, are normally conducted at major stationary sources once each year, according to EPA compliance officials. Some facilities may be inspected more frequently if resources allow for it and indications of problems exist. Consequently, facilities are subject to far less coverage when inspections are the only method used to assess compliance.

CEMs can also detect violations that inspectors cannot. According to EPA compliance officials, inspectors have difficulty judging visible emissions at night and in adverse weather, whereas CEMs are not affected by these conditions. More importantly, gaseous emissions, such as SO_2 and NO_x, are generally not visible, whereas CEMs consistently measure these gases directly and reliably. For some gaseous pollutants, inspectors often can only infer compliance by comparing existing process and control system operating conditions with those recorded during stack testing. However, according to EPA, stack test data are collected under finely tuned process

[1] According to EPA criteria, readings are considered acceptable if obtained from a quality-assured CEM that has been calibrated and verified to provide data within 15 percent of the true value.

and control system operating conditions, and thus may be atypical of tests conducted under normal operations, further adding to the difficulty of detecting violations of permit conditions for gaseous pollutants.

We noted an example of these difficulties during our review. Inspectors performing routine inspections at a large fertilizer-manufacturing plant in North Carolina did not detect emissions violations from 1983 until time for permit renewal in November 1986. The State's Technical Services Branch Chief said most inspections during this period had focused on whether the required control equipment was in place, similar to their inspection practices at other facilities. At permit renewal, inspectors discovered that the facility had altered the pollution control equipment years earlier by removing the materials inside the facility's scrubbers. According to state officials, these materials were integral to the proper functioning of the control devices, and their removal allowed untold amounts of SO_2 and fluoride to be released into the atmosphere. EPA's Region IV field inspector responsible for covering North Carolina told us that, had CEMs been installed in this case, many of the emission violations would have been detected earlier and, with prompt enforcement action, the environmental harm lessened.

Not Enough Emission Monitors in Use

Senior EPA compliance officials told us in October 1989 that only about 1,065 major stationary sources had CEMs installed, even though they estimated that CEMs were feasible at about 10,000 sources. These officials' estimate of 10,000 facilities is based on their knowledge of the categories, types, and sizes of facilities that constitute the universe of 33,500 of the nation's largest stationary sources. Ten thousand is the number of sources where, in their opinion, one or more CEMs would be technologically feasible and economically viable for use in detecting violations. Although no specific criteria have been developed translating these concepts for monitor use into further action, according to the National CEM Coordinator, this means that a facility is capable of installing and maintaining a CEM that provides reliable data at a cost that would not be an economic burden to the firm. EPA had not developed more specific criteria delineating the potential for major stationary sources to use monitors at the time of our audit.

EPA also lacks precise data on the number of major stationary sources with CEMs, but based its 1989 estimate of 1,065 facilities with one or more monitors installed on its 1989 workload model, contacts with EPA regional and state CEM coordinators, and EPA-sponsored studies of CEM use. According to the National CEM Coordinator, little has changed since

the findings of a 1988 EPA study that reported that few monitors were in use relative to the potential for their widespread use. The report stated that only 5 states had more than 100 CEMs installed within their jurisdictions, and 26 states had 25 or less CEMs installed. According to EPA officials, facilities often have more than one device at the same facility. Additionally, EPA reported in August 1988 that many installed CEMs were not used to detect violations, and that only 16 states had used CEMs to detect violations. Instead, data from monitors were often used only to target sites for inspections.

Extent of Noncompliance Understated

Because EPA and state regulators continue to depend largely on on-site inspections to detect violations at nearly 95 percent of the major stationary sources, senior EPA compliance program managers believe the extent of noncompliance among major stationary sources may be significantly understated. In this regard, EPA's Stationary Source Compliance Strategy states that, because of the limitations inherent in on-site inspections,

> it is fair to assume that compliance data being reported by States do not indicate what is happening at a facility on a day-to-day basis, but rather whether the source has been determined to be in compliance at an announced inspection after it has had the opportunity to optimize the performance of its control equipment. Thus, it indicates whether the source is capable of being in compliance rather than whether it is in compliance in its day-to-day operations.

Similarly, a September 1987 EPA Region IV memorandum points out that EPA's practice of relying on opacity observations and on-site inspection of the source does not ensure that the source is in compliance at all times. The memorandum further states that EPA's practice is "hit or miss."

Even with the limited detection potential of on-site inspections, about 14 percent of the major stationary sources were detected violating permit or other requirements in fiscal year 1988, with 1,404, or about 30 percent, of these noncomplying sources in violation one or more times each month for every month of the fiscal year, according to EPA data.

Concerns Regarding Monitor Reliability and Cost

Industry and regulatory officials have expressed concerns about the reliability and cost of CEMs. According to EPA's Stationary Source Compliance Division Deputy Director, monitor reliability has improved substantially and the costs are more reasonable than they were in 1975, when EPA issued its first SIP emission-monitoring regulations. While these concerns may have been legitimate in the past, the issues of reliability and cost, according to EPA's 1984 National Compliance and Enforcement Strategies, have been replaced to some extent with misinformation and inertia. For example, in Pennsylvania—a state which has made increasing use of CEMs since 1984—emission monitors were required at nearly 200 sources as of May 1988. The Chief of Pennsylvania's Division of Abatement and Compliance, Bureau of Air Quality Control, said that using CEMs is largely a matter of mind-set, and that Pennsylvania had decided several years ago that a properly implemented CEM program could produce accurate, reliable data at a cost that was not burdensome to industry. More importantly, he said that, where they can be used, emission monitors are the most effective method of detecting violations and reducing emissions. The Director of Pennsylvania's Bureau of Air Quality Control said that, while CEMs are not appropriate for every major stationary source, the state's experience had been so positive that Pennsylvania will require seven CEMs on each municipal waste incinerator it permits in the future. On average, Pennsylvania CEMs have collected reliable data over 90 percent of the time.

With respect to cost, EPA compliance officials recognize that cost may continue to be a concern at some sources where EPA envisions using CEMs to detect violations, but these officials said that in relation to facility size and gross annual revenues, the cost of monitors is justified, in their opinion, at about 10,000 of the 33,500 major stationary sources. In their opinion, installing and operating CEMs would not constitute an economic burden for these major stationary sources. Further, EPA points out that using CEMs to detect violations is already an important part of a few state programs. For example, California and Pennsylvania officials have used CEM readings to not only detect violations but also to take enforcement actions at a number of sources within their jurisdictions. For example, of the 4,076 total violations cited in the San Francisco Bay Area in 1986 and 1987, 216 were based on CEM readings, while Pennsylvania issued 260 violations on the basis of CEM readings for a similar 2-year period, eventually settling the cases for $336,600 in penalties.

Because most state and local agencies have been slow to implement a CEM regulatory program, EPA sponsored several studies in an attempt to foster their wider acceptance and use in detecting violations. According

to a June 1986 report,[2] state agencies' reluctance to implement an emission-monitoring program centers around (1) perceptions of CEMs as unreliable and (2) concerns that their use would place additional burdens on the limited resources of regulators. The report stated that the perception of state managers was that EPA had required the states to proceed with a questionable monitoring program, without adequate state agency consultation, and then had not provided sufficient technical and policy support to make the program work.

After pilot testing CEMs in two states for more than a year, the study concluded that CEMs' performance showed "very high levels of reliability," and the burden of reviewing excess emission reports was not a burden, averaging less than 1 hour per report. Most importantly, the study demonstrated that CEMs were a highly effective method for assessing the compliance of selected facilities, and that the issue of unreliability can be readily resolved by a management commitment to quality assurance.

Cost Implications of Emission Monitors

While an effective quality assurance program can overcome concerns about the reliability of CEMs, resolving the issue of cost has not been as easy for EPA. First, because installing, operating, and quality assuring data from CEMs' is an expense that facility owners and operators must absorb, EPA does not envision their use at all sources; instead, EPA has targeted only the newest and largest of the major stationary sources. According to EPA compliance officials, the costs of installation vary greatly, from about $10,000 to $150,000, depending on the type, size, location, and facility design, as well as whether any retrofitting is involved. Annual operating and maintenance costs, including quality assurance and periodic reporting, range from about $5,000 to $50,000. However, EPA's National CEM Coordinator points out that relative to the cost of other pollution control equipment that major stationary sources must install, these costs are small, reasonable, and justified, in his opinion, at many major stationary sources.

To help alleviate industry concern over the issue of cost, EPA conducted reviews of selected facilities. As a result, EPA reported in a December 1988 Federal Register that CEMs constituted less than 4 percent of total air pollution costs. Further, as reported by the 1988 Joint Power Generation Conference, in some cases CEMs can reduce operating expenses.

[2]Summary Report: A Pilot Project to Demonstrate the Feasibility of a State Continuous Emission Monitoring System (CEMS) Regulatory Program (EPA, June 1986).

According to the Deputy Director, Stationary Source Compliance Division, the relative cost of installing CEMs at major sources is less than the cost of installing a speedometer on an automobile. He pointed out that while using CEMs to detect violations may not result in significant savings in inspection resources, it is the most effective means of ensuring facility compliance with permit conditions. According to the National CEM Coordinator, in addition to unreliability, industry has used cost as a reason for resisting CEMs when cost is not the reason. The real reason, in his opinion, is that facilities simply do not want their emissions monitored on a full-time basis. CEMs can tell exactly when a source exceeds its permit limits, by how long and how much, he said. He bases his opinion on his dealings with industry, EPA regional and state CEM coordinators, and EPA's own studies. For example, in response to one facility's high cost estimates for CEMs, an in-depth investigation by EPA found that the facility's annual costs would be increased less than two-tenths of 1 percent.

Our work similarly indicates that cost may not be a principal reason that more sources have not installed CEMs. For example, we visited a major coal-fired utility that had installed two opacity and two SO_2 monitors at a total cost of about $250,000, according to the Assistant Plant Manager. To place this amount in perspective, he said gross revenues of this facility average over $100 million per year through the sale of electric power to sections of the northeastern United States. Company representatives told us that CEMs allow them to more closely monitor fuel combustion efficiency and to better ensure the quality of low-sulfur coal from suppliers. Although they had not evaluated whether CEMs had actually reduced operating expenses, the representatives said that the costs were not unreasonable.

Other firms we contacted said that they had reduced their operating expenses by using CEMs. For example, a major manufacturer of wall coverings in Ohio reportedly saves about $50,000 annually in fuel costs because its SO_2 monitors more closely gauge fuel combustion efficiency, and a large U.S. automobile manufacturer, which also operates its own power generating facilities, similarly saves at least $12,000 annually in fuel costs at each of its industrial boilers from CEMs it uses.

Operational cost savings have also resulted from using CEMs at sources other than large power-generating facilities. Although EPA has promulgated no regulations on the use of VOC monitors, savings have been estimated for several Pennsylvania facilities using VOC monitors. For example, one inspector reported that one manufacturer reduced its

annual costs for solvent by $50,000 after equipping its carbon absorption unit with VOC monitors and changing its operating practices accordingly. Solvent recovery for this firm increased from 68 percent in June 1988 to 87 percent in September 1988 after installing CEMs to detect excess emissions. Another Pennsylvania facility's solvent usage was nearly cut in half after installing VOC monitors and correcting inefficient operating techniques. According to a 1988 inspection report, this firm decreased its solvent usage by 45 percent, representing an annual reduction in operating expenses of about $20,000.

Monitors Believed Feasible at More Sources

EPA, state, and industry officials told us that CEMs are technologically feasible and economically viable, or capable of providing reliable emissions data at a cost that would not be an economic burden to the source, at many more sources than those that currently use them. For example, the Coordinator of Ohio's CEM program said steam generators as small as 10 million Btus in size have been required to install and operate CEMs to monitor SO_2 emissions in Ohio, whereas EPA's regulations require CEMs only on steam generators that are larger than 250 million Btus. A Ford Motor Company Regional Environmental Engineer agreed, noting that Ford has used CEMs extensively since 1981 because the company found that CEMs help Ford reduce operating costs. He said they are even used on power boilers not covered by Ohio's CEM requirements. Furthermore, California and Pennsylvania local air compliance program officials told us that in selected cases, VOC monitors are feasible and already used in their states to detect violations, even though EPA has no regulations requiring VOC monitors at any major sources. Pennsylvania officials told us they also plan to use CEMs on hazardous, municipal, and infectious waste incinerators.

Other indicators also support the position that CEMs are potentially feasible for many more sources than currently use them. For example, according to the National CEM Coordinator, EPA has an effort underway to improve its emission-monitoring data base for SO_2 monitors at major power-generating facilities as part of EPA's increased emphasis on acid rain. Airborne SO_2 is a major component of acid rain. Data from this effort indicate that, as of January 1988, only 365 of 2,414 major SO_2 sources in the United States used SO_2 monitors. According to EPA's National CEM Coordinator, CEMs are economically feasible at nearly all of these facilities.

EPA Regulations Focus on Newest and Biggest Sources

Sections 110, 111, and 114 of the Clean Air Act collectively provide EPA with the authority to require any stationary source to install, use, and maintain emission-monitoring equipment. Under this authority, EPA has issued regulations requiring CEMs to be installed at 23 categories of new sources and 4 categories of existing major stationary sources. However, because of the reliability and cost concerns discussed above, EPA's regulations governing the use of CEMs have largely targeted only the newest and biggest sources, and have allowed even these sources alternatives and exceptions to the use of CEMs, according to EPA compliance officials. For example, in August 1988 EPA reported that only 35 sources could be categorized as electric utility steam generators of greater than 250 million Btu-per-hour capacity that had begun construction after September 18, 1978—one of the New Source Performance Standard (NSPS)[3] categories required to install CEMs under section 111 of the act. Similarly, under another subpart of the new source regulations, only those industries that began construction of large steam generators (greater than 100 million Btus per hour capacity) after June 19, 1984, are to install CEMs.

The number of CEMs EPA requires under other sections of the act is similar to its new source requirements, targeting only the biggest of sources. Under section 110 of the act, EPA is to ensure that state and local programs' SIPs require certain existing facilities to monitor emissions. Although states are free to target additional sources, EPA has designated only four narrowly defined categories of existing sources subject to these requirements. These categories include (1) fossil fuel-fired steam generators with a rated capacity of greater than 250 million Btus per hour, (2) nitric acid plants with production capacity of more than 300 tons of nitric acid per day and which are also located in nonattainment areas for NO_x, (3) sulfuric acid plants with production capacity of more than 300 tons of sulfuric acid per day, and (4) fluid bed catalytic cracking units at petroleum refineries with production capacity of more than 20,000 barrels per day.

[3]Major stationary sources constructed after specific dates identified in EPA's regulations are subject to NSPS standards, which generally require installation and use of more stringent controls to attain lower emission levels and, in the case of selected NSPS sources, continuous monitoring of emissions.

EPA's Monitor Use Policy Not Implemented

Efforts to ensure that major stationary sources maintain compliance have become increasingly important, according to EPA, now that most facilities have installed the basic pollution control equipment. In recognition of this growing need and because monitor reliability has improved and, according to EPA, the costs are more reasonable, in March 1988 EPA's Office of Air Quality Planning and Standards issued an emission-monitoring policy calling for CEM installation and use where feasible. According to the policy, if it is technically feasible, CEMs should be required in all new facility permits, operating permits, and resolutions of enforcement actions, including consent decrees and administrative orders. The policy states that CEMs should be used to ensure continuous compliance of sources in both attainment and nonattainment areas. The policy also points out that at least five states—Indiana, Ohio, Pennsylvania, Tennessee, and Washington—already have well-developed emission-monitoring programs, and that EPA's review of these programs has shown CEMs to be valuable tools for ensuring compliance. EPA states in its policy that it is committed to using CEM data in assessing facility compliance.

However, EPA has not fully followed through in implementing its policy, citing resource limitations and higher priority activities. For example, EPA's Stationary Source Compliance Division Deputy Director pointed out that funding for compliance activities has declined 35 percent (in noninflationary adjusted dollars) since 1979, while the major stationary source population has grown from about 23,000 to over 30,000 sources in the same time period. Although EPA's air program work force has remained about the same size nationally, compliance program staffing has been reduced by 14 percent, from 339 to 293 staff, since 1980. He also pointed out that, while these reductions were taking place, even minimally acceptable inspections have become more complex and time-consuming, often taking 50 percent more time than previously required. In addition, efforts expended on a host of new problems such as asbestos, air toxics, radon, hazardous and municipal waste incineration, and smaller sources of VOCs have taken ever increasing amounts of inspectors' time.

Thus, while EPA has the authority to require CEMs at a broad range of sources, according to the Deputy Director, the Stationary Source Compliance Division's limited available resources have forced headquarters managers to make difficult choices, effectively making EPA efforts to require more extensive use of CEMs a lower priority. The National CEM Coordinator explained that, in order to issue regulations requiring CEMs at a broad range of sources, the Stationary Source Compliance Division

would need to validate the various measurement methods involved, develop quality control and quality assurance methods and manuals, develop and propose regulations for each industry affected, answer and incorporate comments on the proposed regulations, and then promulgate final regulations. The Deputy Director explained that undertaking these activities is not possible with their current staffing if they are to also continue compliance and enforcement actions at sources and address new and emerging environmental issues. Consistent with the Deputy Director's statements, EPA's 1984 Compliance Monitoring Strategy for Major Stationary Sources points out that without additional resources, EPA's air compliance program cannot address both the need for CEMs and the need to capture previously unregulated smaller sources of harmful pollutants such as VOCs, or to effectively control asbestos demolition and renovation projects. EPA decided the latter was a higher priority need.

While resources and work load are legitimate factors, EPA continues to approve and fund state and local inspection programs that make little use of CEMs. In 1988, EPA, and state and local agencies conducted over 37,000 inspections. Furthermore, EPA has been slow to ensure that state and local programs comply with the Agency's 1975 regulation requiring them to incorporate CEM provisions in any SIP revisions after that date. For example, two states in EPA Region III—Maryland and West Virginia—have had SIPs approved without CEM provisions because CEMs have not been a high priority consistently over the years, according to EPA Region III officials. EPA Region IV officials explained that inconsistent guidance and direction from EPA headquarters over the years regarding the need for adequate CEM provisions in state SIPs had also caused them to question the Agency's commitment to CEMs as a detection method. Consequently, they told us in June 1988 that their regional approach to CEMs had largely been one of assistance rather than leadership. They explained that if a state or local agency solicited their help in establishing an active CEM program, they would work with them in doing so. Otherwise, it was not a priority.

In addition, headquarters officials told us that EPA has not developed a strategy for promoting CEMs at more facilities, nor do they have a plan for validating existing CEM technology and measurement methods—two critical first steps to regulatory use of CEM data in enforcing emission limits. Furthermore, in both 1988 and 1989, EPA reduced funding for its CEM program, according to the National CEM Coordinator. Even an EPA-

contracted study found that lack of management support and commitment to the CEM program has seriously hampered its implementation. Specific problems identified in this 1988 report[4] included the

> lack of or inconsistent responses to Regional initiatives and inquiries, failure to provide training and in-house technical support, and failure to resolve important data quality problems for the CDS/CEMS subset. Recent EPA policies and program priorities have in some cases been inconsistent with continued support of CEMS program implementation. In a least one Region, a decision to discontinue CEMS-related efforts was reportedly made in response to comments from a visiting OAQPS [Office of Air Quality Planning and Standards] Headquarters representative that the Agency was moving away from the NSPS program.

Clean Air Act Amendments Recognize Value of CEMs

In an effort to control acid rain, the administration's proposed amendments to the Clean Air Act recognize the value of CEMs and would require their use by the most significant contributors to the nation's acid rain problems. More specifically, under Senate Bill S.1630, opacity, SO_2, NO_x, and volumetric flow monitors would be required at 111 of the nation's largest coal-fired electric utilities within 36 months of enactment, and at another 800 to 1,000 of the nation's largest major industrial sources within 5 years of enactment, according to EPA. While these proposals are a step in the right direction, they include some facilities that already have monitors installed and stop short of legislating the extensive use of CEMs already called for in existing EPA policy. According to senior EPA compliance officials, CEMs are technologically feasible and economically viable at an estimated 10,000 major stationary sources and could enhance the likelihood of detecting violations at these sources substantially over current practices.

Despite the significant detection potential of CEMs, because of cited resource limitations, EPA officials said that they will continue to rely primarily on their encouragement of state and local agencies to develop CEM programs, but will not be able to require their broader use under federal regulations. According to senior compliance program managers, while EPA has the authority to require broader use of CEMs, their installation and use beyond the sources already identified in the proposed legislation will continue to be slow.

Conclusions

Major stationary sources are one of the biggest contributors to our nation's air pollution problems. These facilities are responsible for

[4]Status of EPA Regional CEMS Program Implementation (EPA, Aug. 1988).

nearly 40 percent of the nation's total emissions of criteria pollutants. EPA has sought, through regulations, permit requirements, and its review and approval of SIPs, to control major stationary source emissions. However, ensuring compliance at major sources has been, and continues to be, a significant problem.

CEMs represent a significant improvement in ensuring that major sources comply with emission requirements. The concerns about CEMs that existed in the past—reliability and cost—have been eliminated or reduced and, in our opinion, do not remain an impediment to their widespread installation and use. Further, in contrast to traditional inspections, the use of monitors provides solid evidence of a facility's emission levels and whether it complies with permit conditions. CEMs provide far more coverage of facility operations than do inspections and can detect violations that inspectors cannot.

EPA's efforts to expand the use of CEMs at existing stationary sources, however, have been inadequate. Although EPA's policy for encouraging the use of CEMs is a strong acknowledgement of the benefits of this technology, installation of this equipment will not occur on a widespread basis until it is required by EPA. This is because once CEMs are installed, major sources that are not operating within their permit limits face a much greater likelihood of detection. However, the regulations needed to transfer this policy into requirements have not been forthcoming. In our view, regulations that (1) establish criteria for determining where CEMs are technologically and economically feasible and (2) require CEM use in all situations where these criteria are met would significantly increase the use of this technology.

The proposed Clean Air Act Amendments would increase the number of facilities required to install and use CEMs. The amendments, if enacted, would mandate the use of monitors at approximately 1,100 facilities. However, on the basis of EPA's estimate that CEMs are feasible at about 10,000 facilities, considerably greater use can and should be made of CEMs in light of the continued air pollution problems.

Recommendation

In order to more effectively implement EPA's emission-monitoring policy and achieve more widespread monitor use, we recommend that the Administrator, EPA, promulgate regulations that (1) establish clear criteria for determining where CEMs are feasible for major stationary sources and (2) require CEM installation and use at all major sources meeting these criteria.

Penalty Amounts Not Sufficient to Deter Violations

Failure to comply with emission requirements can result not only in additional air pollution, but can also be of economic benefit to major stationary sources. To deter such noncompliance, the Clean Air Act contains penalty authority that allows enforcement officials to administratively assess noncompliance penalties sufficient to remove any economic benefit a violator can gain from failing to comply with the act's requirements. EPA has also established a civil penalty settlement policy used in its civil litigations that requires agency attorneys to accept only those settlement offers that are calculated to offset the economic benefit violators obtain through noncompliance.

State and local programs, however, which handled over 80 percent of the enforcement actions in fiscal year 1989, have not been required to seek economic benefit penalties. These state enforcement programs operate under state law as embodied in the various SIPs, not under the administrative penalty provisions embodied in the Clean Air Act or the EPA civil penalty settlement policy, and EPA has not insisted through the SIP approval process that states commit themselves to imposing economic benefit penalties. As a result, penalties imposed on significant violators—EPA's highest enforcement priority—were often not sufficient to remove the economic benefit of noncompliance. Specifically,

- fewer than half of the significant violators in fiscal years 1988 and 1989 paid cash penalties and
- when cash penalties were assessed, the penalties often were not based on the violator's economic benefit.

Further, although EPA can seek to impose its own penalties in those instances where state and local penalties are inadequate, it has seldom acted to collect additional moneys because it views its own enforcement process as cumbersome and too resource-intensive.

To help EPA take enforcement actions more efficiently, proposed amendments to the Clean Air Act contain provisions that grant EPA additional administrative penalty authority for enforcing air pollution violations. However, EPA still needs to clarify its authority over state and local agencies' enforcement actions to ensure that fair and equitable penalties are consistently imposed, including taking action in state and local cases where penalties are not sufficient. Otherwise, sources that comply will continue to be at an economic disadvantage to those that do not.

Economic Benefit Penalties Established to Promote Compliance

Failure to comply with emission requirements can result in significant economic benefit to major stationary sources. Among other things, these facilities can reap dollar savings by (1) not purchasing pollution control equipment or maintaining equipment already in use, (2) using less expensive but higher polluting raw materials, (3) not changing their production processes, or (4) not applying for a permit to conduct operations controlled under the Clean Air Act. For example, according to a 1986 industry study of emission control technology, steel drum manufacturers and reconditioners could save from $240,000 to $530,000 per plant in annualized costs by not purchasing the equipment needed to control VOC emissions.

To address such financial disincentives to compliance, the 1977 Amendments to the Clean Air Act gave EPA administrative authority to impose substantial cash penalties for pollution control violations. Section 120 of the act provided EPA with administrative authority to make a finding of noncompliance and assess cash penalties against noncomplying firms sufficient to remove any economic benefit derived from the violation. The intent of this provision was to forestall noncompliance with the act's requirements by removing the economic advantage to be gained by postponing investment in pollution control. At the same time, the Congress increased the civil penalties that can be imposed under section 113 of the act and expressed an intent that court-imposed civil penalties "be assessed in amounts which are adequate to assure compliance will result, rather than permitting continued noncompliance to be economically profitable."

EPA established regulations for imposing economic benefit penalties that are consistent with the intent of section 120. In 1984, EPA also developed the Clean Air Act Stationary Source Civil Penalty Policy which requires, among other things, that when EPA settles an enforcement lawsuit out of court, all such EPA settlements seek to remove the economic benefit derived by not complying with the act's requirements.[1] This civil penalty settlement policy provides that, except in extraordinary circumstances, "the lowest possible settlement penalty will be the calculated economic benefit of noncompliance." The policy directs that delayed and/or avoided expenses, such as the costs of control and monitoring equipment, modifications to production processes, operation and maintenance, and the employment and training of pollution control personnel,

[1]The EPA policy does not restrict the decision a judge might render if a particular case should go to trial, and the economic benefit that may be calculated is subject to the statutory maximum of $25,000 per day of violation.

be included in the calculation of economic benefit. Furthermore, the civil penalty settlement policy provides that additional amounts be obtained, if warranted, to reflect the gravity or seriousness of the violation.

Economic Benefit Penalties Not Imposed by State and Local Programs

Because the act is structured as a federal/state partnership for the control of air pollution, state and local agencies are authorized to carry out enforcement activities against violators, including major stationary source violators. In fiscal year 1989, state and local agencies handled over 80 percent of the enforcement actions against stationary sources. These activities are required to be performed in accordance with EPA-approved SIPs, which establish the requirements that authorized state and local programs must adhere to in order to avoid the act's sanctions and obtain federal funding.

However, EPA has not required authorized state and local programs to calculate or impose economic benefit penalties to correct violations. The last major revisions to SIPs were in 1982—about 2 years before EPA finalized its Stationary Source Civil Penalty Policy. Although EPA has the authority to call for unscheduled SIP revisions whenever it is apparent that attainment is in jeopardy, and although individual SIPs have been acted upon during the intervening years, EPA has not required state and local officials to revise their SIPs to upgrade administrative penalty provisions to recover economic benefit. As a result, state and local programs often do not impose cash penalties and at other times impose penalties that do not remove the economic benefit of noncompliance. EPA data for fiscal years 1988 and 1989 show that over half of the significant violators—54 percent—identified by state and local programs paid no cash penalties. Table 3.1 summarizes the penalties assessed in state and local enforcement actions in these years.

Table 3.1: Resolution of State and Local Enforcement Actions for Significant Violator Cases, Fiscal Years 1988 and 1989

	1988 cases		1989 cases		Total cases	
Type of resolution	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Cases resolved with cash penalty assessed	183	37	336	53	519	46
Cases resolved with no cash penalty assessed	315	63	300	47	615	54
Total cases resolved	**498**	**100**	**636**	**100**	**1,134**	**100**

Our review of eight state and local programs found that none regularly sought to recover economic benefit penalties. Three of the eight programs used EPA's civil penalty settlement policy occasionally as a reference in assessing but not collecting fines, four programs did not consider economic benefits in imposing cash penalties, and one program—Arizona's—did not have the authority to enforce civil penalties against violators, according to Arizona Office of Air Quality officials. In order to assess monetary penalties for violations in Arizona, criminal charges must be brought by the state attorney general's office, and the case must be tried in criminal court. Otherwise, the state program can only issue violation notices, which carry no monetary penalties.

Our review of enforcement actions in the eight programs included cases that were resolved without penalties to remove the economic benefit of noncompliance. As shown in the following three examples, although the severity of the violations varied, violations that appear to have economically benefitted the violator were settled with either no cash penalty assessed or, when cash penalties were imposed, no economic benefit calculated:

- A North Carolina facility emitting particulates[2] and VOCs from the annual production of about 30,000 tons of pipe (1) violated its permit limits for particulate emissions 5 times between 1984 and 1988, with 1 inspection observing opacity emissions at nearly 100 percent—almost 5 times above its limit of 20 percent, (2) conducted pipe grinding and fitting operations without a permit, and (3) used noncompliant paint coatings that exceeded VOC emission levels by 13 percent. Local program officials acknowledged that the firm may have benefitted financially from the avoided and delayed cost of timely compliance, but the economic benefit was not calculated by the local agency and no penalty was assessed. According to the manager of the local agency's Air Quality Branch, the firm agreed in July 1988—nearly 5 years after problems were first discovered—to do a better job of operating and maintaining its control equipment, not operate any new processes without a permit, and have its paint reformulated to meet the standard.
- A major refinery located in an ozone nonattainment area in California was cited for 10 violations of VOC emissions standards in 1986 and 1987, resulting from defective tank seals, failure to use proper seals, and leaking valves. At the time of our review, three of the violations were resolved with no cash penalty and four were resolved for a total penalty of $1,300. The remaining three violations were still unresolved at the

[2]Particulates include dust, dirt, soot, smoke, and liquid droplets emitted into the air.

time of our review. No calculation of economic benefit was performed, although enforcement records show that the violations resulted from preventable operational failures and were not the result of equipment breakdown or malfunction.

- A major drum-reconditioning facility in North Carolina, producing about 900 reconditioned steel drums daily, emitted excess VOCs into a VOC nonattainment area from 1980 to 1986 in violation of EPA regulations. This facility failed to install required control equipment by July 1980 and, when discovered in 1986, was using paints that emitted VOCs 57 percent above the standard set for coating steel drums. Negotiations with the facility to resolve the violations took over 2 years, resulting in a penalty of $15,000. No calculation of economic benefit was performed, but the local air program director told us that this penalty amount was consistent with historical amounts for other violations in the local area.

These penalties, however, may not approach the benefit the violator obtained nor serve as a deterrent to future violations. At our request, the EPA headquarters official responsible for the economic benefit program calculated the estimated economic benefit for the violation at the drum-reconditioning facility discussed above. According to his estimate, the economic benefit the firm derived was over $231,000—about 15 times larger than the $15,000 fine imposed. Furthermore, in this situation, the size of the penalty may not have deterred future violations. During a June 1988 inspection—2 months after paying the $15,000 penalty—this facility was found conducting unpermitted operations and had noncompliant materials on-site that would emit excess VOC emissions.

EPA's Office of the Inspector General has also found that penalties are insufficient. In a March 1988 report on EPA Region V and the states of Michigan and Wisconsin, the Inspector General reported that penalties are largely based on what EPA and state regulators believe they can obtain from the company rather than the economic benefit. The report further stated that most collected penalties did not recover the savings the violator received from delayed and/or avoided costs and that cases were found with no support as to how the penalty was calculated.

State and Local Enforcement Philosophies Differ From EPA's

State and local agencies generally seek to use their enforcement actions to secure a source's future cooperation rather than to penalize past violations. Some officials from state and local programs we contacted told us that their penalties are often directed toward getting the attention of

the violating facility's management, including threats of adverse publicity, rather than removing the economic benefit of noncompliance. They said their programs attempt to achieve compliance by working cooperatively with facility owners and operators to correct the cause of the violation, in lieu of assessing penalties. For example, the Chief of North Carolina's Air Quality Section said that their approach does not include calculating, assessing, or collecting penalties using economic benefit as the means of deterrence.

Similarly, one local program official said that compliance, rather than penalizing violators to remove the economic benefit of noncompliance, is the goal of his program. His goal is compliance through field presence and technical assistance to those firms having pollution control problems. He also said that other concerns must be considered in imposing penalties for violations, one of which is the financial impact of the penalty on the violating facilities. He expressed concern that placing economic benefit penalties on significant violators could put facilities in his area at a competitive disadvantage relative to facilities in other areas that do not impose such penalties.

According to some state and local officials, penalties need only be large enough to get the attention of facility management. As a result, they said their enforcement philosophies will continue to emphasize compliance through field presence, technical assistance, and fines on a case-by-case basis.

EPA Has Made Little Effort to Increase Penalties

EPA could increase cash penalties if, through its review and approval of SIPs, it were to require state and local enforcement agencies to adopt penalty policies similar to the section 120 regulations and, in situations where the state and local agencies do not obtain economic benefit penalties, by initiating its own action to impose a penalty. However, EPA has been reluctant to specify that state and local programs seek economic benefit penalties because the Agency is uncertain of its authority to do so. Further, EPA's ability to otherwise influence state and local programs' penalties is viewed as limited because of the time, expense, and resources required to initiate its own enforcement actions.

EPA Reluctant to Require Programs to Adhere to Penalty Policy

EPA officials said that they have been reluctant to mandate that authorized programs commit themselves to imposing economic benefit penalties. According to these officials, requiring programs to follow EPA's civil penalty settlement policy on recovering economic benefit could be

viewed as an infringement on the states' authority to operate their own programs. This could result in the states giving programs back to the federal government to operate rather than complying with enforcement standards based on EPA's economic benefit regulations and the related civil penalty settlement policy. EPA compliance officials pointed out that in 1984, EPA attempted to get state and local programs to adopt EPA's policy, but terminated this effort in 1985 after failing to reach consensus with the State and Territorial Air Pollution Program Administrators and the Association of Local Air Pollution Control Officials—associations which represent state and local air pollution control officials. Since 1985, EPA has not attempted any similar efforts.

EPA compliance officials also said they are unsure of the Agency's authority to require authorized programs to upgrade their penalty policies. They pointed out that state and local programs implement state laws. Consequently, for state and local programs to be required to impose economic benefit penalties, state laws would have to be amended, and the EPA officials were uncertain of their authority to require this. EPA's earlier attempt led them to believe that states would not be willing to amend their laws to conform to a more stringent penalty policy unless such conformance was specifically required as part of the act.

We found that EPA has not requested a legal ruling from EPA's Office of General Counsel on this matter. EPA compliance officials said that such a request could further impinge on their already deteriorating relationship with many state and local programs and that a negative ruling from EPA's own counsel could place them in a worse position for interceding in problem cases than current practice allows.

In our view, however, EPA has the authority to require that SIPs be revised to incorporate whatever enforcement procedures EPA deems adequate, including the nondiscretionary imposition of economic benefit penalties for violations. Specifically, section 110 of the act sets out the minimum requirements for the content of a SIP and charges EPA with SIP review and approval. According to this section, a SIP must include a program to provide for the enforcement of emission limitations and necessary assurances that the state will have adequate authority to carry out the SIP. Additionally, section 172 of the act, which deals with nonattainment areas, mandates that EPA ensure that SIPs include all the necessary requirements to achieve and enforce compliance with the plan.

Concerns such as those that EPA officials expressed have been raised before in the context of vehicle inspection and maintenance programs. Although these programs were a source of much contention, the courts ultimately held that states could be required to enact legislation to carry out the Clean Air Act's requirement to develop such programs or accept the sanctions provided under the act. Under the same theory, a state could be required to seek and collect economic benefit penalties for emissions, permit, and other violations by stationary sources.

EPA Ability to Impose Additional Penalties Has Been Limited

EPA is authorized to initiate a civil suit under section 113 of the act or an administrative action under section 120 to increase state penalties. EPA refers to this procedure as "overfiling." Although sections 113 and 120 provide EPA with the legal authority to issue orders, commence civil actions, institute criminal proceedings, and assess economic benefit penalties, EPA compliance officials said their ability to remedy insufficient state and local penalties is limited because each of these sections currently has drawbacks that hamper EPA from ensuring that state and local penalties are adequate.

In addition to other sanctions, section 113 authorizes EPA to seek court-imposed penalties for air pollution violations. However, EPA compliance officials contend that this is an expensive, time-consuming process, sometimes costing more to prosecute than the eventual court-imposed penalty. According to EPA's Assistant Enforcement Counsel for Air Enforcement and Compliance Monitoring, undertaking court action can cost EPA from $50,000 to about $400,000 on civil actions it takes against polluters, depending upon the complexity of the case and whether the case actually goes to trial or is settled before a trial begins. He stressed that EPA has no way of knowing which cases will actually go to court, so all cases must be handled as if they will eventually end up before a judge. Although overfiling, if successful, can have significant deterrent effects, the high cost of using section 113 to overfile in large numbers of cases where penalties are insufficient is impractical, according to the Assistant Enforcement Counsel. The Chief of EPA's Region IV Air Compliance Branch concurred, noting that in some cases, EPA collects less penalty money from overfiling in state and local cases than it spends in taking the enforcement action. EPA cannot recoup its costs of litigation, and all penalty money collected goes to the U.S. Treasury, not to EPA.

In contrast to section 113, section 120 authorizes EPA to assess economic benefit penalties administratively and to avoid court action unless a source appeals EPA's administratively determined sanction. However,

EPA views this provision of the act as having other problems which make it undesirable to use in many cases. For example, section 120 does not provide EPA with the ability to collect a penalty for any period of violation that occurs before EPA has officially notified the owner or operator of the noncompliance, a limitation not found in section 113. Additionally, the penalty calculation formula for section 120 was promulgated in EPA regulations and requires collection of the full economic benefit, providing little flexibility, according to EPA, for regulators to settle cases for less. Also, section 120 seeks to gain compliance through economic penalties alone and provides no ability to order compliance or to seek injunctive relief. Although the act allows EPA to use section 113 and 120 together to achieve an appropriate remedy for a violation, EPA officials said dual actions such as this are an extremely costly way to achieve compliance, and thus such dual actions are officially discouraged by EPA's enforcement program guidance.

Because of the high cost, difficulty, and inflexibility of using their current authorities to increase state and local penalties, EPA overfiles relatively infrequently. According to the Deputy Director, Stationary Source Compliance Division, the air compliance program's enforcement resources are limited, and any EPA region is able to sustain case work on only 12 to 15 enforcement actions a year, or a total of 120 to 150 cases a year nationwide. Consequently, EPA headquarters and regional officials told us they are able to overfile only in precedent-setting cases and those where the initial penalties are grossly deficient. Region IV staff told us that because so many penalties are deficient, a regional rule of thumb—described in a March 1988 EPA Office of the Inspector General report on Region IV as the "laugh test"—is used to determine which cases will be challenged. According to Region IV staff, a proposed penalty is not challenged if they do not laugh too loudly. A Region III enforcement official told us that, while other judgmental factors may be considered, his region also uses the laugh test in deciding which penalty amounts to challenge.

Senior officials from EPA's Stationary Source Compliance Division and the Associate Enforcement Counsel from EPA's Office of Enforcement and Compliance Monitoring believe that EPA needs a flexible, easy to use administrative penalty authority to improve the Agency's ability to overfile in cases where assessed penalties are insufficient to recover the economic benefit the violator obtained and to deter future violations. According to these officials, such authority could enable EPA to impose economic benefit penalties against polluters expeditiously, thereby

allowing it to more frequently increase state and local agencies' penalties when warranted and to get maximum deterrent effect from EPA's limited resources. Substantial resources would be saved and more cases handled if EPA had greater administrative penalty authority, according to the Assistant Enforcement Counsel, who estimated that EPA would be able to close many cases for approximately $1,000 to $25,000 each.

Proposed Changes to Clean Air Act May Improve Penalties, but Clearer Direction Needed

In June 1989, the administration announced proposals for amending section 113 of the Clean Air Act, including providing EPA with the authority to administratively penalize sources up to $200,000 for violations of the act. Proposed section 113(e) specifically requires the economic benefit of noncompliance to be considered in determining the penalty amount and also allows EPA to assess penalties under section 120 back to the first provable date of the violation. In July and August 1989, legislation was introduced in the House and Senate to carry out the President's proposals.[3] Adoption and passage of these proposals appear to give EPA the enforcement tools and the desired flexibility and would negate limited enforcement authority as a reason if penalties continue to be insufficient to achieve deterrence.

The proposed revisions, however, do not address the issue of whether state and local enforcement programs can be required to collect penalties based on the economic benefit violators have obtained. According to senior EPA compliance officials, such legislative direction is needed to change the state and local agencies' practice of not adhering to EPA's civil penalty settlement policy. They pointed out that since the act makes no specific reference to the issue of state and local penalties, these agencies are likely to contest any EPA effort to require that economic benefit penalties be imposed. The EPA officials said that requiring these groups to assess economic benefit penalties appeared to be the most appropriate and practical remedy because (1) state and local programs will continue to carry out most enforcement actions and (2) EPA's enforcement resources will continue to be limited for the foreseeable future. The EPA officials said that additional legislative authority and/or direction would provide the necessary leverage to compel state and local programs to impose economic benefit penalties.

[3]The Clean Air Act Amendments of 1989 was introduced as H.R. 3030 in the House of Representatives on July 27, 1989, and as S.1490 in the Senate on August 3, 1989. The Senate passed its version of the clean air legislation, S.1630, on April 4, 1990, and the House passed a revised version of H.R. 3030 on May 23, 1990.

Conclusions

Both the Congress and EPA have recognized that one of the most important actions that can be taken to control air pollution from major stationary sources is to penalize violators in amounts sufficient to eliminate the economic benefit derived from the violation. Such penalties, if appropriately imposed, remove the economic and competitive advantage that the violator, through his actions, may have gained over facilities that complied with pollution control requirements. More importantly, economic benefit penalties can serve as strong incentives to major stationary sources to ensure that proper measures are taken to achieve and maintain compliance with pollution requirements and that violations do not occur.

However, state and local agencies have not always appropriately imposed penalties against major stationary sources. Because EPA has not used the SIPs or any other vehicle available to it to get state and local programs to commit themselves to economic benefit penalties, significant violators have paid penalties that were not based on the economic benefit derived and more than half of the violators have not paid any penalties at all. Further, the Agency has taken little action to overfile when penalties were inadequate. As a result, there appears to be little incentive for major sources to take all actions necessary to maintain compliance.

The proposed amendments to the Clean Air Act, if enacted, will provide an appropriate first step in solving this problem. Both the Senate and House bills provide EPA with the authority to impose economic benefit penalties administratively for violations back to the first provable date of the violation. This authority, if properly used, should allow EPA to overfile more efficiently in situations where insufficient penalties have been imposed by state and local programs and to better ensure that violators do not profit from polluting.

However, in the long run, the most effective method for ensuring that economic benefit penalties are appropriately imposed and collected is to have such penalty practices be a part of all state and local air pollution enforcement programs. To achieve this, standards for assessing economic benefit penalties need to be included in each SIP. The consistent requirement for such penalties in all programs will best ensure that violators are treated equally in all areas of the country and that firms that comply with air pollution controls are not placed at an economic disadvantage.

Although we believe EPA has the authority to require that economic benefit penalties be imposed, we recognize that EPA has to rely on state and local programs with differing enforcement philosophies to identify polluters and assess penalties, and that requiring rigid adherence to economic benefit enforcement standards may strain EPA's relationships with these programs. However, EPA's increased ability to overfile will, in our opinion, also improve EPA's ability to persuade state and local programs to impose penalties that reflect the economic benefit that the violator obtained. Once state and local programs realize that EPA will act to increase insufficient penalties—and that the federal government will retain the additional penalty amounts—it is likely that the states will be more willing to amend their SIPs to include economic benefit penalty provisions. Nevertheless, if EPA believes it needs greater statutory leverage in guiding state penalty practices, it should pursue additional legislative authority.

Recommendation to the Congress

Currently proposed amendments to the Clean Air Act contain provisions that provide EPA with administrative penalty authority that would enable it to take more expeditious actions to ensure that cash penalties are appropriate. We support these proposals and recommend that the Congress include such penalty authority in final Clean Air Act legislation.

Recommendations to the Environmental Protection Agency

To better achieve the objective of ensuring that those who violate the act's requirements do not gain financially from their actions, we recommend that the Adminstrator, EPA

- use the enforcement authority available now and in the future under the amended Clean Air Act to overfile to the maximum extent possible to increase inadequate state and local penalties and
- undertake efforts to include specific standards for assessing economic benefit penalties in the next round of SIP revisions and, if necessary and desirable, seek specific legislative endorsement for such action.

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Figure 1.2: Major Stationary Sources Releasing Visible Emissions

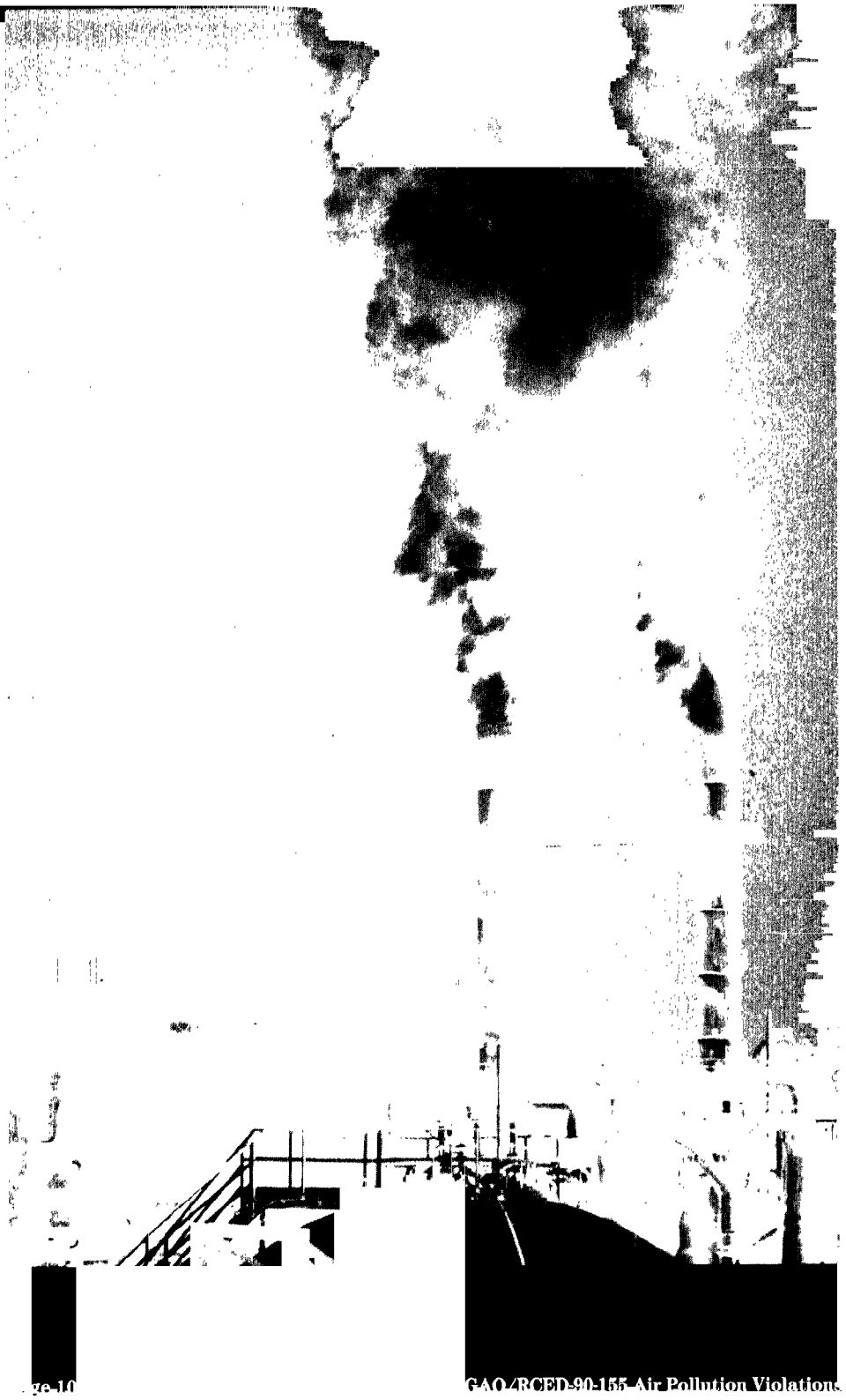
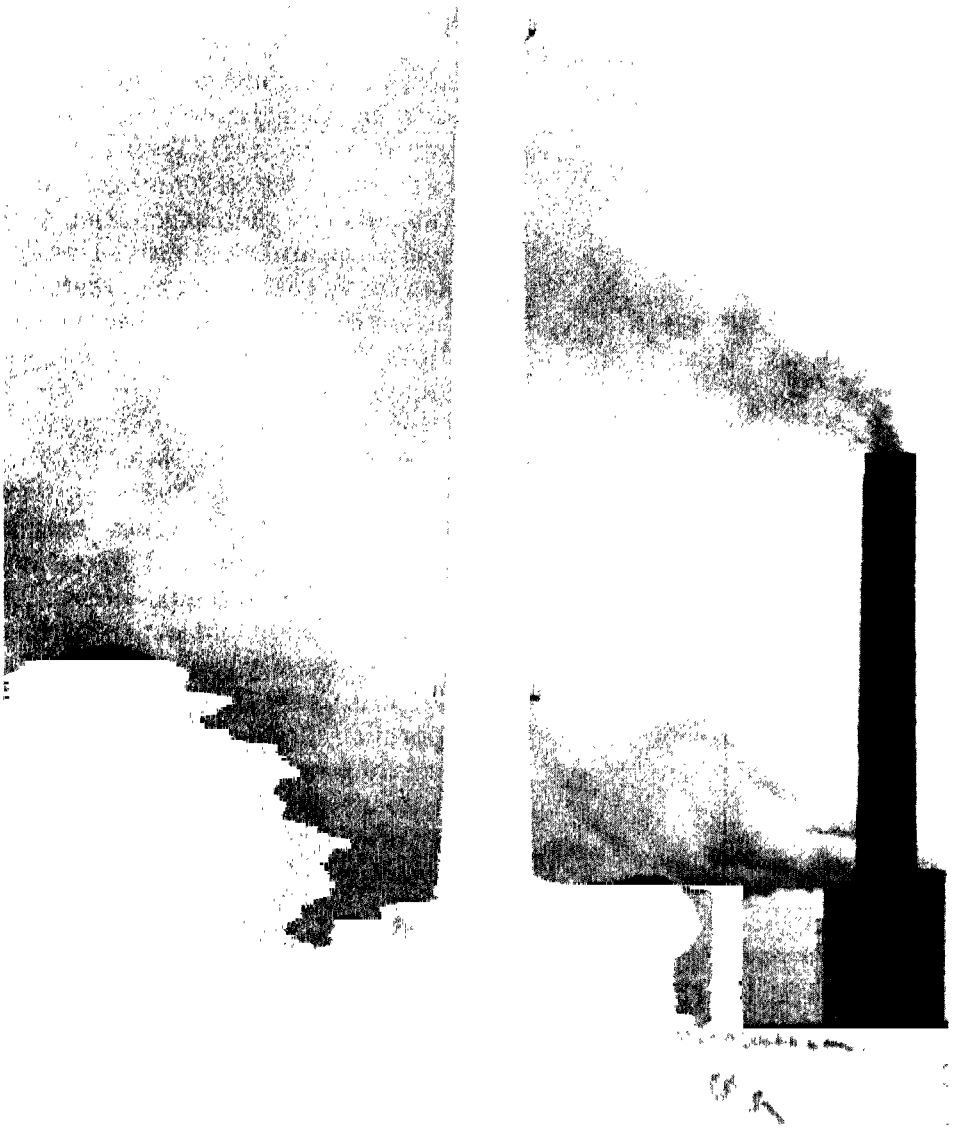


Figure 1.2: Continued



Source: EPA.