

Note

Federal Clean Air Policy: Its Uncertain Foundations

The Clean Air Act Amendments of 1970¹ proposed a significant change in the federal policy of air pollution control. The 1970 Amendments were unique in that, for the first time, protection of the public health and welfare would be the sole consideration in defining federal air pollution regulatory standards.² The strength of any regulatory policy, however, rests in the accumulated knowledge which supports the application of the policy's legal requirements under sanction of law.³ Due to the inherent limitations on the ability of scientists to quantify the adverse health and welfare effects from *all* levels of air pollution exposure, the present federal air pollution control policy lacks the knowledge base necessary to set true health- and welfare-protective standards.

The purpose of this Note is to review the uncertain foundations of the present federal air pollution regulatory program. Such a review will permit an appraisal of the wisdom in selecting a clean air policy whose sole objective is to set air pollution control standards at levels thought to be protective of the public health and welfare, and will permit an evaluation of the impact such a policy will have on the future health and welfare of our nation.

I. 1955-1965: INCREASING FEDERAL INVOLVEMENT—THE EARLY FOUNDATIONS

The Air Pollution Control Act of 1955⁴ was the first legislation to establish an identifiable federal clean air policy. Congress acted in "recognition of the dangers to the public health and welfare . . . from air pollution," but the declared federal policy was "to support

¹42 U.S.C. §§ 1857a-1858 (1970) (amending the Air Quality Act of 1967, Pub. L. No. 90-148, 81 Stat. 485 (1967)). The 1970 Amendments are at the heart of the present federal clean air policy. The Clean Air Act, which was formerly classified to 42 U.S.C. §§ 1857-1858, has been transferred and will now be classified to 42 U.S.C. §§ 7401 *et seq.*, pursuant to the Clean Air Act Amendments of 1977, Pub. L. No. 95-95, 91 Stat. 685. All citations appearing herein to the Clean Air Act as amended prior to 1977, however, will be to the former classification.

²116 CONG. REC. 32901-02 (1970) (remarks of Senator Muskie): "The first responsibility of Congress . . . [now] is to establish what the public interest requires to protect the health of persons."

³For an excellent discussion of the fallacy of basing environmental policies on insufficient knowledge, see B. ACKERMAN, *THE UNCERTAIN SEARCH FOR ENVIRONMENTAL QUALITY* (1974).

⁴Air Pollution Control Act of 1955, Pub. L. No. 84-159, 69 Stat. 322 (1955) (repealed 1963).

and aid *technical* research to devise and develop methods of abating . . . [air] pollution."⁶ The primary federal emphasis was not given to researching the health and welfare effects of air pollution exposure. Congress perceived air pollution control to be an engineering problem of state and local concern; federal funds were to be provided primarily to support the development of the control technologies necessary to attack air pollution at its source through emissions limiting devices.⁶

By 1959, progress was being made in technological control research, but "basic knowledge of the effects of air pollutants on humans was needed in many areas."⁷ A bill introduced in the House of Representatives that year called for a federal policy shift from technological research support to regulation for the first time.⁸ The bill proposed that federally imposed limitations be set on the amount of air pollutants that could be emitted in automobile exhaust. It was proposed that the Surgeon General of the Public Health Service be given the responsibility of establishing limitations on the emission of automobile air pollutants for which sufficient scientific information was then available to permit a judgment as to their adverse effects upon human health. Congress was unwilling, in 1959, to adopt any form of federal regulatory powers for the control of air pollution, but as a compromise measure, the Surgeon General was directed to conduct a "thorough study" of automobile exhaust pollutants to establish what levels of emissions limitation would be required to protect human health.⁹ The paucity of available health effects evidence was demonstrated in 1962, when the Surgeon General reported that he was unable to establish the existence of any scientific evidence confirming direct causal relationships between adverse human health effects and automobile exhaust air pollution.¹⁰ He was only able to report the existence of ample scientific data verifying a generally recognized *link* between automobile exhaust and human disease.¹¹

⁶*Id.* § 1 (emphasis added).

⁷See J. BONINE, *THE EVOLUTION OF TECHNOLOGY-FORCING IN THE CLEAN AIR ACT* (ENVIR. REP. (BNA) Monograph No. 21, 1975).

⁸105 CONG. REC. 17585 (1959) (remarks of Representative Roberts on reviewing the 1959 level of federal funding for air pollution research). The effects of air pollutants on human health were not totally without attention. Many research projects were already attempting to study the possible health effects of air pollution, including studies supported through contracts and grants from numerous federal agencies. See *id.*

⁹H.R. 1346, 86th Cong., 1st Sess., 105 CONG. REC. 57 (1959).

¹⁰Act of June 8, 1969, Pub. L. No. 86-493, 74 Stat. 162 (1960) (amended 1963).

¹¹H.R. DOC. NO. 489, 87th Cong., 2d Sess. 189 (1962).

¹¹*Id.* at 54.

The following year, the Clean Air Act of 1963¹² directed that more attention be given to the study of the possible health and welfare effects of the known air pollutants. The Secretary of Health, Education, and Welfare was directed to conduct his own health effects research and also to survey the results of other scientific studies relating air pollution to adverse health and welfare effects.¹³ For those air pollutants that were found to produce harmful effects, the Secretary was to compile and publish air quality criteria documents which would accurately reflect the latest scientific knowledge as to the nature and extent of the harm to be anticipated.¹⁴ Despite the increased interest, the air quality criteria documents were not going to assume a significant role in federal clean air policy, for in 1963, they were to be published only for "informational purposes."¹⁵ Two years later the Secretary had yet to publish the first air quality criteria document.

In 1965, federal clean air policy made the initial shift from technological research support to regulation. Congress recognized that although automotive smog was not the only source of air pollution, it was a problem that was occurring with increasing frequency and severity in urban areas and therefore required immediate legislative attention.¹⁶ The Motor Vehicle Air Pollution Control Act¹⁷ proposed that national emission limitations be set for the major automobile exhaust pollutants.¹⁸

The proposed legislation differed from the first failing efforts to set automobile emission limitations in 1959. The latter sought to establish limitations at levels that would have been "safe from the standpoint of human health,"¹⁹ and Congress had called for research

¹²Clean Air Act of 1963, Pub. L. No. 88-206, 77 Stat. 392 (1963) (amended 1965).

¹³*Id.* § 3(c)(1).

¹⁴*Id.* § 3(c)(2).

¹⁵*Id.* The questionable importance of even asking for a compilation of the existing health effects data was illustrated by Senator Mansfield's comments on the status of health effects research as of 1963: "A great deal of basic research is needed in air pollution control. To show how far they have to go, scientists are nowhere near agreement on which pollutants are harmful to the human body. . . ." 109 CONG. REC. 18764 (1963).

¹⁶Motor Vehicle Air Pollution Control Act, Pub. L. No. 89-272, § 202(a), 79 Stat. 992 (1965).

¹⁷Motor Vehicle Air Pollution Control Act, Pub. L. No. 89-272, 79 Stat. 992 (1965).

¹⁸*Id.* § 202. Emission limitations, which would regulate the amount of pollution a source may emit over a specified time period, were to be established for the automobile exhaust pollutants: carbon monoxide, hydrocarbons, and oxides of nitrogen. H.R. REP. NO. 899, 89th Cong., 1st Sess., reprinted in [1965] U.S. CODE CONG. & AD. NEWS 3611.

¹⁹See note 8 *supra* and accompanying text.

to substantiate such health-dictated levels in 1960.²⁰ However, the establishment of health-dictated emissions limitations would have been a difficult task in the absence of scientific evidence confirming direct causal relationships between air pollution and adverse human health effects.²¹ In 1965, Congress directed the Secretary of Health, Education, and Welfare to establish the first national automobile emission limitations based solely upon considerations of what would be technologically and economically feasible.²²

During House discussion of the proposed legislation, Representative Lindsay warned that air pollution emission limitations dictated solely by the currently available products of technological research would not assure the protection of the public health.²³ He introduced an amendment to the Senate version of the Motor Vehicle Air Pollution Control Act to increase the federal role in scientific health effects research by directing the Surgeon General to study and report to Congress the effect of air pollution from *all* sources on the public health.²⁴ In pleading for support of his amendment, Representative Lindsay reviewed the status of the scientific health effects evidence as of 1965:

[E]xisting research has yet to establish firm and irrefutable evidence of a *direct causal relationship* between disease and air pollution.

. . . .
. . . Most researchers would admit that more time and intensified effort is needed before firm or definitive answers can be found.

. . . .
*It may be many years before firm and irrefutable evidence confirms the probability that air pollution is a serious threat to human health.*²⁵

Although Representative Lindsay's amendment was not adopted,²⁶ his warning was significant. "Firm and irrefutable" scientific evidence of the direct causal relationships between adverse health effects and air pollution was many years away. Even if air quality criteria documents had been issued in 1965, they would have

²⁰See note 9 *supra* and accompanying text.

²¹See note 15 *supra* and accompanying text.

²²Motor Vehicle Air Pollution Control Act, Pub. L. No. 89-272, § 202(a), 79 Stat. 992 (1965).

²³111 CONG. REC. 6771 (1965).

²⁴H.R. 7065, 89th Cong., 1st Sess., 111 CONG. REC. 6807 (1965).

²⁵111 CONG. REC. 6769, 6776 (1965) (emphasis added).

²⁶See S. 306, 89th Cong., 1st Sess., 111 CONG. REC. 25065-68, 25072 (1965).

reviewed scientific evidence which, at best, only established a generally recognized *link* between air pollution and its probable threat to human health.²⁷ Yet, just two years later, air quality criteria documents were to be made the cornerstones of a newly emerging federal clean air policy, which would require that air quality criteria documents relate firm and irrefutable evidence of direct causal relationships between air pollution and adverse health and welfare effects as a prerequisite to federal regulatory control of air pollution emissions.

II. 1967-1969: UNIFORM NATIONAL INDUSTRIAL EMISSIONS STANDARDS QUASHED—HEALTH- AND WELFARE-DICTATED GOALS

A. *The Air Quality Act of 1967*

In January of 1967, President Johnson delivered a message on pollution to the nation in which he recognized that the growing problem of air pollution was not being mastered under the existing control efforts.²⁸ The President revealed his intention to send to the Congress the Administration's version of the Air Quality Act of 1967, which would require polluting industries to assume more responsibility in solving the nation's growing air pollution problem.²⁹

The Administration's bill proposed a sweeping new role for federal regulatory powers by asking Congress to establish uniform national industrial emission standards.³⁰ Each major polluting industry involved in interstate commerce would be subjected to legally enforceable limitations on the total amount of pollution it could discharge into the atmosphere.³¹ The rationale was clear: By uniformly restricting the total amount of air contaminants that each of the nation's largest industrial polluters would be permitted to emit, a

²⁷See H.R. REP. NO. 899, 89th Cong., 1st Sess. 3, reprinted in [1965] U.S. CODE CONG. & AD. NEWS 3608.

²⁸The President's Message to the Congress Proposing Air Pollution Controls and Measures on Safety, Beautification, and Natural Resources, 3 WEEKLY COMP. OF PRES. DOC. 131 (Jan. 30, 1967). The President stated:

This situation does not exist because it was inevitable, nor because it cannot be controlled. Air pollution is the inevitable consequence of neglect. It can be controlled when that neglect is no longer tolerated.

It will be controlled when the people of America, through their elected representatives, demand the right to air that they and their children can breathe without fear.

Id. at 132.

²⁹*Id.* at 133.

³⁰*Id.*

³¹*Id.*

large amount of the nation's air pollution could be eliminated. The proposed legislation was a dramatic departure from previous federal policy in one other important respect. The industrial emissions limitations would be set without consideration of the technological or economic feasibility of compliance.³² If present technological capabilities were not adequate to meet the federally-established emissions limitations, the responsibility for developing the technologies necessary for compliance would be shifted from the public to the polluter.³³

The Administration's proposal met with strong opposition from industry, whose objection to any form of federally-imposed emissions limitations had been clearly voiced at the Third National Conference on Air Pollution held in Washington, D.C., in December of 1966.³⁴ It was there that the basic concepts underlying the Administration's proposal had been first discussed.³⁵ But if the nation's major polluting industries had any serious fears that the Administration's bill would become the foundation for threatening federal regulatory powers, those fears were allayed ten months later when the Air Quality Act of 1967³⁶ was signed into law.

Though bearing the name of the Administration's proposal, the final draft of the Air Quality Act of 1967 was a more complex but a less industry-threatening substitute, authored by Senator Muskie, Chairman of the Air and Water Pollution Subcommittee of the Senate Public Works Committee. The Muskie substitute rejected the Administration's proposal for national industrial emissions standards as being too inflexible, and for not providing sufficient alternative approaches to air pollution abatement where different regions of the country varied in industrial concentrations, atmosphere conditions, etc.³⁷ With the exception of the national

³²See *Air Pollution—1967: Hearings on S. 780 Before the Subcomm. on Air and Water Pollution of the Senate Comm. on Public Works, 90th Cong., 1st Sess., 761 (1967)*. In discussing the Administration's bill before the Senate, then HEW Secretary Gardner stated that federally imposed emissions standards coupled with severe economic penalties for noncompliance would "undoubtedly provide an attractive economic incentive to the development of control technology and will result in better, cheaper and, most importantly, widely applicable ways of reducing pollution from specific sources." *Id.* at 762.

³³*Id.* at 762. Since 1955, federal monies had been used to develop pollution control technologies which, it was hoped, polluting sources would use if made available.

³⁴U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PROCEEDINGS, THE THIRD NATIONAL CONFERENCE ON AIR POLLUTION 265-66 (1966).

³⁵See *id.* at 12-15 (address of HEW Secretary Gardner).

³⁶Air Quality Control Act of 1967, Pub. L. No. 90-148, 81 Stat. 485 (1967) (amended 1970).

³⁷See 1966 CONFERENCE, *supra* note 34, at 597.

automotive exhaust emission limitations adopted in 1965,³⁸ the nation would not be given a federal clean air policy that would require major air polluters to immediately curb the emission of poisonous air contaminants; instead, the Air Quality Act of 1967 focused upon clean air goals.³⁹ Since damage to the public health and welfare had been the primary concern with respect to air pollution, as an alternative to nationally imposed emissions limitations it was proposed that "reasonable regulation should be based on an *accurate* measurement of the health and welfare needs" of the public.⁴⁰ As the source for determining those needs, attention was directed to the revival of the air quality criteria concept that had been adopted in the Clean Air Act of 1963,⁴¹ but which would suddenly assume a role of "much greater importance" in the Air Quality Act of 1967.⁴²

The Secretary of Health, Education, and Welfare was again directed to publish air quality criteria documents detailing what the best available scientific evidence established as the levels of air pollution concentrations that were harmful to the public's health and welfare.⁴³ However, these documents were no longer to serve as mere sources of information but were now to serve as the basis for the implementation of state air pollution control programs. The desired flexibility in the federal air pollution abatement effort was accomplished by allowing each state to *voluntarily* implement their own programs of air pollution control in accordance with their individual needs. State programs were to require only that individual polluting sources reduce their pollution emissions enough so that the aggregate of emissions from all sources would result in ambient air pollution concentrations below the levels that the air quality criteria documents verified as being safe for the public health and welfare.⁴⁴

³⁸See note 16 *supra* and accompanying text.

³⁹See generally 1966 CONFERENCE, *supra* note 34, at 597-600.

⁴⁰S. REP. NO. 403, 90th Cong., 1st Sess. 10 (1967).

⁴¹See note 12 *supra* and accompanying text.

⁴²H.R. REP. NO. 728, 90th Cong., 1st Sess. 16, *reprinted in* [1967] U.S. CODE CONG. & AD. NEWS 1952.

⁴³Air Quality Act of 1967, Pub. L. No. 90-148, § 108, 81 Stat. 485 (1967) (amended 1970).

⁴⁴1967 S. REP., *supra* note 40, at 44-45. The Air Quality Act of 1967 asked the states to voluntarily adopt air quality standards, which would be the ambient air concentrations of individual pollutants that would be allowable in the atmosphere from *all* sources, based upon the scientific health effects data to be published in the federal air quality criteria documents. Pub. L. No. 90-148, § 108, 81 Stat. 485 (1967). The air quality standards by themselves would be meaningless numbers, however. The states were encouraged to adopt control plans, called "implementation plans," which would translate the requirements of the air quality standards into emissions limitations for individual polluting sources. To accomplish this end the Act proposed that the state control plans reduce complexities such as individual source emission rates, atmospheric

However, the Air Quality Act of 1967 did not suggest that these voluntary state control programs immediately require that individual pollution emissions be reduced to comply with the allowable concentration levels; it only established the air quality criteria documents' findings as the ultimate goals of air pollution control.⁴⁵ In addition, there was not going to be a shift of responsibility from the public to the polluter for the development of abatement technology. States were allowed to take into consideration the technological and economic feasibility of any emissions controls they would require of an individual polluting source.⁴⁶

Although in introducing his bill on the floor of the Senate Senator Muskie stated that "no one . . . [had] the right to use the atmosphere as a garbage dump,"⁴⁷ the Air Quality Act of 1967, in effect, licensed industry's right to pollute the atmosphere. By defining goals of air pollution control instead of imposing strict uniform national industrial emission limitations, the atmosphere would be polluted to levels of contamination that were dictated by the current limits of science's ability to determine direct causal relationships between air pollution exposure and adverse health and welfare effects.

The exact nature of the burden placed upon the nation's scientists, and the breathing public, became clearer when the House Commerce Committee indicated that for air quality criteria documents to be credible, they would now have to be "based upon the most careful studies and analysis" in order to justify relying upon them in developing effective and reasonable abatement programs.⁴⁸ Representatives from Health, Education, and Welfare testified in Senate hearings that they would neither make a finding nor establish an air quality criteria document unless the evidence was "considerable" or "substantial," and that any controls should be "related to *measurable* and *demonstrable* effects on public health and welfare."⁴⁹

chemistry, meteorology, topography, projections of increased urbanization, industrialization, and population into mathematical models. Such models were then to be used to determine the degree of emission control necessary for each of the individual polluting sources to bring the overall air quality to levels below those established by state air quality standards. *Id.*

⁴⁵Thus, as abatement technology advanced, more restrictive emissions limitations were to be implemented until the air quality standards were reached. 1967 S. REP., *supra* note 40, at 30.

⁴⁶*Id.* at 3, 38.

⁴⁷113 CONG. REC. 19171 (1967).

⁴⁸H.R. REP. NO. 728, 90th Cong., 1st Sess. 14, reprinted in [1967] U.S. CODE CONG. & AD. NEWS 1949.

⁴⁹*Air Pollution—1967: Hearings Before the Subcomm. on Air and Water Pollution of the Senate Comm. on Public Works*, 90th Cong., 1st Sess., 2517, 2524 (1967).

However, as indicated by extensive Congressional hearings,⁵⁰ the increased importance and demands upon air quality criteria documents had not been matched by a concomitant advance in pollution health effects knowledge that was adequate enough to support the complex clean air policy proposed. Dr. Barry Commoner, then the Director of the Center for the Biology of Natural Systems, Washington University, in testimony before the Senate Subcommittee on Air and Water Pollution, summarized the nature of the burden the Air Quality Act of 1967 would place upon health and welfare effects researchers:

In order to evaluate the biological hazard [of air pollution], we first need to know what substances are emitted into the air in the original effluents, . . . the way in which they interact chemically to produce new pollutants, and, finally, the influence of the resultant chemical mixture on health.

It is evident there is very little detailed information of this sort . . . in the country . . . , [yet] the accuracy of a prediction of the effect of attempting to control any single pollutant will depend entirely on whether we understand the entire complex picture. . . .

The air pollution problem involves a complex network of chemical and biological interactions. . . . [W]e may be fooled into thinking things are going to work out because we have established the best standards we now know.⁵¹

The Subcommittee on Air and Water Pollution heard additional scientific testimony from expert witnesses who verified that many of the identified pollutants which contaminated the air were known to be highly toxic, even deadly when inhaled in large doses over short periods of time.⁵² However, the health and welfare effects from long-term chronic exposure to low concentrations of known toxic substances, the most common form of pollution exposure, were not known.⁵³ Furthermore, low-level exposure effects would not be known with the scientific exactness necessary to meet the legislative requirements until medical science had had the opportunity to make the long-term medical observations required to give definitive answers.⁵⁴

How much scientific knowledge was needed to serve as the foundation for the establishment of a federal clean air policy whose goal

⁵⁰See, e.g., *id.* at 2103-28, 2659-81.

⁵¹*Id.* at 980-81, 985.

⁵²E.g., *id.* at 793 (statement of Dr. Ivan L. Bennett, Jr.).

⁵³*Id.*

⁵⁴*Id.*

of regulatory control was the protection of the public health and welfare? The Air Quality Act of 1967 had answered the question by enshrining the knowledge-limited air quality criteria document as the cornerstone of new federal air pollution control efforts and thereby establishing the blueprint for future changes in federal clean air policy. Furthermore, because of its dependence on health and welfare effects evidence, it had also become an Act which polluting industries could support, for when federal regulation would require nonprofit-making expenditures by industry, as any air pollution controls would, any form of time delay represents money saved.⁵⁵ The Administration's concept of immediate uniform national industrial emission limitations had been quashed and replaced with an alternative that promised to require long and costly scientific investigations and abatement technology developments before strict pollution regulations would become a serious threat to a polluter. From the polluter's perspective, the only real future threat posed by the Air Quality Act of 1967 would be the ability of science to meet the heavy burden of proving measurable and demonstrable health and welfare effects for the lower exposure levels of the known air pollutants, or science's ability to identify the health and welfare effects of, as yet, unknown atmospheric poisons. The real threat to the public would be that medical science would not possess the capabilities necessary to meet those burdens for decades, even if strong probabilities of adverse effects were immediately established.⁵⁶

⁵⁵See J. ESPOSITO, *VANISHING AIR* (1970), where the following evaluation of the Air Quality Act of 1967 is offered:

The striking resemblance of the Air Quality Act of 1967 to the impressive body of industrial public relations literature that preceded it makes clear that the Act adopted an approach which industry had endorsed for many years prior to enactment. Although the antecedents of the law can be found in many corporate publications, one pamphlet—*A Rational Approach to Air Pollution Legislation*, published by the Manufacturing Chemists Association (MCA) in 1952—is remarkable for the degree to which it “anticipates” legislation passed fifteen years later.

Point by point, the Air Quality Act of 1967 follows the path spelled out by the MCA pamphlet. Three techniques, each designed to buy precious time cheaply, . . . suggest the several ways by which delay can be achieved:

1. By straining the public's comparatively meager reserves by shifting the burden of proving adverse health effects from the polluter to the public;
2. By institutionalizing through the concept of ambient air standards the idea that industry has a right to pollute up to a certain level;
3. By obfuscating the facts through transformation of what should be political decisions into esoteric scientific jargon.

Id. at 260.

⁵⁶Concerning the need for an intensive research effort to upgrade the scientific

B. 1968-1969 Senate Hearings—The Inadequacies of a Health- and Welfare-Based Policy Revealed

The health and welfare consequences of a federal clean air policy which scaled down air pollution emissions based upon the slow progress of scientific research became even clearer in 1968. The Senate Subcommittee on Air and Water Pollution planned a series of hearings to develop the factors to be considered while establishing air quality criteria documents. A staff report⁵⁷ prepared for use by the Subcommittee in July of 1968, just prior to the start of the hearings, anticipated the problems that would be presented. The report was designed to summarize existing evidence on the nature, type, and extent of air pollution health effects, and to present the general principles connected with the establishment of scientific and medical recommendations in the development of air quality criteria.⁵⁸ The report's conclusions demonstrated the nature of the health and welfare protection the public could expect from a control policy whose standards were set only upon measurable and demonstrable health effects evidence.

The report's findings verified the expert testimony given before the Subcommittee in 1967.⁵⁹ Ample quantitative scientific evidence was found to exist relating acute levels of exposure to air pollution and resultant adverse effects on the public health and welfare; this evidence had been gathered primarily during air pollution episodes⁶⁰ when persons with chronic bronchitis, lung cancer, and other respiratory and cardiopulmonary diseases suffered aggravated physiological distress or even death. However, limited knowledge existed of the human health effects for many of the known air con-

data base upon which air quality goals were to be established, the Senate Committee only stated:

Because the committee is concerned with both long- and short-term hazards as well as the need for valid scientific data to substantiate the correlation between pollution and health and welfare the Secretary [of HEW] is urged to move forward with diligence and perseverance in the area of scientific analysis of health effects.

1967 S. REP., *supra* note 40, at 10 (emphasis added).

⁵⁷STAFF OF SENATE COMM. ON PUBLIC WORKS, 90th CONG. 2d SESS., REPORT ON AIR QUALITY CRITERIA (Comm. Print 1968).

⁵⁸*Id.* at vi.

⁵⁹See note 52 *supra* and accompanying text.

⁶⁰1968 STAFF REPORT, *supra* note 57 at 5. A large number of studies had been conducted which correlated high atmospheric concentrations of known pollutants with increased mortality rates. Periods of unusually high concentrations of air pollutants were termed "episodes." During episodes, large numbers of individuals who were particularly susceptible to air pollutants became ill and died. However, episodes are only the dramatic short-term manifestations of a long-term problem. *Id.*

taminants under conditions of chronic exposure—the long-term, lower-level exposure of ten, twenty, or thirty years—which the report found had “persistent and insidious effects on public health, on vegetation, and on materials of all kinds and undoubtedly represent[ed], in the long run, a greater damage and loss to individuals than does the occasional air pollution episode.”⁶¹ Chronic exposure effects appear in later life as an increased incidence of diseases, which scientists have suspected may be carcinogenically⁶² or mutagenically caused, and which are irreversible in most cases.⁶³ The staff report stated:

It is quite clear that protection of public health requires quantitative answers regarding the effects of . . . chronic exposures [without which] there is no assurance that control and abatement established for protection against acute conditions . . . will provide adequate protection of public health and welfare against chronic long-term exposures at less than acute levels.⁶⁴

Furthermore, the report concluded that any suggestion that threshold levels existed, below which no adverse health or welfare effects were present, would be “deceiving” since many effects were not observed because “study techniques are either insensitive or the effects unsuspected.”⁶⁵ In addition, quantification of adverse health and welfare effects required by the Air Quality Act of 1967 would be further complicated because the chemical composition of the urban atmosphere was largely unknown,⁶⁶ and little if anything was known of the interactions between combination of individual pollutants.⁶⁷ The health effect of two individual contaminants that interact could be additive, competitive, or even multiplicative factors of their individual effect, yet no clear answers had been defined at that time.⁶⁸

The report further recognized that establishing air quality criteria documents would require that individual pollutants be monitored and identified, but as a result of the complexities of at-

⁶¹*Id.* at 11.

⁶²Health experts now estimate that as many as 60 to 90% of all cancers are environmentally caused. See Taylor, *Echoes of “Silent Spring,”* TRIAL MAGAZINE, November 1968, at 28.

⁶³1968 STAFF REPORT, *supra* note 57, at v.

⁶⁴*Id.*

⁶⁵*Id.*

⁶⁶*Id.* at 12.

⁶⁷*Id.* at 8.

⁶⁸*Id.*

mospheric chemistry, "individual monitoring and identification of the vast number of contaminants in the atmosphere . . . [were] not presently feasible," and therefore, pollution "indices" would have to be established which would only *represent* the wide variety of solid, liquid, and gaseous substances present in the atmosphere.⁶⁹ Sulfur dioxide, for example, which is itself an identifiable and measurable air pollutant, would serve as an index for the host of other air pollutants which result from the combustion of coal and oil.⁷⁰ It is important to note that the staff report warned that "indices" may be representing other substances "the physical form and chemical composition of which may separately and in combination be of greater relevance to clinical research than expression of their atmospheric concentrations as single [proxy] contaminants."⁷¹ However, due to the lack of adequate scientific knowledge, the pollution "indices" which would be selected to provide a basis for evaluating health and welfare effects of all atmospheric pollution would be limited to those individual contaminants which scientists were able to identify and monitor.

The expert testimony presented before the Senate Subcommittee on Air and Water Pollution in 1968 and 1969 verified the shortcomings of the data base that was to support the emerging federal clean air policy; the best scientific evidence available comprised a totally inadequate data base for the type of scientific conclusions that one would expect the proposed policy to rest upon.⁷² Dr. Raymond Slavin, then Assistant Professor of Internal Medicine at St. Louis University, testified concerning the inherent difficulties health effects researchers would face in overcoming the deficiencies the staff report had uncovered:

It will take long, slow, careful, costly investigation to determine the effects of each pollutant separately and in various combinations—and *meanwhile the mixture we are actually breathing will have changed again.* . . . [C]ontrolling only

⁶⁹*Id.* at 12.

⁷⁰*Id.*

⁷¹*Id.* at 13.

⁷²*E.g., Air Pollution—1968: Hearings on Air Quality Criteria Before the Subcomm. on Air and Water Pollution of the Senate Comm. on Public Works, 90th Cong., 2d Sess., at 718 (1968) (statement of Dr. Eric Cassell). Dr. Cassell, Mount Sinai School of Medicine, testified that due to the inherent inabilities of science to quantify low-level adverse health effects, air quality criteria were the wrong goals of air pollution control. Instead, air pollution emissions should be controlled "to the greatest extent feasible employing maximum technological capabilities." *Id.* See also Cassell, *The Health Effects of Air Pollution and Their Implications for Control*, in 33 LAW AND CONTEMPORARY PROBLEMS: AIR POLLUTION CONTROL 197 (1968).*

those pollutants which can be clearly shown to have an effect on health by themselves, means simply not to act against a larger proportion of pollutants because that kind of cause and effect relationship has not been, and perhaps cannot be established.⁷³

A great responsibility was therefore placed upon the scientist, and the import of the Air Quality Act of 1967 was clear. Air quality criteria documents could only be issued which would adequately support a clean air policy that attempted to control the gross and obvious air pollution exposures, and control objectives could only be set in terms of a percentage reduction in the ambient air concentrations of identifiable and monitorable pollutants. Polluting industries would not be faced with strict air pollution control regulations of the kind necessary to control the chronic low-level exposures to the known air pollutants or of the kind necessary to control the potential multitude of unidentified atmospheric poisons until scientists could overcome the nearly insurmountable task of quantifying adverse health and welfare effects. Furthermore, even gross and obvious levels of air pollution would not be abated under the Air Quality Act of 1967 if the states found the necessary controls to be economically or technologically infeasible.⁷⁴

The controversy over the adequacy of the data base supporting the emerging federal clean air policy⁷⁵ overshadowed the bill which would be described as "perhaps the most significant domestic regulation of the decade."⁷⁶ It would firmly establish federal air pollution controls upon a scientific data base that was inadequate to provide sufficient assurances for the protection it would claim to afford the American public.

⁷³*Air Pollution—1969: Hearings Before the Subcomm. on Air and Water Pollution of the Senate Comm. on Public Works, 91st Cong., 1st Sess. 45 (1969) (statement of Raymond Slavin) (emphasis added).*

⁷⁴See note 46 *supra* and accompanying text.

⁷⁵In January of 1969, the National Air Pollution Control Administration of the Department of Health, Education, and Welfare announced the issuance of air quality criteria documents for the particulate matter and sulfur oxides indices. Air Quality Criteria for Particulate Matter (NAPCA Publication No. AP-49), Air Quality Criteria for Sulfur Oxides (NAPCA Publication No. AP-50), 34 Fed. Reg. 1988 (1969). In March of 1970, air quality criteria documents were announced for carbon monoxide, photochemical oxidants, and hydrocarbons. Air Quality Criteria for Carbon Monoxide (NAPCA Publication No. AP-62), Air Quality Criteria for Photochemical Oxidants (NAPCA Publication No. AP-63), Air Quality Criteria for Hydrocarbons (NAPCA Publication No. AP-64), 35 Fed. Reg. 4768 (1970).

⁷⁶116 CONG. REC. 42381, 42394 (1970).

III. 1970: UNIFORM NATIONAL AMBIENT AIR QUALITY STANDARDS— HEALTH- AND WELFARE-DICTATED CONTROLS

A. *The Clean Air Act Amendments of 1970*

As the decade grew to a close, apart from the controversy over the adequacy of the air quality criteria documents, Congress grew impatient with the lack of progress of the voluntary state control programs anticipated under the Air Quality Act of 1967.⁷⁷ It was also becoming readily apparent that merely providing federal funds to support research for the development of methods of abatement and control would not solve the technological problems of air contamination alone, and solutions were not being readily provided through voluntary industry contributions.⁷⁸

The Clean Air Act Amendments of 1970⁷⁹ were enacted "to speed up, expand, and intensify the war against air pollution."⁸⁰ To accomplish this end, the 1970 Amendments proposed the adoption of new federal regulatory powers that would make mandatory, and set deadlines for, the voluntary control program outlined for the states by the Air Quality Act of 1967. The Administrator of the newly formed Environmental Protection Agency (EPA)⁸¹ was to establish uniform national ambient air quality standards that would prescribe the maximum atmospheric concentrations of air pollutants allowable to insure the protection of the public health and welfare.⁸² Each state would then be required to promulgate its own air pollution control plan—or be subjected to a federally promulgated and enforced plan—dictating the reduction in emissions required by each individual pollutant source to bring the aggregate pollutant concentrations below the federally imposed air quality standards.⁸³

More significantly, the new national air quality standards were to be based solely upon what could be scientifically demonstrated as necessary to protect the public health and welfare.⁸⁴ National air

⁷⁷See, e.g., *Air Pollution—1969: Hearings on Problems and Programs Associated with the Control of Air Pollution Before the Subcomm. on Air and Water Pollution of the Senate Comm. on Public Works*, 91st Cong., 1st Sess. at 10 (1969).

⁷⁸116 CONG. REC. 32900-01 (1970) (remarks of Senator Muskie).

⁷⁹42 U.S.C. §§ 1857a-1858 (1970) (amending the Air Quality Act of 1967, Pub. L. No. 90-148, 81 Stat. 485 (1967)).

⁸⁰H.R. REP. NO. 1146, 91st Cong., 2d Sess. 1, reprinted in [1970] U.S. CODE CONG. & AD. NEWS 5356.

⁸¹Reorg. Plan No. 3 of 1970, 3 C.F.R. 1072 (1966-1970 Compilation), reprinted in 5 U.S.C. app., at 609 (1970) and in 84 Stat. 2086 (1970). This new executive department combined the environmental departments of 15 different federal agencies.

⁸²Clean Air Act Amendments of 1970, § 109, 42 U.S.C. § 1857c-4 (1970), See note 44 *supra* and accompanying text.

⁸³Clean Air Act Amendments of 1970, § 110, 42 U.S.C. § 1857c-5 (1970).

⁸⁴See note 2 *supra*.

quality standards and state control plans were to be established and enforced without consideration of technological or economic feasibility.⁸⁵ Thus, the new regulatory policy was to be "technology-forcing"⁸⁶ by requiring the polluting industries to bear the burden of developing new technologies where necessary to comply with federal health- and welfare-dictated controls.⁸⁷ However, the heavier burden of quantifying the health and welfare effects of air pollutants, still a prerequisite to regulatory control, remained upon the public.

Within thirty days of the enactment of the 1970 Amendments the EPA Administrator was to prescribe national "primary" and "secondary" air quality standards for each of the air pollutant "indices" specified in the air quality criteria documents that had been issued prior to 1970.⁸⁸ Primary standards were to be set at levels "requisite to protect the public health"⁸⁹ and secondary standards at levels "requisite to protect the public welfare."⁹⁰ Those levels were to be determined solely by relying on the scientific data compiled in the air quality criteria documents. For each air pollutant found to have an adverse effect on the public health or welfare but not yet covered by an existing air quality criteria document, the EPA Administrator was to issue new air quality criteria and uniform air quality standards concurrently.⁹¹ The 1970 Amendments' answer to the controversy over the inadequacy of the existing scientific data base was to provide that any new criteria documents should include data reflecting the results of exposures to air pollutants "in varying quantities."⁹² "[T]o the extent practicable" the new criteria documents were to also include information on the "variable factors" which by themselves or in combination with other factors might alter the effect of a pollutant on health or welfare.⁹³ However, this language still clearly indicated that any new air quality criteria documents were only expected to reflect the current abilities—or inabilities—of science to quantify the adverse health and welfare effects.⁹⁴ Therefore, these provisions did not even begin to solve the

⁸⁵116 CONG. REC. 32900-01 (1970) (remarks of Senator Muskie).

⁸⁶See BONINE, *supra* note 6.

⁸⁷116 CONG. REC. 32900-01 (1970) (remarks of Senator Muskie).

⁸⁸Clean Air Act Amendments of 1970, § 109(a)(1)(A), 42 U.S.C. § 1857c-4(A)(1)(A) (1970). See note 43 *supra*.

⁸⁹Clean Air Act Amendments of 1970, § 109(b)(1), 42 U.S.C. § 1857c-4(b)(1) (1970).

⁹⁰*Id.* § 109(b)(2), 42 U.S.C. § 1857c-4(b)(2) (1970).

⁹¹*Id.* § 108(a)(1), 42 U.S.C. § 1857c-3(a)(1) (1970).

⁹²*Id.* § 108(a)(2), 42 U.S.C. § 1857c-3(a)(2) (1970).

⁹³*Id.* § 108(a)(2)(A), (B), 42 U.S.C. § 1857c-3(a)(2)(A), (B), (1970).

⁹⁴*Id.* § 108(a)(2), 42 U.S.C. § 1857c-3(a)(2) (1970). The Clean Air Act Amendments of

problems raised in the Senate hearings the year before.⁹⁵

Section 103 of the 1970 Amendments did call for an accelerated health and welfare effects research effort with special attention to be given to both the long- and short-term effects of exposure to air pollution.⁹⁶ However, even massive federal research support would not change the nature of the difficult and complex task of quantifying those effects. Furthermore, although calling for intensified health effects research, the 1970 Amendments failed to provide for a regular review and update of the air quality criteria documents that had been issued prior to 1970. The EPA Administrator was only *urged* to review "from time to time" and to update "as appropriate" those criteria documents issued after the enactment of the 1970 Amendments.⁹⁷ Thus, there were not even assurances that the air quality criteria documents would constantly reflect the most recent health effects data. At the EPA Administrator's discretion the air quality criteria documents initially adopted could remain the basis of the federal and state regulatory programs indefinitely.

Other language and provisions of the 1970 Amendments also suggested that the federal clean air policy defined in 1970 focused its attention on short-term pollution abatement goals defined in

1970 also provided several other specific control measures for the direct reduction of specific pollutants not covered by air quality criteria documents. The EPA Administrator had direct authority to establish and impose emissions limitations for any air pollutants that in his judgment are "hazardous"—hazardous pollutants are defined as those which "may cause, or contribute to, an increase in mortality or an increase in serious irreversible or incapacitating reversible illness." *Id.* § 112(a)(1), 42 U.S.C. § 1857c-7(a)(1) (1970). All pollutants from major new sources of potential air pollution are subject to control under section 111. *Id.* § 111, 42 U.S.C. § 1857c-6 (1970). The EPA Administrator is allowed to establish "standards of performance"—emission limitations—for new pollution sources which "significantly" contribute to air pollution or contribute to the "endangerment" of public health or welfare. *Id.* This section potentially would bring all of the emissions from *new* sources under federal control, regardless of their recognition in other control provisions of the 1970 Amendments.

However, all of these provisions share the same catastrophic flaw as pollution controls based upon air quality criteria documents; the reduction of air pollutants is still tied to the ability—or inability—of science to identify, monitor, and demonstrate direct causal relationships between exposures and adverse health effects. For a discussion of the effectiveness of these specific control provisions, see Jorling, *The Federal Law of Air Pollution Control*, in FEDERAL ENVIRONMENTAL LAW 1058, 1103-1107, 1086-1087 (1974).

⁹⁵See notes 72-73 *supra* and accompanying text.

⁹⁶Clean Air Act Amendments of 1970, § 103(a), 42 U.S.C. § 1857(a) (1970).

⁹⁷*Id.* § 108(c), 42 U.S.C. § 1857c-3(c) (1970). By December 31, 1980, and at 5-year intervals thereafter, the Administrator now *must* review and revise, as necessary, the air quality criteria documents and ambient air quality standards. The Administrator is also to appoint a new and independent scientific review committee to recommend the needed reviews and revisions. Clean Air Act Amendments of 1977, Pub. L. No. 95-95, § 106, 91 Stat. 691 (to be codified at 42 U.S.C. § 7409).

terms of the currently available knowledge-limited air quality criteria documents. The 1970 Amendments were significantly concerned with the expedition of specific federal air pollution controls. The House report stated: "[I]t is urgent that Congress adopt new clean air legislation which will make possible the more expeditious imposition of specific emission standards . . . and the effective enforcement of such standards by both State and Federal agencies."⁹⁸ Thus, from a regulatory point of view it would have been desirable to set aside the controversy over the knowledge-limited data base of the proposed regulations, to establish air pollution exposure levels below which there were no measurable or demonstrable adverse health and welfare effects, and then to establish air quality standards at those levels in the name of protecting the public health and welfare. It would then have been possible to present the polluting industries with a regulatory package of emissions limitations that would remain constant for the foreseeable future. This course of action would certainly encourage the highest probability of effective enforcement, while at the same time leading the public to believe that their health and welfare were fully protected.

The 1970 Amendments have, in effect, accomplished this end by defining an adverse health effect in terms of the scientific limitations of demonstrating a direct causal relationship between disease and exposure to an air contaminant. The Senate committee, where the concept first originated, described the primary air quality standard as follows:

Ambient air quality is sufficient to protect the health of . . . persons whenever there is an absence of adverse effect on the health of a statistically related sample of persons in sensitive groups from exposure to the ambient air. An ambient air quality standard, therefore, should be the maximum permissible ambient air level of an air pollution agent or class of agents . . . which will protect the health of any group of the population.⁹⁹

Thus, the national primary air quality standard was defined in such a way as to suggest that there were threshold exposure levels below which there were no adverse health effects,¹⁰⁰ when, in fact, air quality standards could only be set at levels below which health researchers had been incapable of quantifying direct causal relation-

⁹⁸H.R. REP. NO. 1146, 91st Cong., 2d Sess 5, *reprinted in* [1970] U.S. CODE CONG. & AD. NEWS 5360.

⁹⁹S. REP. NO. 1196, 91st Cong., 2d Sess. 10 (1970) (emphasis added).

¹⁰⁰See note 65 *supra* and accompanying text.

ships between adverse health and welfare effects and exposures to individual air pollutants.

This distortion of the danger air pollution posed to the nation's health was strengthened by the statutory directive requiring the EPA Administrator to apply an "adequate margin of safety" in establishing the primary air quality standard.¹⁰¹ The legislative purpose of this mandate was to require the resolution of any doubts created by conflicting or ambiguous scientific evidence in favor of protection of the public health. However, when the primary standards would be based upon knowledge-limited air quality criteria documents,¹⁰² what purpose could a "margin of safety" serve other than to create the illusion that the public health would be fully protected? The answer was provided three years later when the first, and to date only, major review of the scientific data supporting the present federal clean air policy was conducted.

B. The National Academy of Sciences Review

In the three years following the enactment of the Clean Air Act Amendments of 1970, many challenges were made, particularly by the polluting industries, concerning the adequacy of the air quality criteria documents used to justify the national air quality standards being imposed on polluting sources via state control plans.¹⁰³ The argument was not that the air quality standards were too lenient, but due to the lack of adequate data to support them, they were now subject to complaints of being too strict. In August of 1973, the Senate Committee on Public Works entered into a contract with the National Academy of Sciences¹⁰⁴ for an evaluation and review of the

¹⁰¹Clean Air Act Amendments of 1970, § 109(b)(1), 42 U.S.C. § 1857c-4(b)(1) (1970). The secondary air quality standard, the purpose of which was to protect the public welfare, was defined as being protective against any effects on soils, waters, crops, vegetation, man-made materials, animals, wildlife, weather, visibility, and climate, damage to or deterioration of property, and hazards to transportation, as well as protective against the effects upon economic values and personal comfort and well-being. *Id.* § 302(h), 42 U.S.C. § 1857h(h) (1970). The 1970 Amendments did not intend these standards to include a "margin of safety." *Id.* § 109(b)(2), 42 U.S.C. § 1857c-4(b)(2) (1970).

¹⁰²Primary and secondary air quality standards were promulgated in April of 1971. 40 C.F.R. § 50 (1970). The only new air quality criteria document issued under the 1970 Amendments was for nitrogen oxides. *Id.* There have been no other air quality criteria documents or air quality standards promulgated since 1971.

¹⁰³*See, e.g.*, [1971] 2 ENVIR. REP. (BNA) 249.

¹⁰⁴The National Academy of Sciences, under its Congressional charter, is called upon to act as the official yet independent advisor to the federal government in any matter of science and technology. This provision accounts for the close ties that have existed between the Academy and the government, although the Academy is not a governmental agency and its activities are not limited to those on behalf of the government.

current scientific data on the health effects of the major air pollutants.¹⁰⁵ Specifically, the contract provided only for the review of data available on the pollution indices for which air quality criteria documents had already been issued.¹⁰⁶

In partial fulfillment of the contract, the Academy forwarded to the Senate Committee on Public Works a transcript and executive summary of a conference which had been held by the Academy in 1973 for the purpose of gathering the current health effects research data.¹⁰⁷ From the papers and discussions presented at the conference, the executive summary proposed the following tentative conclusion, among others: "Due to the limitations of present [scientific] knowledge, it is impossible at this time to establish an . . . [air quality standard for] any pollutant—other than zero—below which it is certain that no human being will be adversely affected."¹⁰⁸ However, until future health effects researchers could quantify causal relationships between adverse health effects and individual pollutants, "no compelling basis" would exist for altering the present air quality standards—those having been set by relying upon data obtained during acute level exposures.¹⁰⁹

This clear statement of the weaknesses of a health- and welfare-based policy was missing when the Academy released the final

¹⁰⁵See S. REP. NO. 291, 93 Cong., 1st Sess (1973).

¹⁰⁶*Id.*

¹⁰⁷NATIONAL ACADEMY OF SCIENCES, CONFERENCE ON HEALTH EFFECTS OF AIR POLLUTION, SUMMARY OF PROCEEDINGS (1973). At the opening of the conference, Senator Muskie addressed himself to the Academy, on behalf of the Subcommittee on Air and Water Pollution, and clearly stated where the burden lies in the present pollution control policy:

The scientific community . . . has a great responsibility. It is you who must show what levels of air quality are needed to protect the health of people. It is you who must show how your experimental conclusions can be the basis for public policy decisions. You must show who is endangered by dirty air, and what pollutants, in what combinations and concentrations pose the dangers.

As scientists you are the first line of defense for national environmental policy and in air pollution you are the most significant line of defense.

Id. at iii.

¹⁰⁸*Id.* at 7.

¹⁰⁹*Id.* at 10. Labeled as a "general comment," the following was also included in the summary statement:

It will apparently be very difficult to obtain reliable dose-response curves (which relate physiological effects to ambient-air concentrations) for one or more pollutants in question. . . . The conservative view of the Academy in relation to change of the present air quality standards is fostered by emerging data that suggest that observed adverse health effects may arise in considerable part not only from the interactions of bodily tissues with the primary pollutants but with unidentified reaction products generated by complex chemical events in the atmosphere or induced within the lung.

Id.

report of its study in September of 1974,¹¹⁰ and the evils of its progressive generalizations were apparent. The final report's summary statement concluded that none of the Academy's scientists were satisfied with the current air quality criteria documents' data base; nevertheless, the evidence which had accumulated since the promulgation of the national air quality standards, "*in general*," supported those standards as being protective of the public health and welfare.¹¹¹ Furthermore, "[o]n balance, the [Academy] found no substantial basis for changing the standards."¹¹² A comparison of the full report, from which this often-quoted summary was drawn, with the Conference's tentative conclusions, however, indicated that the phrase "on balance" weighed most heavily in favor of the 1970 Amendments' vast regulatory control program, which would have been completely disrupted if air quality standards had been changed by any significant alteration in the air quality criteria documents.

Within the Academy's full report it was conceded that the present air quality standards *were* based upon the assumption that threshold exposure levels existed for air pollutants and that the air quality standards were simply set at a somewhat lower "safety margin" level than the lowest level for which measurable health effects were scientifically identified and quantified.¹¹³ However, the report stated that the concept of threshold exposure levels had "no physiological meaning," since at any concentration in the atmosphere, no matter how small, adverse health effects may occur.¹¹⁴ As for the "margin of safety" called for in setting the primary air quality standard, the report stated:

"Margin of safety" is actually a misnomer. . . . [I]t supposedly protects the public from unknown effects that may occur at concentrations within this margin. Since effects may occur at concentrations below the existing standard following improvements in research, the word "safety" can be misleading *The most serious uncertainty is the lack of information on whether a lower limit exists*¹¹⁵

Despite these revelations concerning the nature of protection being offered by the present regulatory program, the final report sum-

¹¹⁰NATIONAL ACADEMY OF SCIENCES/NATIONAL ACADEMY OF ENGINEERING, AIR QUALITY AND AUTOMOTIVE EMISSION CONTROL, A REPORT BY THE COORDINATING COMMITTEE ON AIR QUALITY STUDIES (1974).

¹¹¹*Id.* at 6.

¹¹²*Id.*

¹¹³*Id.* at 17. See note 65 *supra* and accompanying text.

¹¹⁴*Id.*

¹¹⁵*Id.* at 334-35 (emphasis added).

mary statement provided the Senate Committee on Public Works with the conclusion needed to quash industry criticisms of the 1970 Amendments' air pollution control program. Neither the proponents of the current air quality standards in Congress, nor industry polluters who had already met the present standards had anything to fear from the Academy's report. The issue of the critical lack of scientific data to assure that public health- and welfare-based control standards were truly protective had been generalized away.

IV. CONCLUSION

The basic premise of the present federal clean air policy is that it is acceptable to permit anyone to dump poisons into the atmosphere until it is shown by measurable and demonstrable evidence that a specific contaminant is causing a specific harm. Only then will its emission into the atmosphere be reduced through federal regulation. However, the one-pollutant-at-a-time approach to air pollution control, which seeks to document the health and welfare effects of each discoverable air pollutant separately, ignores the complexity and continually changing relationships of atmospheric pollution. It is not a single pollutant which produces a single adverse effect, but the entire complex atmospheric mixture that is known to be hazardous to human health and welfare.

Instead of vainly attempting to quantify the adverse effects of this complex mixture—the composition of which is expanding far more rapidly than the scientific knowledge of its health and welfare effects—attention should be directed toward limiting, to the greatest degree possible, the quantity of all of the contaminants entering the mixture. This is precisely the intent of a clean air policy which attempts to uniformly limit the discharges of all air pollutants to the maximum degree at the source. It is the only means of insuring the greatest degree of protection for the public health and welfare.

Uniform national air quality standards and air quality criteria documents are inherently unsatisfactory guidelines for providing the air pollution controls necessary to insure protection of the public health and welfare. To date, the federal regulatory controls imposed by this health- and welfare-dictated policy have only been able to insure protection against exposures to acute levels of certain identifiable and monitorable air pollutant indices. This is because, to date, scientific evidence exists which only provides the requisite measurable and demonstrable health and welfare effects evidence for acute levels of exposure for a handful of pollutant indices. However, regulatory controls will be adequate to fully protect the

public only when provisions are made for protection against chronic low-level exposures to the known air pollutant indices, as well as to the potentially vast numbers of, as yet, unknown atmospheric poisons. Under the present federal policy, the controls necessary to provide further reduction of air pollutant emissions are restricted by the long, slow, and costly progress of the scientific research that will be necessary for, but perhaps inherently incapable of, quantifying adverse health and welfare effects. But until science is able to quantify all of the existing probabilities of air pollution's human dangers, or as long as measurable and demonstrable health and welfare effects evidence is required as a prerequisite to further reductions in air pollution emissions, this nation will be continually misled into believing that the present federal regulatory effort is fully protective against all of the dangers of atmospheric pollution.

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