Enforcement of Air Pollution Controls on Stationary Sources under the Clean Air Amendments of 1970

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Last year’s protracted congressional struggle over the so-called emergency energy legislation brought sharply to public attention the debate that has simmered since before the passage of the Clean Air Act.


1. This legislation went through numerous versions. It was originally debated in the Fall of 1973 (H.R. 11450, 93d Cong., 1st Sess.; S. 2589, 93d Cong., 1st Sess.), when it contained, in addition to amendments to the Clean Air Act (Clean Air Amendments of 1970, 42 U.S.C. §§ 1857-58a (1970) amending 42 U.S.C. §§ 1857-57l (Supp. V, 1970). In all following notes, the term “Clean Air Amendments” refers to the Clean Air Act, 42 U.S.C. §§ 1857 et seq., as amended through 1970.), a number of energy-related authorities, including authority for the President to impose petroleum rationing (S. 2589, 93d Cong., 1st Sess. (1973), conference bill, printed at 119 Cong. Rec. S23821 (daily ed., Dec. 21, 1973)). The first conference version was recommitted to committee in the Senate by a combination of oil industry and environmental pressure, 120 Cong. Rec. S734 (daily ed., Jan. 29, 1974). Later reported out again and passed by Congress, it was vetoed by the President on March 6, 1974, reportedly because it contained authority for gasoline rationing and for eliminating windfall profits. This bill will hereinafter be referred to as the “Energy Emergency Act bill.”

On March 28, 1974, Chairman Harley Staggers of the House Interstate and Foreign Commerce Committee reintroduced the energy legislation without the provisions thought to be offensive to the President. “Standby Energy Emergency Authorities Act” bill, H.R. 13834, 93d Cong., 2d Sess. (1974). Within short order, however, these provisions were once again tacked onto the bill in both House and Senate Committees. Realizing that the new bill, as amended, would suffer the same fate as the original energy bill, those on the House Committee who favored amending the Clean Air Act split the bill in half. H.R. 14368, which contained only the amendments to the Clean Air Act from the original energy bill, was introduced by Congressman Hastings on April 24, 1974. (The other half of the bill, which had contained all the authority that could have affected substantially the supply or demand for oil, languished and died.)

After a long and rancorous conference, H.R. 14368, in heavily amended form, was reported out and passed in early June, 1974, under the revealingly labored title of the “Energy Supply and Environmental Coordination Act of 1974.” It was signed into law by the President on June 22, 1974. Pub. L. No. 93-319, 88 Stat. 246). For purposes of brevity, it is hereinafter referred to as “ESECA.”
Amendments of 1970 over the control of pollution from steam electric generating plants and other large polluters. Using the oil-producing countries' embargo as pretext, the electric utilities, coal companies, and other large industrial interests attempted to uproot the very foundations of the 1970 Amendments. Claiming that the shortage of oil necessitated a rapid shift to the use of coal for generating electric power, they sought virtual exemption from air pollution controls. Though this audacious effort was largely repelled, it represented only the latest chapter of the continuing controversy over the degree and methods of control to be applied to these sources of pollution. The history of this struggle, which affects the health and welfare of literally millions of people, reveals much about the impediments to successful use of regulation to control major economic institutions in present American society, particularly the possibility of forcing technological change upon such industries.

To set the problem in perspective, over half the total sulfur oxide pollution (one of the three pollutants emitted in great quantities from stationary pollution sources) in the United States is the result of fuel

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2. In fact, conversion of presently oil and gas-fired power plants to the use of coal did not offer a solution to the short-term shortage of oil occasioned by the Arab embargo, because the coal industry did not have the capacity to produce increased supplies of coal rapidly, the railroads did not have the equipment to move increased supplies, and the utilities did not have the machinery to store or burn it. This point, generally acknowledged by representatives of each of these industries in their initial testimony of the emergency energy legislation (see Hearings on S. 2589 Before the Senate Comm. on Interior and Insular Affairs, 93d Cong., 1st Sess. (Nov. 8, 1973)), is addressed at length in the testimony of Richard E. Ayres in Hearings Before the House Comm. on Interstate and Foreign Commerce, 93d Cong., 2d Sess. at 218 et seq. (Apr. 3, 1974). Estimates of the time needed to increase significantly the use of coal in utility boilers ranged from three to five years.

This article focuses on the problem of controlling sulfur oxide pollution from large stationary sources. Such sources also produce large quantities of nitrogen oxides and particulate matter (including extremely toxic trace metals, such as cadmium and mercury), all of which are also major pollution problems. The use of coal in preference to oil or gas in such sources would result in major increases of these pollutants as well as of sulfur oxides. Though many of the general themes of this article are equally applicable to the particulate and nitrogen oxide pollution problems, the technical aspects of controlling these pollutants are sufficiently different that it seemed preferable to limit discussion to the control of the one pollutant.

3. During the course of debate on this legislation, the American Public Health Association released an estimate, based on a study it was conducting as part of the comprehensive Ford Foundation-funded Energy Policy Project, of the health impact of converting power plants now burning oil and gas to coal.

At a press conference called to express its concern over the bill, the Association noted that some 21 million people live in areas now experiencing concentrations of sulfur oxides 25 percent or more above the National Primary Air Quality Standards set to protect public health. Conversion of 60% of the presently oil and gas fired power plants to coal would, the APHA said, cause a 20 to 40% increase in morbidity and mortality owing to respiratory and cardiovascular disease in this "at risk" population. American Public Health Association, press statement, Dec. 17, 1973.
combustion in fossil-fueled power plants—some 19.6 million tons of the total national output of 33.6 million per year of sulfur oxides in 1970. Furthermore, the rate of growth in power plant emissions is staggering; in the 30 years between 1940 and 1970, they have multiplied sevenfold.4 Coal-fired power plants, which account for only about 55 percent of the megawattage of such plants, account for some 94 percent of their total emissions of this pollutant.5 Thus, controlling emissions from power plants, especially those burning coal, is the most important regulatory problem faced by EPA.

Basically, four methods exist for dealing with this pollution: (1) reducing the sulfur content of the fuel burned, (2) installing devices to remove the pollutants from exhaust gases prior to releasing them into the air, (3) permanently curtailing or ceasing production, and (4) dispersing the pollution, either by installing tall smokestacks or varying the rate of emission over time depending on wind conditions. As is obvious, the first three result in reducing emissions of pollutants into the air, while the last merely reduces the highest concentrations recorded in the vicinity of the facility. The question of whether dispersion is considered a valid means of control continues to be a major issue. A second and even more controversial issue involves the technique of cleaning exhaust gases as they go up the smoke stack.

I

THE "SCRUBBER" CONTROVERSY

The battle over the emergency energy bill spotlighted the utilities' continuing refusal to install the flue gas desulfurization equipment ("scrubbers") to reduce pollution from power plants. During the late sixties, state and local air pollution authorities increasingly had turned to regulations requiring power plants to convert to less polluting fuel in order to reduce concentrations of sulfur oxides (and particulate matter) in the ambient air. These decisions were the result of a number of factors. Low sulfur fuel requirements were eminently enforceable, since it was possible to use regulations governing fuel merchants to insure compliance. In addition, this control method was not subject to failure owing to mechanical breakdowns. Oil and gas were widely available and sufficiently cheap that conversion from coal often conferred an

4. The figures are for 1970, the latest year available. Between 1960 and 1970, emissions of sulfur oxides from power plants have been growing at the rate of 1 million tons, or approximately 5 percent per year. EPA, AP-115, Nationwide Air Pollutant Emission Trends, 1940-1970, (Jan., 1973), at 5.

5. EPA, REPORT OF THE HEARING PANEL, NATIONAL PUBLIC HEARINGS ON POWER PLANT COMPLIANCE WITH SULFUR OXIDE AIR POLLUTION REGULATIONS, Jan. 1974, at 11 [hereinafter cited as SCRUBBER HEARINGS].
economic benefit on the utility, especially in the heavily polluted port cities of the East. Finally, the utilities were adamantly opposed to any requirement to install flue gas desulfurization equipment, which would have allowed them to continue burning coal, because they considered scrubbers too expensive and insufficiently proven.

In considering the bill that became the Clean Air Amendments, the Senate Subcommittee on Air and Water Pollution nonetheless avoided writing an exclusively clean fuels policy into the law—in part because the members were aware of the possible energy implications of such a policy, and in part at the urging of Senator Randolph (D-W. Va.) whose constituents' interests in the use of coal is obvious. The Subcommittee was, however, determined that where coal was to be used, it must be used in a manner compatible with protecting the public health. It therefore obtained the views of the National Air Pollution Control Administration (NAPCA), EPA's predecessor with respect to air pollution, and industry groups, to learn how long it would take to perfect and install stack gas cleaning devices to abate sulfur oxide emissions. It then established a deadline which, while granting sufficient time to be realistic, would also "force the state of the art." In effect, then, the Amendments were a congressional invitation to the affected industries to press forward as rapidly as possible in commercializing technology that would allow the fullest possible exploitation of the country's immense coal reserves while protecting the environment.

Sadly, neither coal nor utility industries accepted the challenge. With a few exceptions, notable by contrast with the rest of the industry, utilities have sat on their hands. By 1972 (the latest year for which figures are available), the privately owned utilities were spending only 0.069 percent of their total operating revenues on research and development. An EPA Hearing panel, called to consider the question of stack gas cleaning, was moved to report early in 1974 that "some companies appear to have spent more in defending their lack of progress or in attempting to have the emission requirements changed than they have in controlling their sulfur oxides emissions." In the absence of activity on the part of the utilities, vendors of control equipment have at-
tempted to fill the gap. Their attempts to market their products, however, have been frustrated by utility demands for guarantees so unprecedented as to compel the conclusion they were not meant to be met.11

Nor have the coal companies supported demonstrations of the feasibility of stack gas cleaning technology, despite their seemingly obvious economic interest in proving it workable. In the five year period 1969-1973, the entire coal industry spent an average of only $17 million a year on all research designed to find less environmentally damaging ways of using coal. Most of this was spent for research on coal gasification and liquefaction, processes which are considered even by optimists to be a decade or more from commercial usage. Only two coal companies were conducting any work at all on flue gas desulfurization.12 Instead, the companies have sought to delay, or avoid altogether, the installation of stack gas cleaning equipment. And EPA, by its interpretation of the statute, has unwittingly played into their hands.

11. The question was explored at some length in EPA's SCRUBBER HEARINGS. The hearing panel concluded that vendor guarantees for flue gas desulfurization (FGD) equipment are similar to those offered for other major equipment purchased by utilities but that utilities were demanding unprecedented contract terms:

... the demands put forth by the industry are often unreasonable, not in accord with usual business practices, and clearly not in accord with the requirements of the Act. For example, AEP [American Electric Power Company, the largest private coal burning utility in the country] demanded a guarantee for a proposed FGD system that was unprecedented in any of their previous equipment contracts. AEP wanted an iron-clad guarantee that the installed equipment would function nearly trouble-free for 15 years handling coal with a sulfur content up to 3.5 percent. Design was to be completed less than 9 months after the contract was awarded and the system was to be operating full scale in time to comply with 1975 standards. The equipment was to complete its first year as a "demonstration period," and if the system failed, the vendor would be liable for 150 percent of the contract price. The vendor would also have been liable for consequential damages of up to $53 per megawatt per day for any downtime beyond 5 days a year for the remaining 14 years of the guarantee. This same utility characterizes itself as a leader in the industry and a pioneer in supercritical boilers. AEP took a risk in installing the first 100-megawatt supercritical boiler with no provision for consequential damages or any reliability guarantee, but is not willing to install pollution control equipment under the same conditions. The difference may be in the incentive for the utility to take the risk. Supercritical boilers result in lower generating costs, but there is no cost incentive for AEP to install a pollution control system.

Id. at 45.

EPA's conclusion was echoed in Clean Air Act oversight hearings, held by Senator Muskie in May 1974, where representatives of environmental organizations pointed out that the concept of reliability adopted by the utilities would define nuclear power as "unavailable" and might well do the same for coal itself. Testimony of Richard E. Ayres, Natural Resources Defense Council, May 16, 1974 (not yet published). Senator Muskie, irked by the attempt to discredit scrubbers, angrily denounced utility executives for adopting this tactic.

12. Information supplied by the National Coal Ass'n.
Under Section 110 of the Act, each state was required to prepare and submit a state Implementation Plan no later than January, 1972. As noted previously, prior to the enactment of the Act, many states had adopted, or were adopting, emission limitations contemplating the use of low sulfur fuel. Most simply included these regulations in their state Plans or passed similar ones. In determining whether to approve these Plans, EPA was handicapped by two self-imposed restraints. First, it interpreted the Clean Air Amendments in a way that prevented disapproval of a state Plan or part of a Plan on the grounds that there would be insufficient low sulfur fuel to meet all the state Plan requirements, even though it suspected at the time that this was true. At the same time, it improperly allowed the states to submit individual compliance schedules long after their state Implementation Plans, setting back the timetable for action Congress had counted on to stimulate installation of scrubbers.

Thus, EPA was caught in a box of its own making: when the states finally began to negotiate compliance schedules, the utilities could argue for using clean fuel because it was already too late to install scrubbers soon enough to meet the Act's deadlines; and then, when the Arab oil embargo struck, they could claim that clean fuel was not available. Given this syllogism, they hoped there could be only one


14. In the preamble to EPA's notice of approval and disapproval of various state Implementation Plans, the Administrator specifically addressed the issue of fuel availability and suggested that changes in state Plans might be necessary:

Since fuel desulfurization facilities are unlikely to be built on the scale which would be required to fully implement all State plans by 1975, it appears that all State plans can be completely implemented by 1975 only with a major short term shift to naturally clean fuels. Unfortunately, these naturally clean fuels are not likely to be available in quantities necessary to meet the projected demand.

... Pending further study, EPA is approving or promulgating regulations for meeting both the primary and secondary SOx standards. The States should proceed to develop compliance schedules on the assumption that both standards can be met. In the meantime EPA will be completing its studies of the aggregate situation and will suggest necessary changes to the States, ...


15. The Clean Air Amendments of 1970 provide that an approvable Implementation Plan (which must be completed by Jan., 1972) must include "emission limitations, schedules, and timetables for compliance with such limitations," [emphasis supplied] § 110(a)(2)(B). Despite this clear requirement, EPA regulations detailing requirements for preparation, adoption, and submittal of Implementation Plans, 42 C.F.R. § 420.15 (1971) (recodified as 40 C.F.R. § 51.15 (1971)), specified that compliance schedules could be submitted by the date for submittal of the first "semi-annual report," February 14, 1973. Nonetheless, some states still have not submitted any compliance schedules and most have not completed their submissions; EPA has yet to complete its review to decide whether to approve the state schedules, let alone promulgate, as required by § 110(c) of the act, 42 U.S.C. § 1857c-5(c) (1970), compliance schedules where state submissions were inadequate or non-existent.
conclusion: extend the Act's deadlines to allow continued burning of dirty fuel.\textsuperscript{16}

During the early days of the Arab oil embargo, it appeared for a time that Congress might capitulate to this logic with respect to facilities already using oil and natural gas. Early versions of the emergency energy legislation would have given the Federal Energy Administrator the power to order any plant physically capable of it to convert from oil or gas to coal, regardless of the effect on air pollution. Converted plants would have been given until the end of 1979 to comply with the federally approved state Implementation Plan emission limitations that would otherwise have been applicable as of mid-1975 or earlier.\textsuperscript{17} By the spring of 1974, however, Congress was no longer willing to rend the fabric of the Clean Air Amendments so drastically. In the final version of the energy bill (ESECA), such "compliance date extensions" can be granted only if three important environmental constraints can be satisfied. First, in order to approve an extension, the EPA Administrator must find that the use of coal will not cause or contribute to the violation of any National Primary Ambient Air Quality Standard.\textsuperscript{18} Secondly, if a plant is located in an Air Quality Control Region in which any National Primary Ambient Air Quality Standard is being violated, it may not receive such an extension unless it can meet the state Plan emission limitations for that pollutant.\textsuperscript{19} Thirdly, if EPA de-

\textsuperscript{16} According to reliable sources, when the Arab embargo struck and the Congress began to consider emergency energy legislation, the coal companies first sought a ten year exemption from Clean Air Act requirements, apparently oblivious to the political liability of a 1984 compliance date. The final conference version of the vetoed Energy Emergency Act bill provided for a 1979 date for converted plants, S. 2589 § 201 (proposed § 119(b) of the Clean Air Act). Rumors persisted that a 1984 date would appear in the second attempt to pass the energy bill. The Administration asked for exemption until January 1, 1980, in its package of proposed amendments to the Clean Air Act Amendments. § 8 of the Administration bill (proposed § 119(b)(1) of the Clean Air Act), 4 ENV. Rptr.—Curr. Dev. 2004 (1974). ESECA, as ultimately passed, provides for compliance by converted plants with state emission limitations not later than January 1, 1980.


\textsuperscript{18} § 119(d)(2)(A) of the Clean Air Act, as added by § 3 of the ESECA.

\textsuperscript{19} § 119(c)(2)(D) of the Clean Air Act, as added by § 3 of the ESECA. The purpose of this provision is to minimize the increase of atmospheric loading with pollutants in already polluted regions of the country. Thus, if a plant is located in an AQCR in which National Primary Ambient Air Quality Standards for particulate matter are violated at any point in the Region, but primary ambient standards for sulfur oxides are being met, it could convert only if it installed (or refurbished) particulate matter control equipment (such as electrostatic precipitators) adequate to assure compliance with the state emission limitations for particulate matter. With respect to sulfur oxides,
terminates that the burning of coal by the plant will result in an increase of "any air pollutant for which national ambient air quality standards have not been promulgated, . . . and that such increase may cause (or materially contribute to) a significant risk to public health," it must take action to revoke the FEA order to convert, leaving the plant subject to enforcement action by EPA, the states, and private citizens for failure to meet the emission requirements of the state Implementation Plan.  

As passed, then, the energy legislation favors those who feel that it would not have to meet the emission limitations until 1979 (or an earlier date set by EPA, if this were possible). It would, of course, continue to be obliged not to cause or contribute to a violation of the National Primary Ambient Air Quality Standards for sulfur oxides.

It is important to note also that this provision provides an incentive for facilities in such a Region to police each other. The reason is that if, during the period of the compliance date extension, emissions of a pollutant for which the National Primary Ambient Air Quality Standards were previously being met increase anywhere within the Region sufficiently to cause violations of these ambient standards, the source would become subject to the requirement to meet the emission limitations of the state Plan, rather than merely the ambient standards themselves, through the operation of the "is being violated" language of § 119(c)(2)(D).

20. § 119(d)(3)(B)(iii) of the Clean Air Act, as added by § 3 of the ESECA. This provision was included in the statute to prevent conversions to coal in areas where concentrations of acid sulfates, trace metals, or other pollutants not covered by National Ambient Air Quality Standards were already at levels which EPA had determined were harmful to public health. At the time the new statute was passed, evidence was piling up that acid sulfates were already a significant risk to public health (as well as the remainder of the biosphere) in large areas of the country. See text accompanying notes 33-37 infra.

Though EPA has not yet promulgated a National Ambient Air Quality Standard for these pollutants, it is clear that the vastly increased emissions of sulfur oxides and particulate matter that would result from burning coal rather than oil or gas would contribute significantly to increasing these concentrations. Unable to point to specific ambient air quality standards for these pollutants, but determined to exercise prudence in authorizing large increases in them, Congress therefore wrote the statute's prophylactic rule to prevent conversions in the affected areas. The fact that coal burning is also known to contribute greatly increased quantities of mercury, cadmium, and other trace metals to the air was the reason for including these pollutants among those which would also trigger action to prevent increased burning of coal in some areas.

Earlier versions of the ESECA would have made a finding with respect to these "non-criteria pollutants" a precondition to EPA's approving a compliance date extension for plants ordered to convert by FEA. Though the final version of the statute replaces this requirement with authority for EPA to force rescission of the conversion order after the compliance date has been extended, it would seem the height of folly for a facility in an area where sulfate or trace metal contamination was already high to seek to convert to coal, only to be later subjected to action that would force it back to burning petroleum products. At this writing, it does not appear that EPA will promulgate regulations requiring it to notify a source before conversion that it will be subject to this action, but it would seem wise for any source considering conversion to request some indication of position from the Agency before embarking on the expense of conversion. The statute does provide that states or local governments may petition EPA for a determination of this issue, and one would hope, for the benefit of both breathers and industry, that they would seize this opportunity to obtain a determination of this issue before conversion orders and compliance date extensions were issued.
utilities should be forced to install scrubbers or use other methods to reduce emissions caused by the use of coal. Given the health-protective conditions attached to FEA's power to order conversions, few plants are likely to be allowed to violate state emission limitations by this legislation. For those that are, the legislation does not remove the compulsion to adopt such measures. Compliance date extensions may not be granted unless the facility commits itself, at the time of conversion, to a compliance schedule for either low sulfur coal or coal "by-products" (such as liquefied or gasified coal), or the installation of a sulfur oxide scrubber. The compliance schedule must provide for meeting the state emission limitations as expeditiously as practicable but in no case later than the beginning of 1980.21

Thus, the first attempt by the utilities to avoid installing scrubbers has apparently failed. But the battle is plainly not over. Industry forces are seeking more sweeping amendments, covering all plants rather than just those that converted, which would relieve them of the requirement to install scrubbers. The coming battle is likely to pit EPA and environmental forces against major segments of the industry, the Federal Energy Administration, the Federal Power Commission, the White House, and other elements of the federal bureaucracy.

II

TALL STACKS, INTERMITTENT CONTROL SYSTEMS, AND AMBIENT STANDARDS

As part of the attack on the Clean Air Act, the utilities, the coal companies, and their allies also pressed for relief far beyond "temporary" exemptions from emission limitations, seeking changes that would have emasculated the Clean Air Amendments. The attack consisted of attempts to legitimate three discredited concepts that had been forcefully rejected in the 1970 Amendments: tall stacks, "intermittent control systems," and regulation directly through ambient air quality standards. All three are less effective and less enforceable substitutes for controlling the emissions from a plant's smoke stack.

The most direct attack on the Amendments occurred on the House floor, during the frenzied 1973 pre-Christmas debate on the energy emergency legislation. Congressman Murphy, Democrat of New York,22 not satisfied with the House bill's six-year exemption from state

21. § 119(c)(2)(A) and (B) of the Clean Air Act, as amended by § 3 of the ESECA.

22. Congressman Murphy represents the 17th Congressional District in New York which includes Staten Island and a part of lower Manhattan. His support for the amendments described in the text is, to say the least, curious, since his constituency stood to suffer mightily from the conversion to coal proposed by Consolidated Edison,
and local emission limitations, sought to make it permanent. He offered an amendment that would have eliminated emission limitations altogether for plants switching to coal under the energy emergency bill. Instead, such a plant would only have had to prevent violations of \textit{ambient air quality standards.}\footnote{23} Though Murphy attempted to conceal the intent of his proposed amendment by characterizing it as merely "technical,"\footnote{24} in fact it was an attempt to repeal the most fundamental

encouraged by the Federal Energy Office, and acquiesced in by EPA, of Con Ed's 726 megawatt Arthur Kill unit #30, located upwind (under prevailing wind conditions) from most of Murphy's district. New York's Implementation Plan reported annual average concentrations of particulates and sulfur oxides in the vicinity of this plant nearly double the national health protective standards, even when Arthur Kill was burning oil. Murphy's amendments would have allowed this conversion permanently, without scrubbing equipment to remove sulfur oxides.

In 1974, New York City's Department of Air Resources estimated that allowing mixed coal and high sulfur oil burning at Arthur Kill would increase sulfur oxide emissions 406\%, from 5291 tons/year to 26,770 tons/year and particulate emissions 5,086\%, from 188 tons/year to 9750 tons/year (even assuming 90\% efficient stack gas removal of particulates). \textit{BUREAU OF TECHNICAL SERVICES, NEW YORK CITY DEPARTMENT OF AIR RESOURCES, AN EVALUATION OF THE IMPACT OF USING COAL AND NON-COMFORMING RESIDUAL OIL AT ARTHUR KILL AND RAVENSWOOD,} (an analysis prepared for variance hearings held in March, 1974), at 4.


\footnote{24. Murphy always tried to cloak his proposed amendments in the guise of protecting the environment:} I would like to point out that the Clean Air Act was written and brought to this floor and passed by this committee, and that the committee has no intention of permitting a relaxation of those safeguards to insure clean air and maintain clean air... a relaxation that would go back in terms of turning the clock back on some of the air pollution problems we had, particularly in my city and in some of the other cities of the country.

I think the language, as we amended it in the committee, along with one further technical amendment which we will offer on the floor will protect and insure that the quality of air in the airsheds is maintained, and also that we do meet our responsibility to the problem of the production of energy and the proper use of fuels within our resources.

\footnote{119 CONG. REC. H11191 (daily ed. Dec. 12, 1973).}

After passage of Murphy's amendment, Representative Symington (D-Mo.) offered a counter-amendment that would have required compliance with state emission limitations at the end of the exemption period—in effect, an attempt to negate the Murphy change and to return to the original concept of the bill. In response, Murphy baldly asserted that his amendment would be equally effective:

Mr. Chairman, the two Murphy amendments say in one specific aspect that we want to maintain the national ambient air quality standards in every air shed, particularly in the air sheds over our cities where air in the past has been very poor. The difference in the amendments is this: We have State plans, and we have some States who will not change their air quality plans. We have an Administrator created under this act, and the Administrator may require certain specific types of control on power plants.

My amendment does this. It permits the Administrator to authorize noncontinuous emission standards—and when I say continuous emission standards, these are the heavy scrubbers that will be on these machines for 40 years that cost from $46 to hundreds of millions of dollars. They say we will permit intermittent or alternate types of mechanisms on our power plants but at the
policy decision underlying the 1970 Amendments—the decision to discard the unenforceable effort to regulate through air quality standards alone that had been the approach of the 1967 Act—and to require instead enforceable emission limitations for every polluter.

Except under the rare circumstances when one polluter is responsible for nearly all the pollution in a given area, it is virtually impossible to prove a causal connection between air quality and the emissions from a given source with sufficient certainty to win an enforcement case in court. Even when proof might be possible, enforcement would be utterly impracticable for most state air pollution control agencies because of the cost of the elaborate monitoring needed. Thus, Murphy's amendment struck at the heart of the entire program to clean the air. Nonetheless, in the hysteria prevailing in the House prior to the 1973 Christmas recess, the amendment was added to the bill. In the conference cooler heads prevailed, and the amendment was stricken.

The threat to the environment from relying on ambient standards as the principal enforcement tool is indeed obvious. More subtle, but equally dangerous, are the attempts by utilities and others to substitute

The fact is that for the limited period of this legislation—we hope this energy shortage is short-lived—the Symington amendment makes no ability to change the State plans. In effect, it will mandate heavy scrubbers, and extraordinary expenditures, particularly in the areas where we can put them at this time, and I would urge the defeat of the Symington language.

25. The House debated dozens of floor amendments after nearly a hundred others had been considered in Committee mark-up sessions. Representative Landrum (D-Ga.) expressed the mood of the House near the end of this effort when he moved to recommit the entire bill:

Mr. Chairman, during the entire 21 years that I have had the pleasure of serving in this body, this is the first time I have ever offered such a motion. But . . . It is now obvious that if we stay here long it would be—that the bill would not be recognizable and that it would be impossible of enforcement, and that no one in the country would know what was in it, what he had to do or when to do it.

26. § 119(b)(2)(C), amending the Clean Air Act, as contained in the conference version of S. 2589, § 201. The Conference Report was artfully opaque in discussing this change, perhaps to mollify Congressman Murphy and his supporters. Avoiding direct discussion of the purpose and effect of Congressman Murphy's revolutionary proposal, the report merely noted dryly that the rejected House provision would have conditioned a long-term suspension on the facility's agreement to "use the control technology necessary to permit the source to comply with national ambient air quality standards as expeditiously as possible." [emphasis supplied]. S. Rep. No. 93-663, 93d Cong., 1st Sess. (1973), at 80. The second Conference Report (issued after the Energy Emergency Act bill had been recommitted and re-reported from conference) contained an essentially identical discussion of this aspect of the various bills. See S. Rep. No. 93-681, 93d Cong., 2d Sess. (1974), at 85.

When the legislation was considered again in the spring (after the President vetoed the second conference version of S. 2589), Congressman Murphy did not offer his amendments, and they were not considered.
“dispersion enhancement techniques”—tall stacks and so-called “intermittent control systems” (“ICS”)
— for the emission limitations called for in the Amendments. Depending on the quantity and characteristics of emissions and the local topography, it is possible to dilute pollutants to meet virtually any ground level ambient air quality requirement by building a tall enough stack. ICS, in principle, involves the curtailment of emissions temporarily during periods of stagnant air, either through reduced production or temporary use of low sulfur fuel. In concept, ICS uses a combination of weather forecasting and extensive air quality metering in the vicinity of the facility to initiate the control action and assure that ambient standards are not violated. Although ICS has not been widely used heretofore, a number of states incorporated regulations into their Implementation Plans that gave credit against emissions limitations for extensions of stack height.

The environmental bankruptcy of the dispersion strategy, though intuitively obvious, has been increasingly documented in recent years as the damage caused by power plant pollutants has become better un-

27. The term “intermittent controls” was invented by smelter and utility industries to describe something that is actually not a control at all. Until recently, EPA had used the same term. When it decided to propose regulations to allow the use of ICS, however, the Agency adopted the more cosmetic term “supplementary control systems” (SCS), even though the proposed regulations patently did not confine the use of ICS/SCS to supplementing emission limiting technology or clean fuel. The Tennessee Valley Authority has invented a third term, “sulfur oxide emission limitations” (SOEL) to describe the same thing.

28. For instance, the Georgia state Implementation Plan reported that two major SO$_2$ sources would install immense stacks of 800 and 1,000 feet—the latter nearly as high as the Empire State Building—in order to meet ambient air quality standards in the Atlanta Air Quality Control Region. See Georgia state Implementation Plan, at 94. Such gigantic smokestacks are no longer unusual. Indeed, it has become clear that the utilities hope to use tall smokestacks as their main response to the sulfur oxide problem unless restrained by EPA or the courts. See, e.g., Press statement of the Tennessee Valley Authority, February 5, 1974, testimony of Aubrey Wagner, Chairman of the Board of Directors of TVA, and of A. Joseph Dowd, Vice President and General Counsel, American Electric Power Company, before oversight hearings of the Senate Subcommittee on Environmental Pollution, May 13, 1974. American Electric Power, a holding company for a number of Midwestern utilities, embarked on a $2.7 million advertising campaign in the spring of 1974, aimed, inter alia, at winning acceptance for tall stacks and ICS/SCS. See, e.g., N.Y. Times, May 30, 1974, at 50; June 12, 1974, at 60; July 31, 1974, at 60; Washington Post, June 18, 1974, at D16; July 10, 1974, at B20.

29. EPA cited only 3 examples of intermittent control systems in operation when it proposed a regulation to allow ICS. 38 Fed. Reg. 25698 (1973). The EPA Office of Stationary Source Enforcement reports that only a handful of sources nationwide operate such systems.

30. In an admittedly incomplete analysis, EPA concluded that some 15 states have such stack height formulas: Arkansas, Arizona, Colorado, Delaware, Georgia, Indiana, Iowa, Louisiana, Missouri, New Jersey, North Carolina, Oklahoma, South Carolina, Tennessee, Texas. EPA Memorandum from Control Programs Development Div. (Research Triangle Park, N.C.) to D. Kent Berry, Chief, Regulations and Guidelines Section (Wash., D.C.), May 22, 1973.
derstood. With respect to human health, the scientific community increasingly agrees that damage is related more clearly to the levels of acid sulfates than to concentrations of sulfur dioxide. Acid sulfates, unlike sulfur dioxide, are not emitted by polluting sources. Rather, they are the result of chemical transformation of sulfur dioxide in the atmosphere, occurring over a period of several days. Since in that period the air mass over a very large land area undergoes considerable mixing, high acid sulfate concentrations, unlike high sulfur dioxide concentrations, blanket entire regions relatively uniformly, depending on the total quantity of emissions of the precursor pollutants. Measures such as dispersion techniques that reduce peak sulfur dioxide concentrations without reducing the total atmospheric loading with the pollutant have virtually no effect on acid sulfate concentrations. Thus any system that does not reduce total sulfur dioxide emissions (as well as emissions of particulates) will be unavailing to protect the public health.

Similar findings have become accepted with respect to vegetation damage. Researchers in a number of countries, including the United

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31. In an EPA memorandum dated October 10, 1972, Carl M. Shy, M.D., Acting Director, Human Studies Laboratory Division, stated:

... we now have evidence that suspended sulfates, rather than gaseous SO₂ or total particulate matter, is [sic] the most reactive (toxic) component of atmospheric exposure to sulfur oxides.

A year later EPA reported in Health Consequences of Sulfur Oxides: Summary and Conclusions Based Upon CHESS Studies of 1970-1971 (Draft, August 15, 1973), at 21:

Our data indicates that adverse effects on elderly subjects with heart and lung disease and on panels of asthmatics, are being experienced even on days below the national primary standard for 24-hour levels of SO₂ and total suspended particulates. However, as is evident from the presentation given [above] these adverse health effects should be attributed to suspended sulfate levels rather than to the observed concentrations of SO₂ and TSP.

32. Because of the long residence period of sulfates in the atmosphere, the effects of emissions from any source occur over very large geographical areas:

The average residence time of sulfate in the atmosphere is probably measured in days. A large urban source of sulfur dioxide will therefore result in increased atmospheric sulfates being present many miles downwind. In regions where there are multiple urban sources of sulfur oxides, such as the northeastern United States, there has been a general buildup of ground level sulfates stretching many hundreds of miles. This includes rural areas which have appreciable suspended particulate sulfate concentrations despite relatively negligible sulfur dioxide levels. In view of the possible toxicity of suspended sulfates, it should be noted that emission control measures designed to disperse sulfur dioxide from point sources, e.g. tall stacks, will not have a major effect on areawide suspended sulfate levels despite producing a decrease in local ambient sulfur dioxide concentrations.


33. Findings of acid rainfall have been reported in England, Scotland, Scandinavia, and Brazil. Likens, Bormann & Johnson, Acid Rain, Environment Mar. 1972, at 33-40.
States, have found the greater atmospheric loading of sulfur dioxide reflected in increasingly acid rainfall, even in areas remote from industrial pollution. In its major report to the United Nations Conference on the Human Environment, held in Stockholm in 1972, the Swedish government stated that emissions of sulfur oxides occurring as far away as England and Germany could be expected, if continued, to result in a loss of 3 to 15 percent of the productivity of Swedish forests over the next 30 years. Acid rainfall poses a similar threat to the productivity of agricultural land. Internal EPA documents reveal that scientists in the Agency regard this problem as a critical one that is rapidly moving toward a crisis point in large areas of the nation. They fear that the natural chemically basic materials found in the soil will be exhausted neutralizing acid rainfall, causing a sudden increase in soil and stream acidity that will be disastrous for entire ecosystems. This problem can be mitigated only by reducing total sulfur dioxide and particulate emissions—a measure the Swedish government forcefully recommended in its United Nations study.

Intermittent control systems are also flawed by pervasive problems of reliability and enforceability. Even its proponents do not claim that ICS results in meeting air quality standards at all times and places, even though that is the requirement imposed by the Clean Air Amendments and even though this level of compliance is attainable using either clean fuels or properly designed and operated modular stack gas cleaning devices. Moreover, ICS imposes an impossible enforcement burden on already short-handed state and local agencies. Realistically,

34. Research by Cornell, Yale, and Dartmouth University scientists documents rising acidity in precipitation in New York, New Hampshire, Massachusetts, Connecticut, Maine, Vermont, and Rhode Island. Id. at 34.
35. For example, extraordinarily acid precipitation has been noted in experiments at the remote Hubbard Brook Experimental Forest in New Hampshire, far from major pollution sources. Id. at 37.
40. The Puget Sound Air Pollution Control Authority, one of the few state agencies with experience in overseeing such systems, estimates that it presently spends $160,000 to $200,000 per year to monitor the ICS now operating at American Smelting and Refining Company's Tacoma, Washington, smelter. (Telephone interview with Frank Dommkoebler, Air Pollution Control Officer, PSAPCA, Nov. 8, 1973).
the net effect of authorizing the use of ICS would be to allow a polluter to determine whether or not the air affected by his facility will meet air quality standards.

Although the policy objections to dispersion are overwhelming, the immense financial interests of utilities and smelters in obtaining approval for tall stacks and ICS have kept alive the issue of their legality. In the face of strong industry and Administration pressure, EPA's interpretation of the statute has not been consistent, despite pointed statements since passage of the 1970 Amendments from the authors that they intended to outlaw the use of dispersion techniques when they passed the law. In Oversight Hearings before the Senate Subcom-

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EPA's own estimates fall into the same range: "The additional cost of policing an ICS may run as high as $130,000 the first year and $50,000 per year thereafter." EPA briefing paper prepared for EPA conference on SCS [ICS], April 1973, Tab 6, at 3, published at 119 CONG. REC. S10958 (daily ed. June 12, 1973).

41. See Hearings Before the Subcomm. on Air and Water Pollution of the Senate Comm. on Public Works, 92d Cong., 2d Sess., 11 (February 16, 17, 18, and 23, 1972):

Senator EAGLETON. Didn't the act as we passed it in 1970 specifically require as part of implementation plans a program of emission limitations? . . . It is very clear at least to me that emission limitations are absolutely required by the law. Section 110(a)(2), in part says as follows and most important: "it includes emission limitations schedules and time tables for compliance with such limitations and such other measures," et cetera. But it includes emission limitations . . . . President Nixon said on March 10, 1970, "these abatement plans would cover areas both inside and outside designated control regions and could be designated to achieve any higher level of quality which the State might choose to establish. They would include emission standards for stationary sources of air pollution."

Finally, to complete the record on this point, I will read into the record a paragraph from page 12 of the report on the Clean Air Amendments of 1970 which reads as follows:

The committee bill would establish certain tools as potential parts of an implementation plan and would require that emission requirements be established by each State for sources of air pollution agents or combinations of such agents in such region and that these emission requirements be monitored and enforceable.

I don't think anything could be clearer than that.

In addition to Senator Eagleton's statements, the Senate Subcommittee Briefing Paper prepared for the Oversight Hearings pinpointed the discrepancies between EPA action and Congressional intent on the issues of emission limitations and dispersion techniques:

Numerous questions have been raised as to whether emission limitations are mandated by the law for individual emission sources. State agencies have been unable to get EPA to make a clear statement on the issue.

There is substantial evidence that the law, the Congress, and the Administration intended that emission limitations become the basis for any control strategy for the enforcement of air quality.

Emission limitations were called for in HEW guidelines published in May 1969:

"The heart of an implementation plan is its emission control strategy, which sets forth requirements for the prevention, abatement, and control of a given type of air pollutant and establishes a timetable for obtaining compliance with those requirements. Legally enforceable emission standards applicable to sources of that pollutant ordinarily will be a principal element of the emission
mittee on Air and Water Pollution held in January, 1972, the Administrator took the position that the Act prohibited the use of any method that did not reduce emissions. Four months later, EPA approved a

control strategy, but not necessarily the only ones. Other elements may include regulations pertaining to fuel use, rules for the location of new industrial plants and other sources of the pollutant, restrictions on open burning, plans for disposal of solid waste materials, and so on."

[quotations from statements of President Nixon and Secretary Finch that emissions standards would be employed.]

And, most important, the law itself states:

"Sec. 110(a)(2) * * * The Administrator shall approve such plan, or any portion thereof, if he determines that it was adopted after reasonable notice and hearing and that—

* * * *

"(B) it includes emission limitations, schedules and timetables for compliance with such limitations, and such other measures as may be necessary to insure attainment and maintenance of such primary or secondary standard * * *""

The April 7 proposed guidelines required emission limitations but the final guidelines did not. There is correspondence indicating that EPA would not require emission limitations from the States, but Ruckelshaus' testimony to the House Interstate and Foreign Commerce Committee seems at some points to indicate that such limitations are required. In a colloquy with Mr. Rogers the following occurred:

Mr. ROGERS. How are you going to effect anything or carry it out unless you know how to bring about a limitation of the emissions? Here we state it first in the law and then it is left out of your guidelines.

Mr. RUCKELSHAUS. I do not think it is left out.

Mr. ROGERS. Then the intent is that they shall; is that correct?

Mr. RUCKELSHAUS. It is certainly so stated in the regulations. Hearings on the Implementation of the Clean Air Amendments of 1970 Before the Subcomm. on Air and Water Pollution of the Senate Comm. on Public Works, 92d Cong., 2d Sess. 309-10 (1972). See also id., at 180, 207-09, 244, 268-71.

42. On February 18, 1972, Administrator Ruckelshaus testified as follows before the Senate Subcommittee on Air and Water Pollution on the issue:

The problem is that whenever we adopt a control strategy, the purpose of that control strategy is to reduce emissions in that particular air quality region so as to meet the ambient air quality standard. What we mean by emission limitations is really emission reduction so that anything that reduces, including the transportation controls that Senator Randolph was concentrating on, the total emission in an air quality control region so as to meet the air quality standards. As I read the act, I have to approve as a control strategy that in fact complies with the act.

All of these control strategies [sulfur oxide scrubbers, clean fuels, coal gasification, plant shutdown etc.], if they in fact reduce the emissions to below the ambient air quality standards would have to be acceptable by our agency and under my definition of emission limitation, all of these things would be an emission limitation and acceptable to us.

Senator EAGLETON. But the point I guess I can't get across to you and up to now you have not been able to get across to me, is the fact that the final August 14 guidelines do not require as part of the implementation plan an emission control strategy which was required in the 1967 act, which was required, I can assure you, in the 1970 act because I participated in the drafting of it and in the final conference meetings on it, was required in your April 7 guidelines, was required in your June 28 guidelines, was spoken about by President Nixon in his environmental message, was endorsed by the Secretary of HEW, Mr. Finch.
number of state Plans that relied on the use of tall stacks as a means of attaining National Standards. Two months after that, the Administrator rejected the use of ICS on the grounds that it had not been proven reliable. Finally, slightly more than a year later, the Agency again switched positions, this time proposing to allow the use of both ICS (now renamed "Supplementary Control Systems" or "SCS") and tall stacks. (Though these regulations were never promulgated, it ap-

All of these at different points of time talk about emission limitations but your final guidelines do not.

*Id.* at 265 (emphasis supplied).

Despite Administrator Ruckelshaus’ claim that only strategies that reduce emissions would be acceptable to EPA, a legal memorandum submitted by the Agency a month later once again revised EPA’s official position to open the door to future use of “closed loop” (ICS) systems:

This language seems to clearly indicate that by using the words “emission limitation” Congress meant to include all types of requirements which resulted in reductions of emissions. The key to acceptable requirements is that they be susceptible of monitoring and enforcement. It is this criteria [sic] that EPA will apply to all methods of air pollution control submitted as part of implementation plans. The regulations are clear that the plan must provide for the attainment of the standards. Measures adopted by the State to achieve that standard must be those which will be effective, and which both the State and EPA can enforce. Accordingly, the so-called “closed loop” or any other requirement respecting emissions will be evaluated against this criteria [sic]. If the criteria are not met, that portion of the control strategy cannot be approved. The fact that in the past a strategy has not been used or has not been used successfully does not of itself preclude the use of such a strategy now if it can be shown to meet the test.

*Id.* at 315.


44. The EPA position was set forth on July 27, 1972, as follows:

... At this time, it [intermittent or supplementary controls] is not considered an acceptable substitute for permanent control systems for attaining and maintaining national standards. Experience with systems employing intermittent process curtailment indicates that although air quality is improved, violations of ambient air quality standards still occur. Additional experience with these systems may, however, in specific cases improve their reliability.


45. 38 Fed. Reg. 25697 (1973). The Agency cited as grounds for its newest reversal the alleged success of three sources using ICS/SCS:

Over the past year, EPA has continued to assemble and evaluate available data on the development and use of supplementary control systems. EPA has examined published reports and statements 1-3 containing information on experience with supplementary control systems at the Tennessee Valley Authority’s Paradise Steam Plant and the American Smelting and Refining Company copper smelter at El Paso, Texas. In addition, EPA personnel have visited these facilities and have discussed the use of supplementary control systems with air pollution control officials, citizens’ groups, and industry representatives. The available data show a substantial and consistent improvement in the performance of supplementary control systems in the recent past. Effective and reliable operation of a supplementary control system often can be enhanced by increasing the stack height beyond what would normally be considered good engineering practice.

*Id.* at 25698. For a critique of EPA’s claims, see Comments on EPA’s Proposed Rule-making, submitted by the Natural Resources Defense Council, Feb. 14, 1974, published at 120 CONG. REC. S10419-23 (daily ed. June 12, 1974).
pears the Agency has decided to implement them on a case-by-case basis without formal rule-making.)

Meanwhile, the Natural Resources Defense Council, joined by a Georgia citizens' group and two private citizens, was bringing the issue to a head before the Fifth Circuit Court of Appeals. These petitioners asked the court to overturn the Administrator's approval of the Georgia state Plan, which contained a regulation granting polluters credit against emission requirements for installation of tall stacks. The court, in a strongly worded opinion written by Judge Wisdom, held that Congress had set its face against dispersion techniques when it passed the Amendments. Dispersion enhancement was to be used, if at all, the court held, only if all available emission limitation measures had been adopted, and the state was still unable to meet the deadlines of the Act for attaining National Air Quality Standards. Since the court explicitly noted that it considered permanent curtailment or cessation of plant operations to be "available emission limitations," it seems to have left no room for dispersion measures.

Even before this decision was rendered, however, industry and the Administration had been moving forward with attempts to write into the Act an explicit authorization for the use of dispersion techniques. Again acting as spokesman for the utility industry, Congressman Murphy introduced an amendment to the Energy Emergency Act bill that would have accomplished this purpose. Once again, however, it was

46. NRDC v. EPA (Georgia), 489 F.2d 390, 6 ERC 1248 (5th Cir. 1974), cert. granted sub nom. Train v. NRDC, 95 S. Ct. 39 (1974).

47. Id. at 410, 6 ERC at 1261-62.

48. The court defined emissions limitations in a footnote as follows:

For our purposes in addressing the issues in this case, in particular the third objection raised by the petitioners, it is necessary to explain three terms used to define different categories of the kinds of "enforceable controls" which may be employed to effect attainment of ambient air standards. The first, "emission standards", refers to standards setting specific quantitative limits on the amounts given individual sources may emit into the air. The second, "emission limitations", is an inclusive term referring to any type of control to reduce the amount of emissions into the air. This includes, of course, "emission standards", but it also includes a number of regulatory devices. These range from regulations directing sources of emissions to cease or curtail operations to regulations specifying limits on the sulfur content of fuel that fuel-burning emission sources may burn; "transportation controls" designed to reduce the use of motor vehicles, either through the development of mass transit systems, or through traffic control devices, commuter taxes, gasoline rationing, or parking restrictions; and the imposition of emission charges or other economic incentives aimed at inducing parties to reduce their emissions voluntarily. Both the terms "emission limitations" and "emission standards" are used at various points throughout the 1970 Amendments. See, e.g., 42 U.S.C. §§ 1857c-6(a)(1), 1857c-6(d)(1), 1857c-7(b)(1), 1857h-2(a)(1), 1857c-5(a)(2)(B) (1970).

Id. at 394, n.2, 6 ERC at 1249 n.2.

excised by the conference committee even before the bill died under
the President's veto.\textsuperscript{50} Less than a month later, however, newspaper
stories began to appear suggesting that the Administration would ask
Congress again, in its consideration of general amendments to the Act,
to provide explicit authorization for dispersion;\textsuperscript{51} rumors also spread
that EPA's proposed "SCS" regulations, which had been delayed while
the energy bill was being considered, had been killed by the Office
of Management and Budget on the grounds that they were too restric-
tive.

When the Administration's proposed amendments finally were
submitted,\textsuperscript{52} they revealed that even EPA's position favoring "interim"
use of dispersion techniques was not acceptable to the Administration.
In a highly unusual move, Administrator Train transmitted proposals
incorporating two different intermittent control/tall stack policies. EPA
endorsed an amendment to the Act which would, for the first time, ex-
plicitly authorize the use of "alternative or intermittent control mea-
sures which the Administrator determines are reliable and enforce-
able" as interim measures during an extended period (until 1980) while coal-converting plants installed "permanent controls."\textsuperscript{53} In
addition, Mr. Train transmitted, without EPA endorsement, language
proposed by "other agencies" that would amend section 110 of the Act
to authorize use of such measures in permanent satisfaction of air pollu-
tion requirements.\textsuperscript{54}

The final energy emergency legislation (ESECA) reflected, rather
than resolved, the tense confrontation on the dispersion issue. Mention
of tall stacks is conspicuously, and purposely, absent in the Act, reflect-
ing a congressional decision to leave the issue as decided by the Fifth
Circuit. The statute authorizes EPA to approve the use of "interim
requirements" on the few facilities authorized by the Act to convert
during the period before full compliance with state emission limitations,
in order to prevent violations of National Ambient Air Quality Stan-
dards, so long as they are "enforceable measures."\textsuperscript{55} The conference
committee report explains that this would allow EPA to require the use
of ICS as an interim measure but only if the Administrator makes a

\begin{itemize}
\item \textsuperscript{50} S. 2589, 93d Cong., 2d Sess. (1974) (proposed § 119 of the Clean Air Act).
\item \textsuperscript{51} N.Y. Times, Mar. 11, 1974, at 58, col. 1.
\item \textsuperscript{52} 4 Env. Rptr-Curr. Dev. 2004 (1974). The proposals were submitted on Mar.
22, 1974.
\item \textsuperscript{53} § 8 of the proposed bill (proposed § 119(a)(2) and (b)(4) of the Clean Air
Act).
\item \textsuperscript{54} Unnumbered proposed section on intermittent controls (proposed § 110(h) of
the Clean Air Act).
\item \textsuperscript{55} § 119(d)(2)(A) of the Clean Air Act, as added by § 3 of the ESECA.
\end{itemize}
finding that intermittent controls "are enforceable and will provide the necessary assurance pertaining to attainment and maintenance of the national primary air quality standards."

Senator Muskie, for one, made clear his position on how this decision should be made:

It may be a non-sequitur to suggest that intermittent control strategies are enforceable by EPA. An analysis of EPA's monitoring capability suggests that monitoring is severely limited. I have serious doubts about the viability of intermittent control strategies, [about] whether or not EPA has the capacity to monitor the ambient impact of emissions from coal conversions.

Muskie detailed these doubts with a barrage of material, including internal EPA memoranda, describing the unenforceability of intermittent systems. He also pointedly noted that the permission given for ICS in the energy legislation was not to be considered a precedent for the future.

III

NON-DETERIORATION

The Sierra Club raised a third major issue having implications for stationary sources of pollution when it brought suit in 1972 to compel the Administrator to disapprove state Implementation Plans that did not provide for preventing significant deterioration of air quality. EPA, and its predecessor NAPCA, had adopted a Janus-headed position regarding this question since the congressional deliberations on the 1967 Act. In 1970, Congress considered writing a specific non-degradation requirement into the federal Act, but was dissuaded by the protestations of NAPCA that explicit language was unnecessary because the policy was already contained in § 101(b) of the Act as it stood. Act-

56. 120 CONG. REC. H4899, H4902 (daily ed. June 6, 1974).
57. 120 CONG. REC. S10409 (daily ed. June 6, 1974). There seems little question that Senator Muskie contemplated a decision by EPA on the enforceability of ICS generally, as well as at each candidate facility, since he returns repeatedly to the question of whether EPA has the monitoring and other resources necessary to undertake enforcement of a number of ICS installations as well as others of the generic objections to intermittent controls. At this writing, it appears that EPA will not honor this intent but rather concentrate on the enforceability questions that relate to using ICS at a particular facility.
58. 120 CONG. REC. S10410-25 (daily ed. June 6, 1974).
59. Id. at S10409.
61. Clean Air Amendments Hearings, supra note 7, at 1517. Robert Finch, then Secretary of HEW, submitted a statement to the same effect, id. at 132-33, and his Un-
ing under this section in the 1967 Act, NAPCA had already promulgated "guidelines" endorsing the non-deterioration concept in 1969. EPA reiterated this position in promulgating its National Air Quality Standards under the 1970 Amendments.

When it came to promulgating regulations instructing states on the nuts and bolts requirements for Implementation Plans, however, EPA waffled, stating obliquely that its regulations were not intended to discourage state Plans from preventing significant deterioration but stopping well short of requiring specific regulations in the plans protecting against deterioration. To observers, it seemed clear that the Agency was caught in a dilemma of its own making; on the one hand, in order to avoid specific legislative language requiring it to prevent deterioration, it had represented to Congress that it already was under such a legal obligation, while on the other hand it was unwilling to face the political implications of translating its representations into action. Only this interpretation appears to explain the tone of hurt outrage with which the Agency greeted the district court's decision to take the Agency at its word. The district court's opinion was affirmed unanimously per curiam in the District of Columbia Court of Appeals and again by an evenly divided Supreme Court. Months later, the Agency still persisted in denying that the issue had been definitely settled.

dersecretary, John Veneman, underscored his superior's statement under questioning by the Senate Subcommittee, id. at 143, 159. For a fuller discussion of this legislative history, see Note, supra note 60, at 818-22.

62. Part I of the Guidelines, which was entitled "Requirements of the Air Quality Act," specifically stated:

[An explicit purpose of the Act is "to protect and enhance the quality of the Nation's air resources" [emphasis added]. Air quality standards which, even if fully implemented, would result in significant deterioration of air quality in any substantial portions of an air quality region clearly would conflict with this expressed purpose of the law.

DEP'T OF HEW, NATIONAL AIR POLLUTION CONTROL ADMINISTRATION, GUIDELINES FOR THE DEVELOPMENT OF AIR QUALITY STANDARDS AND IMPLEMENTATION PLANS, § 1.51 at 7.


64. The EPA Guidelines for State Implementation Plans, promulgated August 14, 1971, state as follows in Subpart A's General Provisions, § 420.2 Stipulations:

Nothing in this part shall be construed in any manner:

(a) To encourage a State to prepare, adopt, or submit a plan which does not provide for the protection and enhancement of air quality so as to promote the public health and welfare and productive capacity.


65. In the preamble to the Agency's proposed Regulation for Prevention of Significant Air Quality Deterioration, the Administrator stated:

In EPA's view, there has been no definitive judicial resolution of the issue whether the Clean Air Act requires prevention of significant deterioration of air quality. When the issue was presented to the Supreme Court, the Court was equally divided. The Court's action had the effect of permitting to stand the judgment of the Court of Appeals for the District of Columbia Circuit, which was entered in the procedural context of the issuance of a preliminary injunction.
It proposed regulations which did not conform fully with the court decisions, forecast doom if the decision were implemented, and, finally, utilized the time-tested bureaucratic tactic of delay.

At this writing, it seems likely that EPA will ultimately attempt to implement the Sierra Club decision with regulations that require a three-tiered air quality zoning system but leave the decisions about zoning entirely to the states. If the regulations proposed in the summer

In the absence of a definitive judicial decision on the issue, the Administrator adheres to the view that Section 110 of the Clean Air Act requires EPA to approve State implementation plans that will attain and maintain the national ambient air quality standards, and that the Act does not require EPA or the States to prevent significant deterioration of air quality. The proposed alternative regulations set forth herein would establish a mechanism for preventing significant deterioration pursuant to the preliminary injunction issued by the District Court.


67. The Agency has consistently fueled the fires lit by industry and other critics of the decision with claims that faithful implementation of the Court's opinion would halt economic growth. See, e.g., 38 Fed. Reg. 18987 (July 16, 1973).

The most thorough-going study of the problem to date, however, flatly contradicts the assumption that continuing rapid increases in pollution are the price that must be paid for prosperity. As noted previously (see text accompanying note 6, supra), the primary and most rapidly growing component of the sulfur oxides pollution problem in the United States is the production of energy from fossil fuels. Over the past two years, the Ford Foundation's massive Energy Policy Project has carefully studied the relationship between the consumption of energy and economic growth. Examining three different "scenarios" for the future—growth at the recent historical rate ("historical growth"), growth constrained to about half that rate by energy conservation measures ("technical fix"), and growth reduced to zero after 1985 by more basic changes in energy consumption practices ("zero energy growth")—the EPP concluded that we could have economic growth and a high quality of life under any of the three scenarios:

Our technical fix scenario shares with historical growth a similar level and mix of goods and services. But it reflects a determined, conscious national effort to reduce demand for energy through the application of energy-saving technology. Our work so far has revealed that slower rate of energy growth in technical fix—about half as high as historical growth—permits more flexibility of energy supply, but still provides a quality of life at home, travel convenience, and economic growth that, to our minds at least, differs little from the historical growth scenario [emphasis in last sentence supplied].

* * *

Zero energy growth is different. It represents a real break with our accustomed ways of doing things. Yet it does not represent austerity. It would give everyone in the United States more energy benefits in the year 2000 than he enjoys today, even enough to allow the less privileged to catch up to the comforts of the American Way of Life. It does not preclude economic growth. [emphasis in last sentence supplied].


68. The Supreme Court's opinion came down on June 11, 1973. Though EPA published proposed regulations for implementing the decision on July 16, 1973, as of August 1974, more than a year later, the Agency still had not promulgated any final regulations.
of 1973 are any indication of the Agency's thinking, it is extremely unlikely that EPA's implementation of the Sierra Club decision will slow down, let alone stop, increased atmospheric loading with sulfur oxides.\textsuperscript{69}

IV

LESSONS FROM THE FIRST FOUR YEARS

This history of the implementation of the Clean Air Amendments with respect to stationary pollution sources is the story of a major, if largely unnoticed, political issue of our time. It involves the question of whether several of the most powerful economic interests in the nation will be regulated effectively in the interest of protecting the public health and welfare. In passing the Amendments, Congress employed a relatively novel approach—a cooperative state-federal regulatory procedure, operating under fixed time deadlines—to hasten the adoption of technology that would allow the use of coal to generate power in a way that would not endanger the public. Since it now seems clear that in many places the deadlines will not be met, it is appropriate to assess the causes in order to avoid similar mistakes in the future.

First of all, contrary to some claims, the fault does not lie in the alleged "rigidity" of the Amendments. One need only examine the history of implementing past legislation to conclude that it is more likely that the Amendment's deadlines are largely responsible for any progress that has been made to date. The specific deadlines written into the Amendments were a response to Congress' rising frustration (shared by an increasing number of private citizens) at the undue deliberateness of the administrative process. Nothing that has occurred in the interim has done anything to lessen that frustration; to the contrary, as the foregoing history suggests, there is every reason for heightened concern.

To be useful for future policy formulation, an explanation of the failure to force technology development as expected must rest on several levels. At the most basic level, the cause is the utility and coal industries' refusal to commit themselves to the development of stack gas control technology. This refusal must be explained by ideological as well as financial factors. It appears that the installation of stack gas cleaning devices has in the past not been in the financial interests of the utilities. Scrubbers, unlike additional generating capacity, do not produce operating revenue for the company. Until recently, the cost of installing scrubbers apparently could not be made up by the differ-

\textsuperscript{69} See Comments on EPA's Proposed Rulemaking, submitted by the Natural Resources Defense Council, supra note 66.
ence in cost between coal and oil or gas.\textsuperscript{70} Furthermore, with rare exceptions, state public service commission rules do not allow the costs of such capital equipment to be automatically "passed through" to the consumer in the form of higher electric rates while they do allow automatic pass-through of the additional costs of lower sulfur fuel.\textsuperscript{71}

Economics is not, however, the whole story. Despite the fact that higher fuel costs can usually be passed on automatically to the consumer, most utilities nonetheless fought state regulations requiring cleaner fuels. Likewise, although it has been obvious since the sixties that the coal industry had an economic interest in finding environmentally acceptable ways of using coal, the industry concentrated its attention on fighting environmental restrictions rather than on researching stack gas cleaning and other methods that would have largely dissolved the objections of public health authorities and public groups to the use of coal. Meanwhile, it witnessed massive conversion from coal to oil,\textsuperscript{72} cutting drastically into the market for its product. It saw the railroads scrap coal hauling cars and many utilities discard coal handling equipment, rendering the market all but irrecoverable.\textsuperscript{73} Thus, while the utilities and coal companies may cite economic factors to explain their inaction, much of it must be blamed on an extreme conservatism that remains more willing to resist measures beneficial to the public health than to develop means to use coal without threatening public health and welfare. Whatever the explanation, the fact is that neither utilities, supposedly already under charter to operate in the public interest, nor coal companies, for practical purposes public utilities, have been willing to take into account the public interest in protecting human health and the biosphere. Thus, it seems clear that new means must

\textsuperscript{70} This has been commonly accepted for some time. With the price of oil likely to stabilize considerably above its pre embargo levels and the price of low sulfur coal also being driven up rapidly because of increased demand (see \textit{Hearings on H.R. 13834: The Standby Energy Emergency Authorities Act Bill Before the House Comm. on Interstate and Foreign Commerce}, 93d Cong., 2d Sess., 218 et seq. (Apr. 3, 1974) (Testimony of Richard E. Ayres), it seems possible that scrubbing high sulfur coal may become economically attractive.

\textsuperscript{71} \textit{SCRUBBER HEARINGS, supra} note 5, at 56.

\textsuperscript{72} John N. Nassikas, Chairman of the Federal Power Commission, in Senate hearings on what became the Senate version of the Energy Emergency Act bill, S. 2589, stated: Since 1965, there have been substantial conversions from coal to oil, requiring the consumption of an estimated 228 million barrels per year. \textit{Hearings on S. 2589 Before the Senate Comm. on Interior and Insular Affairs}, 93d Cong., 1st Sess., 124 (1973).

be found to force these entities to recognize and deal with the broader public effects of their operations.

Senator Jackson (D-Wash.) has at times suggested one method of doing this—nationalizing the energy companies. Replacing profit-oriented private boards of directors with public directors does not necessarily ensure operation in the public interest. But nationalization, if properly performed, could remove the narrowly conservative economic and political bias in these companies that has been manifested both in their approach to energy production and pollution control research and development.

The government itself, particularly the Nixon Administration, must also share the blame for the failure to perfect and commercialize more environmentally acceptable ways of using fossil fuels. Underlying the limited success of the entire Clean Air Amendments’ program has been this Administration’s unwillingness to commit the funds acknowledged by everyone to be necessary to develop the needed technology rapidly. The Administration has never, in all the years since the Amendments were passed, asked for more than one-third the funds NAPCA stated in 1970 would be needed for research and development on sulfur oxides control technology.

74. During conference consideration of the Emergency Energy Act bill, S. 2589, Senator Jackson, angered by Administration and oil industry opposition to the excess profits provisions, remarked bitterly to reporters: “Unless we make rational moves now we are going to see in 1974, the most punitive legislation ever adopted by Congress affecting any one industry.” Washington Post, Dec. 22, 1973, at 4, col. 2. Among the forms such legislation might take, he suggested, could be placing public members on the boards of directors of the energy companies or outright public ownership.

75. This underfunding was noted in remarks by Senator Randolph on the Senate floor. 118 Cong. Rec. 3429-30 (daily ed. Apr. 5, 1972). The Administration and EPA have hailed the $215 million increase in EPA’s FY 1975 budget as evidence of renewed vigor in pollution control activities, but Senator Muskie forcefully pointed out the cosmetic nature of this “increase”:

EPA’s budget appears to have received a $215 million dollar increase this year. But the real increase in basic programs is a mere $16 million dollars. The budget is padded:

The so-called energy increase is $168.5 million, most of which the Office of Management and Budget has indicated will be transferred to an Energy Research and Development Agency.

$16.7 million of the increase is simply a bookkeeping transition to pay GSA for rent.

$6.0 million for solid waste is carryover money given last year by Congress.

$7.5 million of the increase is for programs not yet authorized. This totals $198.7 million of the apparent $215 million increase.

This is a mere 3 percent increase. Last year, the Gross National Product rose 11.6 percent. The proposed increase does not even keep pace with the impact of inflation. These figures justify grave doubt about the adequacy of funds for environmental programs.

Opening Statement of Senator Edmund G. Muskie, Hearings on Environmental Protection Agency’s Budget Request for FY 75 Before the Subcomm. on Environmental Pollution of the Senate Comm. on Public Works, 93d Cong., 2d Sess. (1974).
Finally, four years of experience with the Clean Air Amendments suggest the need for considering some changes in the 1970 Act. For clarity, this can be discussed under three general headings: (1) the underlying scientific basis for the regulatory scheme, (2) the basic choices of social and economic policy made in 1970, and (3) the need for new regulatory tools to accomplish the Act's policy goals.

1. The Underlying Scientific Basis.

When the Clean Air Amendments were debated, one unanswered scientific question about how air pollution affects the biosphere became extremely important in the deliberations of the Congress: whether or not there were "threshold" concentrations of pollutants below which they were harmless to life. At the time, much of the existing data was consistent on its face with either view since it typically was in the form of experiments in the field or laboratory which demonstrated damage to a given organism at a given concentration.76 Among scientists independent of organizations with a financial self-interest, however, the threshold view has never enjoyed great acceptance. For example, even as the Clean Air Amendments were being debated, Dr. Middleton, then head of NAPCA, was extremely reluctant to identify for Senator Muskie's subcommittee a health effects threshold for sulfur oxides, on the grounds that the known information probably reflected more the sensitivity of existing measuring instruments than any real threshold of damage.77 One of the major reasons for skepticism towards the threshold approach has been the fear of cumulative effects caused by continued atmospheric loading with pollutant emissions. Recent scientific evidence, especially in the studies detailing the phenomena of pollution-caused acid sulfates contamination and acid rainfall, tend to confirm these fears.78

However, the Clean Air Amendments leaned heavily toward the threshold approach. In sections 108-11079 and section 112,80 the statute adopts the threshold theory. In sections 108-110, it directs EPA to set National Ambient Air Quality Standards by reference to the concentrations at which injury to health and welfare has been demonstrated, and mandates state Implementation Plans to reduce emissions sufficiently to

76. There were important exceptions. For example, the "criteria document" published by EPA to identify the scientific basis for the sulfur oxide standard indicated that addition of sulfur dioxide to the atmosphere up to the concentration allowed by the National Secondary Ambient Air Quality Standard for this pollutant would reduce visibility to 12 miles, though it is as much as 100 when the air is free of this pollutant.
77. Clean Air Amendments Hearings, supra note 7, at 1490.
78. See note 5 supra.
restore air quality to these levels. In section 112, it directs the Administrator to promulgate emission limitations sufficient to prevent endangering the public health from emissions of “hazardous pollutants,” such as mercury, asbestos, and beryllium. In section 202, Congress wrote into the statute its own judgment about the threshold levels that produce damage from pollutants emitted by automobiles and required specific emissions limitations for new automobiles, designed to prevent concentrations exceeding the threshold.

Two sections of the Act do discard the threshold approach. Section 111 calls for emissions limitations for all new stationary sources of pollution, based upon the best available technology. And section 101 requires EPA to prevent significant deterioration of air quality, regardless of the existing ambient air concentrations of pollutants. But even these two sections do not fully implement the implications of the non-threshold theory. For if all atmospheric loading produces damage to the biosphere, this implies that the law should not allow the unpenalized emission of pollutants, which new source performance standards and non-deterioration both do.


The law's endorsement of the ambient air quality threshold theory has important unfortunate social and economic policy implications. Setting National Ambient Air Quality Standards implies that lesser concentrations are harmless, which encourages the belief that as long as the Standards are not violated, industry should be allowed free use of the air to dispose of wastes. Thus, the threshold approach tends to sanction an ill-considered subsidy from the public to polluting industries. The air's assimilative capacity is a valuable resource, held in common by the public. For the private polluter, the right to use some of this resource without charge represents an important monetary subsidy from the taxpayers in general. Even if, adopting the threshold theory, one assumes that a certain amount of pollution can be tolerated without adverse health and welfare effects, it would seem a dubious public policy to grant such a subsidy without careful governmental consideration.

And if, as the best scientific information now suggests, any at-

85. The fact that this subsidy is distributed very unevenly to different economic groups makes it all the more suspect. As noted previously, the electric power industry is one of the most important beneficiaries. The primary metal smelting industry is an-
mospheric loading produces harmful effects, allowing industries to appropriate some of the air resource without charge amounts to a double subsidy, paid partly in lost revenue to the government and partly in a degraded environment and increased disease and death. One cannot help asking whether, if the true dimensions of these subsidies were made known to the public by forcing industries to internalize these costs, people would not consume considerably fewer of the products produced with their aid.

One of the clearest and most important policy choices of the drafters of the Act was the decision to jettison the 1967 Act's attempt to regulate directly with ambient air quality standards and to substitute emission limitations, derived from ambient air quality measurements, in its place. It was expected that this would be a more enforceable scheme that would encourage the development of new, more effective, and less expensive means of controlling emissions. The results have not lived up to expectations. By retaining ambient air quality as the measure of success for state Implementation Plans, the Act has encouraged the development of extremely innovative means of minimizing the costs of reducing ambient concentrations of pollutants without reducing emissions. The drive to legitimize tall stacks and intermittent controls, detailed previously, is an example of this phenomenon. Another example, less noticed but perhaps more insidious, is the increasingly refined use of "diffusion modelling," which is corroding the distinction between the air quality and emission limitation approaches that is a hallmark of the 1970 legislation. In its early regulations, EPA encouraged the states to establish uniform emission limitations for categories of similar sources, such as power plants or copper smelters, through its "example region" approach. States were encouraged to

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other. For example, the copper smelting industry alone emitted over four million tons of sulfur dioxide in 1970. Lead and zinc smelting industries also produce massive quantities of this pollutant. The aluminum smelting industry is also an important beneficiary, since it uses tremendous quantities of electric power and also produces massive emissions of fluorides into the atmosphere. Perhaps the most subsidized industry, however, is the automobile industry, which is responsible for 66% of all the emissions of carbon monoxide, 54% of the emissions of hydrocarbons (an important component of photochemical smog), and 47% of all the emissions of nitrogen oxides. OFFICE OF AIR PROGRAMS, EPA, SUMMARY OF NATIONWIDE EMISSION ESTIMATES OF AIR POLLUTANTS (May 1971).

86. Public response to the increased prices of energy in the wake of the "energy crisis" would seem to suggest that considerably lessened consumption could be expected. The reduced consumption which has followed on the increased prices of heating fuel oil, electricity, and gasoline, has been predicted in the economic literature for some time. See, e.g., ASSOCIATION OF THE BAR OF THE CITY OF NEW YORK, ELECTRICITY AND THE ENVIRONMENT 170-173 (1972).

determine the emission reductions that would be necessary to restore the air in the most polluted portion of a region or state to the purity of the National Ambient Air Quality Standards, then apply the same limitations to all the members of the category within the region or state. This approach was consistent with the uncertain state of knowledge about how far the pollutants travelled, how they affected the biosphere, and how accurately ambient concentrations could be measured: it was, to use a term often adopted in connection with public health risks, "conservative." Given our present understanding, this conservatism appears to have been thoroughly warranted.

Since then, however, EPA, prodded by a number of large polluting sources, has developed increasingly sophisticated computer routines for "predicting" the ambient concentrations expected to result from any given quantity of emissions from a particular plant. Though the accuracy of these models has received little empirical testing, they are increasingly used to argue for emission limitations tailored to each individual polluter. When based on such computer modelling, emission limitations become essentially vestigial elements in a system that amounts to regulating each plant directly through ambient air quality standards. With the onset of the "energy crisis," EPA has been prodded by the Federal Energy Administration and major polluters such as the Tennessee Valley Authority into employing this technique to eliminate the environmental "overkill" in the state plans.

By the same token, the Act has largely failed to call forth innovative approaches to reducing emissions. While polluters' response to the state Implementation Plans has been to seek new ways to meet ambient standards, there has been no concomitant effort to develop new technology in response to the new source performance standards, which were intended to require the application of "best available control technology" to new stationary sources. EPA has apparently successfully used this authority to require new sources using eastern coal to install sulfur dioxide scrubbers. But it is no surprise that more efficacious

88. The Energy Supply and Environmental Coordination Act, relying on the availability of this technique, directs EPA to encourage the states to reconsider their Implementation Plans with an eye to loosening emission limitations that might result in reducing emissions below the levels needed to meet National Ambient Air Quality Standards. § 4, ESECA.

89. A lugubrious misappellation for regulations that would provide a margin of safety in the protection of public health. Environmental critics of this process have described it as eliminating "underkill" to indicate their distaste for the exercise.

90. EPA's new source performance standards for steam electric power plants, which would require the installation of scrubbers on new power plants using high sulfur coal, were recently upheld when challenged by member companies of the American Electric Power system. Essex Chemical Co. v. Ruckelshaus, 486 F.2d 427 (D.C. Cir. 1973), cert. denied, 416 U.S. 969 (1974).
means of control have not been developed by industry since the company that develops a new technique may merely be forcing itself and the rest of its industry to spend large sums installing it throughout the industry.\textsuperscript{91} Thus, EPA, using tax dollars, has been forced to bear a disproportionate share of the cost of developing new control devices.

This discussion suggests that it may be time to rethink certain elements of the 1970 control scheme, particularly those that rely on the use of ambient air quality as the measure of compliance with the law. The Clean Air Amendments represented a compromise between those still wedded to the ambient air quality approach and those who wanted to require the installation of best available control technology across the board, as is obvious from the adoption of the new source performance standards. The weaknesses of using ambient air quality standards are now manifest, but it has also become apparent that the best technology approach is not entirely satisfactory either. Yet, it would seem extremely unwise to scrap these regulatory systems. Without ambient air quality standards, densely populated areas could become uninhabitable, even if all sources installed the best available control technology as more and more sources cluster around them. Likewise, without a requirement for best available control technology, polluters might defile areas that presently have large reserves of air better than the National Air Quality Standards.\textsuperscript{92}

3. \textit{The Problem of Effective Regulatory Tools.}

Simplicity and the choice of the proper forum for deciding an issue are crucial to the success of any regulatory scheme. The fewer the issues of fact that must be proven in each enforcement action, the less likely the regulated industry will risk noncompliance. Questions of science and fact, to the extent possible, should be resolved at the most general and highly visible level of government, rather than left to the vagaries of case-by-case adjudication by court or administrative agency. Where information related to a specific source is necessary, the source itself should, with appropriate sanctions to assure accuracy, bear the financial burden of gathering it. In some important respects, the Amendments, as administered thus far, violate these maxims and thus fail to maximize compliance. In a regulatory system based on ambient

\textsuperscript{91} Ironically, the new source performance standards for steam electric plants may be one of the important factors motivating such eastern power systems as American Electric Power to contract for western coal; indeed, the trend towards western coal may be the major "innovation" in response to the new source standards.

\textsuperscript{92} This tendency should be curbed by the operation of the nondeterioration decision. \textit{Prevention of Significant Air Quality Deterioration}, 39 Fed. Reg. 42510 (1974). See discussion in text accompanying notes 60-69 \textit{supra}. 
air quality, four issues of fact could be claimed relevant to any enforce-
ment action: (1) what ambient air quality is necessary to protect the
public health and welfare, (2) what emission limitations are necessary
to attain the desired air quality, (3) whether a polluter is complying
with the emission limitations, and (4) whether it is technically feasible
to meet the emission limitations at an acceptable economic cost. Ex-
perience under the 1967 Act and previous federal and state legislation
demonstrates that if all four of these issues could be addressed whenever a control agency sought enforcement, the costs of enforcement
would exceed what either federal or state legislatures are willing to ap-
propriate for air pollution control. Thus, if all four issues could be
raised, enforcement would cease for all practical purposes, destroying
the deterrent effect of the law and effectively frustrating the attainment
of cleaner air.

In 1970 Congress recognized that it was neither necessary nor de-
sirable to have all these issues adjudicated in each enforcement action.
By altering the forum and manner in which they were to be resolved,
it sought to lighten the enforcement burden and increase the deter-
rence and effectiveness of the regulatory scheme while increasing the
consistency and accuracy of the underlying scientific judgments on
which it is based. In effect, Congress reached a decision that certain
major scientific judgments, applicable to numerous individual enforce-
ment actions, should be the subjects of single, concentrated efforts by
the EPA, rather than piecemeal decisions by the courts. In sections
108-110, Congress sought to have the question of what level of air
quality was desirable decided in a single standard-setting action by
EPA, subject to challenge only by petition for review filed within 30
days of the promulgation of a National Ambient Air Quality Stan-
ard. The opportunity to contest the state's determination of how

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93. The courts have demonstrated repeatedly their (perhaps understandable) aversion to deciding scientific and technical issues. See, e.g., Kennecott Copper Corp. v. EPA, 462 F.2d 847, 3 ERC 1682 (D.C. Cir. 1972); NRDC v. EPA (Utah, Colorado, New Mexico), 481 F.2d 116, 5 ERC 1509 (10th Cir. 1973). When forced to make such decisions, their lack of experines sometimes tempts them to let their ideological predis-

94. This effort has been a success. To date, only one challenge has been mounted to the National Ambient Air Quality Standards. Kennecott Copper Corp. v. Ruckels-
haus, 462 F.2d 847, 3 ERC 1682 (D.C. Cir. 1972). To the author's knowledge, no at-
tempts have been made to contest the National Standards in enforcement actions, and two courts have rendered decisions which would appear to preclude any such challenge. Getty Oil Co. (Eastern Operations) Inc. v. Ruckelshaus, 467 F.2d 349, 4 ERC 1567 (3rd Cir. 1972), cert. denied, 409 U.S. 1125, 4 ERC 2040 (1973); Anaconda Co. v. Ruckelshaus, 482 F.2d 1301, 5 ERC 1673 (10th Cir. 1973), reversing 352 F. Supp. 697, 4 ERC 1817 (D.C. Colo. 1972).
much emission reduction was necessary to meet these ambient air quality standards was similarly curtailed.

Issues of technology and economics, at least with respect to the attainment of National Ambient Air Quality Standards, were removed from the executive and judicial branches altogether. Rather than allow the agencies or courts to balance these factors against the goal of restoring healthful air quality, the legislature clearly stated that the cost or technological problems of meeting the requirements of state Implementation Plans to attain these Standards were to be no defense to an enforcement action. 95

Similar attempts to limit the range of argument in enforcement actions can be seen in the mandate for new source performance standards. By basing these standards on technological capability, Congress made ambient air quality irrelevant in the enforcement of these standards. Likewise, 111 96 precludes repeated relitigation of the issue of technological feasibility or cost since any challenge to the standards must come within thirty days of their promulgation.

Thus, Congress purposely sought to narrow the issues that could be raised to defend against enforcement actions in order to discourage non-compliance. Even so, enforcement agencies will be faced with formidable issues of fact, demanding a scientific and engineering expertise that many of their budgets will not support. For example, even EPA continues to be hard-pressed to meet utility objections to scrubbers, despite resources that far outstrip even the best-endowed state agencies.

Another problem that has become more obvious since 1970 is the Act's failure, in common with nearly all state anti-pollution statutes, to provide truly effective remedies. The present regulatory systems are successors to the common law doctrine of nuisance. In enacting them, legislatures expressed the conclusion that judicial balancing of the envi-

95. In a widely quoted discussion, the Senate Committee's Report made clear their commitment to this position:

In the Committee discussions, considerable concern was expressed regarding the use of the concept of technical feasibility as the basis of ambient air standards. The Committee determined that 1) the health of people is more important than the question of whether the early achievement of ambient air quality standards protective of health is technically feasible; and, 2) the growth of pollution load in many areas, even with the application of available technology, would still be deleterious to public health.

Therefore, the Committee determined that existing sources of pollutants either should meet the standards of the law or be closed down. . . .


The Act does provide flexibility to take account of bona fide cases of technological inability to comply, but only under strict and specific conditions to ensure against abuse. § 110(e), (f); 42 U.S.C. § 1857c-5(e), (f) (1970).

ronmental and economic factors under nuisance law had slighted the protection of health and welfare. The Clean Air Amendments of 1970 embody the principle that where health or welfare conflicts with cost, health and welfare are to predominate. But paradoxically, these same statutes have curtailed the courts' power to give effect to their judgments. Common law nuisance courts had wide latitude to fashion appropriate remedies, but the Clean Air Amendments of 1970 restrict the relief for violations to two, a civil injunction or a criminal penalty of as much as $25,000 per day or imprisonment (doubled for recidivists).

The criminal sanctions are probably doomed to desuetude because of problems of proving intent and the high standard of proof in criminal cases, as well as the government's (no doubt correct) belief that courts will not impose criminal liability except in cases of extreme and open obduracy. Injunctive relief, the staple of pollution enforcement litigation, is not much more useful. A control agency cannot even seek an injunction until a polluter violates some legal requirement (when the damage is already done) and will usually not obtain relief until after an additional period of protracted and expensive litigation. Even then a judge's choices are limited to either shutting down the offending facility or issuing an order to comply. Given the short-term economic impact of shutdown that will almost always be alleged, few courts will have the temerity to issue such an order without the most overwhelming and convincing proof of injury to public health. Instead, a court will almost always issue an order to comply—in effect, a new and extended compliance schedule. Thus, even if a control agency wins

97. Though a conflict between these values is usually glibly assumed by commentators, it often does not exist. Many of the measures that attack the basic causes of pollution promise immense social and economic benefits besides reducing pollution. For example, measures aimed at reducing air pollution by creating a more balanced transportation system will also have great economic benefits through reduced traffic congestion and injuries, lowered shipping costs and transportation costs for commuters, lessened noise levels, and (if European examples are any guide) increased business viability for center cities.

98. See NRDC v. EPA (Georgia), 489 F.2d 390, 6 ERC 1248 (5th Cir. 1974), cert. granted sub nom. Train v. NRDC, 95 S. Ct. 39 (1974).


100. The word "allege" here is used descriptively. Courts seldom if ever ask for any proof on the matter. In some cases dire results might well follow a shut-down order, but courts would be wise to regard unsupported allegations with skepticism. A power plant ordered to close down or use cleaner fuel, for example, might well be back in operation within days; likewise, not all major sources of pollution are also sources of large numbers of jobs.

101. For an example of the kind of arduous proof necessary to convince a judge to close down a polluting facility, see the recent order of the court in U.S. v. Reserve Mining, 380 F. Supp. 11, 6 ERC 1449 (D. Minn. 1974). This order was later reversed by the U.S. Court of Appeals for the Eighth Circuit, 498 F.2d 1073, 6 ERC 1657 (1974).
such a lawsuit, it usually gains nothing except a right of action for contempt if the polluter fails to comply with the extended compliance schedule.102

A regulatory system also nurtures the adversary aspects of the relationship between industries and the government. If government exercises its coercive powers to encourage the development and application of technology, a resisting industry is invariably cast as a villain. Enforcement litigation carries a tone of condemnation, which may induce an industry to resist even if there is no strong financial reason.

This critique suggests some important changes to the present federal air pollution control scheme that would both increase its effectiveness and relate it more to present scientific knowledge and good public policy.

First, more effective sanctions must be found to deter violations. The drawn-out controversy over scrubbers demonstrates how important this is. So long as the utilities know that the agencies have no effective redress, it has been to their interest to delay in installing this equipment, in the hope that it could be avoided altogether. As a result, it is becoming clear that it is now too late to meet the Congressional deadlines in most of those areas where scrubbers are critical to restoring clean air. Unless new forms of remedy are added to the statute, the utilities' obstructionist tactics will have paid off. At the same time, those who have complied with the statute by installing needed controls will have suffered an injustice that may redound to their competitive disadvantage.103

One partial response to this situation has been suggested in the Administration's package of proposed amendments to the Act, submitted in the spring of 1974. Under section 6 of this proposal, EPA would be empowered to seek civil fines in addition to the injunctive and criminal relief now available. A variation on this same idea, the "excess emissions penalty," would be preferable. Under this proposal, polluters would be liable by statute for a penalty for all emissions in excess of the emission limitations contained in the state Implementation Plan. For the pollution control agency, ironically, the greatest value of this result lies in the court's increased ability, under its broad-ranging contempt powers, to fashion a remedy such as a civil fine, which would apply continuing pressure for compliance. Even this added enforcement tool, however, may not always be as effective as it might seem. See Commonwealth of Pennsylvania v. U.S. Steel Corp., supra note 93.

102. For the pollution control agency, ironically, the greatest value of this result lies in the court's increased ability, under its broad-ranging contempt powers, to fashion a remedy such as a civil fine, which would apply continuing pressure for compliance. Even this added enforcement tool, however, may not always be as effective as it might seem. See Commonwealth of Pennsylvania v. U.S. Steel Corp., supra note 93.

103. Among private industries, those who disobeyed the law would, in the absence of countervailing government action, be unjustly enriched at the expense of those who complied with the law and must therefore charge more for their product. In theory public utilities should not be enriched in this way since their profits are limited by statute. But given the phenomenon of "regulatory lag" which penalizes utilities that install scrubbers (see text accompanying notes 70-71 supra), the problem of unjust enrichment exists with respect to utilities also.
Plan. Liability for this penalty, which would be calculated according to the quantity of excess emissions, would begin as of the attainment date specified in the existing state Implementation Plan. In order to minimize the costs to the consumer, an additional element could be added that would allow rebating part or all of the penalty to reimburse the bona fide costs of pollution control equipment, at the time installation was completed. In addition to providing a powerful incentive to comply with state emission limitations, such a penalty would tend to offset the unjust enrichment which would otherwise accrue to those who fail to take prompt action to curtail their emissions.

Beyond this improvement in the remedies available to prevent violations, both new scientific knowledge and good public policy demand certain structural changes in the Act. The best scientific information now available suggests that the goal of air pollution control agencies should be the maximum possible reduction in emissions of pollutants. If clearly adopted as the goal of the Act, this would also tend to eliminate some of its most important policy weaknesses. As we have seen, the use of ambient air quality thresholds as the measure of pollution control success tends to produce new and more innovative ways of avoiding emission limitation, to foster an illconsidered subsidy to polluting industries, and to place unwarranted and difficult obstacles in the way of enforcement agencies.

The new source performance standards suggest one way to resolve these lingering problems. The law could rely primarily or altogether on requiring the installation of the best available control technology, with little or no resort to the expensive and uncertain attempt to tie emission limitations to ambient air quality.

Even in such a simplified system, however, certain problems would remain. First, violations of emission limitations must still be proven, and this is extremely expensive. At the moment, the usual method of establishing the actual emissions from a plant is a stack test, which can easily cost the enforcement agency $10,000. Since these are usually one-shot tests, they are also subject to manipulation by plant operators, who are far more familiar with their own equipment than the testers and therefore able to alter operations during the testing period. This problem can be alleviated. The Clean Air Amendments require sources to install and use continuous stack sampling devices.

104. The penalty would not be a tax, even though the size of the penalty would depend on the quantity of excess emissions. The penalty would not be levied against those who met state emission limitations, and would cease whenever a violator came into compliance. The fact that the "punishment" would, with greater precision than usual, "fit the crime" makes it no less a penalty.

105. The Clean Air Amendments direct that state Implementation Plans shall contain "requirements for installation of equipment by owners or operators of stationary
and the sources can and should be made to bear the cost of collecting the necessary data to assure that they do not endanger public health.106

Still, the best technology approach has sizable drawbacks. Even if the opportunity to challenge agency judgments remains limited, this approach still requires the control agency to become expert in methods of pollution control for each major industry—a costly and wasteful undertaking at best, since it means the same information must be developed and paid for twice—once by the agency and then again by the industry when it begins to install the equipment. As noted above, this approach also places the main burden of developing new technology on the government since it provides a negative incentive for the affected industries to develop new controls. Further, it does nothing to change the basic policy assumption, criticized above, that beyond the standards set by law, industry may appropriate the common air resource without cost. And finally, it tends to focus the efforts of control agencies on control technology rather than on their primary mission, the protection of people and the rest of the biosphere from the effects of pollution.

Many of these problems might be solved by the often-discussed pollution tax if it were properly implemented. Consistent with the policy of minimizing emissions, such a tax should be placed on emissions of all types of pollutants deemed by EPA or the Congress to be harmful to life. The tax rate should not, as has often been suggested, be based on the cost of the best available technology but rather on the costs to the public, caused by the pollutant in question. This is consistent with economic theory, which treats pollution damage as a misplaced cost or "externality" of the production process, which should be "internalized" in order to inform the buyer of the true costs of what

sources to monitor emissions from such sources . . . ." 42 U.S.C. § 1857c-5(a)(2)(F) (ii) (1970). Despite the clearly mandatory language of the statute, EPA has attempted by regulation to give the states discretion whether to require monitoring. EPA's regulations do not direct that state Plans shall contain "requirements" for monitoring; instead, they require only that the state have "legal authority" to demand monitoring. 40 C.F.R. § 51.11(a)(6) (1974). When NRDC challenged EPA's approval of the Utah State Implementation Plan, NRDC v. EPA (Utah), 481 F.2d 116, 5 ERC 1509 (10th Cir. 1973), because it did not require monitoring, EPA admitted its policy was illegal but asserted that this deficiency would soon be corrected.

The Environmental Protection Agency has not determined the reliability of available monitoring devices. The Agency is now developing regulations which specify performance specifications for monitoring equipment and which will command the States to require certain sources to install monitoring equipment . . . . It is anticipated that these regulations along with the performance specification requirements, will be prescribed sometime within the coming year.

Respondent EPA's Brief, at 8, 10 (filed Feb. 1973).

106. The simple equity of this notion receives support in economics also. The cost of determining the damage caused by pollution is a cost of pollution also, which should be internalized just as the actual costs of damage to life caused by the pollution.
Focusing on the costs of pollution to the public rather than the costs of control would also direct the pollution control effort where it belongs—on the injury caused by pollution rather than the engineering required to cope with it. It would also simplify the factual problem confronting the control agencies beyond even the best available technology approach. The problem of determining the aggregate costs of pollution should not be minimized; they are substantial, and can never be established with perfect precision. On the other hand, as we have seen, determining what is the best available technology is very difficult and expensive, requiring detailed knowledge of the engineering problems of dozens of major industries. These costs are also largely wasted since the affected industries must also learn the same lessons in order to install the equipment mandated by the control agency's standard. By contrast, the task of determining the aggregate costs of pollution is a socially useful and nonduplicative one.

The biggest problems with a pollution tax proposal are political. The present regulatory system has been refined and strengthened for many years and will probably be further refined. A political structure has grown up around it in the Congress which is especially knowledgeable and committed to the protection of the environment. An attempt would surely be made to shunt a pollution tax proposal to different congressional committees, with memberships far more hostile to the public health and welfare. The tax could be imposed at a level so low as

107. The proceeds of this tax might, it has often been suggested, be used to finance research on new pollution control techniques. But one of the major advantages of such a tax would be its powerful financial incentive for private research to avoid the tax. Creation of a government fund would also probably tend to bias research toward technological solutions, which are not always the cheapest or most environmentally sound. Such a fund would tend to perpetuate itself, creating a bureaucracy whose career depended on not solving the pollution problem (much as the highway trust fund has encouraged ever increasing new "needs" for roads). And finally, using the tax to support such research would represent an additional government subsidy, which is objectionable for the reasons previously cited in the text.

108. The problem is not entirely unexplored, however. In 1970, the Department of Health, Education and Welfare published a study estimating air pollution damages to health, residential property, and materials and vegetation at some $24.9 billion annually. HEW, PUBLIC HEALTH SERVICE, THE COST OF AIR POLLUTION DAMAGES: A STATUS REPORT (July 1970). The Environmental Protection Agency has also periodically published estimates of the costs of air pollution that the public incurred. As part of the Ford Foundation's Energy Policy Project, the American Public Health Association conducted a study of the aggregate magnitude of health effects from various levels of air pollution, and a few econometric studies have been done in an attempt to relate given levels of air pollution with their aggregate costs in terms of health. See, e.g., Lave and Seskin, Air Pollution and Human Health, 169 SCIENCE 723 (Aug. 21, 1970). Needless to say, none of these studies has been supported with the level of resources necessary to arrive at precise estimates. With the greatly increased resources that would be available if this information became crucial to the regulatory system, however, it would seem possible to arrive at far more accurate estimates.
to constitute little more than a nuisance while it served as the excuse for dismantling the existing regulatory system. These political problems suggest that even though such a tax may be the most preferable method for controlling pollution from stationary sources, any tax proposal must be scrutinized carefully to be sure that it will have its intended effect.