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ACID PRECIPITATION:
CAN THE CLEAN AIR ACT
HANDLE IT?

Margaret R. Gallogly*

I. INTRODUCTION

Ordinarily, the falling of rain and snow is a common and unremarkable event which seems to prompt headlines only when it happens too little or too often. During the past two decades, however, public attention has begun to focus on rain and snow for a reason other than anticipation of drought or flood. This increasing concern centers on a detected change in a characteristic of precipitation—specifically, its level of acidity.¹ Underlying the alarm is strong evidence that the rain and snow essential to our water supply may cause serious ecological damage when their level of acidity becomes abnormally high.²

The amount of acidity in precipitation (and the entire chemical composition of rain and snow) depends on the concentration of minerals and gases in the atmosphere at the time of a storm. These atmospheric substances react with water vapor during condensation and after the water droplet is formed³ to determine the ultimate

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¹ The acidity of a solution is commonly registered on what is known as a pH scale, which ranges in numerical value from zero to fourteen. The numbers on the scale represent a measurement of the concentration of Hydrogen ions present in a particular solution. A rating of seven on the scale indicates neutrality. Readings of less than seven signify increasing acidity while higher ratings indicate progressively higher levels of alkalinity. Thus, water with a pH reading of 4.0 is more acidic than water with a pH of 5.0. Normally, precipitation is slightly acidic and has a pH of approximately 5.6 to 5.7. ENVIRONMENTAL PROTECTION AGENCY (EPA), RESEARCH SUMMARY: ACID RAIN 3 (1979) (EPA-600/8-79-028).


chemical composition of the precipitation. The subsequent beneficial or detrimental impact of precipitation on the environment is a function of the chemical composition of the rain and snow as determined by the atmospheric "mix" in which the precipitation was formed. The ecological benefits of precipitation often go beyond the replenishment of the water supply. Rain and snow also wash important nutrients such as phosphate, potassium, and nitrogen out of the air and return them to the earth for reuse. The atmospheric reactions between precipitation and other minerals and gases can result in characteristics which are harmful or have the potential to harm the environment. Scientists believe that an abnormally high level of acid in precipitation is properly included in the latter category. This phenomenon of increasingly acidic precipitation is known as acid rain or, since it includes both rain and snow, acid precipitation.

Sulfur and nitrogen oxides are the compounds most responsible for acid precipitation. Once released into the atmosphere, these gases are converted into sulfates and nitrates through oxidation. The sulfates and nitrates—including sulfuric and nitric acids—are returned to earth in water vapor and small particles of solid material.

4. Id.
7. See Ferenbaugh, supra note 2, for a discussion of the ecological impacts of acid precipitation. See also text at notes 37-66 supra.
8. The terms "acid rain" and "acid precipitation" are, in a sense, inappropriate. Even in an unpolluted state, precipitation is slightly acidic. This condition is caused by contact between water vapor and carbon dioxide gas which produces carbonic acid. Ferenbaugh, supra note 2, at 745. Concern about the acidity of precipitation is actually with the increase in the acidity of precipitation beyond what is normally expected.
9. In 1973 approximately 65 percent of the excess acidity in the precipitation falling in the northeastern United States was caused by sulfur compounds and 30 percent by nitrogen compounds. Cogbill & Likens, Acid Precipitation in the Northeastern United States, 10 WATER RESOURCES RESEARCH 1133, 1135 (1974). The percentage of acidity caused by nitrogen oxides is increasing. Id. This trend is significant since nitrogen oxides are more difficult to control than sulfur dioxide. Wetstone, Air Pollution Control Laws in North America and the Problem of Acid Rain and Snow, 10 ENVIR. L. REP. 50,001, 50,011 (1980).
10. Oxidation is the process whereby an oxygen molecule (O₂) is added to a chemical compound. For example, SO₂ (sulfur dioxide) becomes SO₃ (sulfate). The rate of oxidation varies depending upon the meteorological conditions, the time of the year, and the presence of other pollutants. Rosencrantz & Wetstone, Acid Precipitation: National and International Responses, 22 ENVIRONMENT 6, 7 (1980).
11. Acid deposits can fall from the atmosphere in either a "wet" or a "dry" condition. The chemicals which cause acidity can be absorbed by water and fall in precipitation—wet deposits. Alternatively, the same chemical compounds can be absorbed directly while in a gaseous form
The presence of sulfuric and nitric acids increases the acidity of the solution and, if not neutralized by other compounds in the atmosphere, the precipitation falling onto the earth will be acidic.\textsuperscript{12}

Both natural and man-made sources emit sulfur and nitrogen oxides into the atmosphere. Volcanoes, sea spray, and decaying organic material release significant amounts of sulfur\textsuperscript{13} while decaying plant and animal tissues are the predominant natural sources of nitrogen emissions.\textsuperscript{14} In addition, sulfur and nitrogen oxides are by-products of the burning of fossil fuels.\textsuperscript{15} Of the man-made sources which use fossil fuels, electric power plants\textsuperscript{16} and metal refining smelters\textsuperscript{17} are responsible for the major portion of sulfur dioxide emitted in the United States. These stationary sources also release large amounts of nitrogen oxides\textsuperscript{18} into the atmosphere.\textsuperscript{19}


It is estimated that dry material accounts for 50 percent of the acid deposited from the atmosphere. Studies in the area have concentrated on acid falling in precipitation apparently because accurate and convenient measurement techniques are available. \textit{1980 Hearings}, supra note 2, at 9. It is impossible to distinguish the environmental effects of one form from the other. For purposes of this article, acid precipitation will refer to both wet and dry deposits.

\textsuperscript{12} See Likens, \textit{supra} note 3, at 43.
\textsuperscript{13} Ferenbaugh, \textit{supra} note 2, at 755.
\textsuperscript{14} J. ZANETTI, \textit{THE SIGNIFICANCE OF NITROGEN} 5 (1931).
\textsuperscript{15} Likens, \textit{supra} note 3, at 43.
\textsuperscript{16} Raffle, \textit{Prevention of Significant Deterioration and Nonattainment Under the Clean Air Act: A Comprehensive Review}, 10 \textit{ENVIR. REP.} (BNA) (Monographs No. 27) 32-33 (1979). Combustion of fossil fuel (coal, gas, and oil) accounts for about 75 percent of the sulfur dioxide emitted annually in the United States. \textit{Id} at 32. Of the stationary sources which use fossil fuels, coal-fired power plants are the most significant contributors of sulfur dioxide emissions. They are responsible for more than one half of the annual amount. \textit{Id}. at 33.
\textsuperscript{17} Id. Smelters of copper, lead, and zinc emit about 10 percent of the sulfur dioxide released by the United States stationary sources.
\textsuperscript{18} “Nitrogen oxides” and “sulfur oxides” are general terms which refer to those molecules which are a combination of a nitrogen or a sulfur atom with one or more oxygen atoms. Thus, nitrogen oxide (NO), nitrogen dioxide (NO\textsubscript{2}), and nitrogen trioxide (NO\textsubscript{3}) are all included when referring to nitrogen oxides. The same holds true for sulfur oxides.
\textsuperscript{19} \textit{Research Summary}, \textit{supra} note 1, at 2. In 1977, approximately 56 percent of the nitrogen oxide emissions in the United States were from stationary sources while mobile transportation sources accounted for the remainder. \textit{Id}. Emissions from the latter do not contribute significantly to the regional problem of acid precipitation because they are released close to the ground and, generally, deposited in their original form near the source area. The formation of acid causing compounds requires some time in the atmosphere. Therefore, the closer to the ground emissions are released, the less likely that they will contribute to acid precipitation. See \textit{1980 Hearings}, supra note 2, at 435.
The acidity of the precipitation falling in a large area of the United States is well above what is considered a normal level. While precipitation is expected to have a pH of approximately 5.6 to 5.7, it is estimated that the average acidity of precipitation in the northeaster United States is less than 5 on the pH scale. In some urban areas, where the burning of fossil fuel has been concentrated, acidification of precipitation probably occurred as long ago as the turn of this century. However, the widespread occurrence of acid precipitation is a relatively recent phenomenon. Within the past twenty-five years the problem has spread from the northeast section of the United States to encompass most of the areas east of the Mississippi and various locales far to the west.

The increase in precipitate acidity experienced in the United States over the past two or three decades is linked by most authorities to the increased emissions of sulfur and nitrogen oxides from the burning of fossil fuels. For example, between 1960 and 1970, approximate emissions of sulfur oxides attributable to stationary sources burning coal, gas, and oil rose from 22.6 million tons per year to 32.9 million tons per year. At the same time, estimated nitrogen oxide emissions from those sources almost doubled, increasing from 5.5 million tons per year to 10.6 million tons per year. Meanwhile, deposits of sulfuric and nitric acids in precipitation in eastern North America rose dramatically. Increases in sulfur and nitrogen oxide emissions and parallel increases in the amount of acid deposited in precipitation are expected to continue at least until the

20. See note 1 supra.
21. Likens, Acid Precipitation, 54 CHEM. AND ENGIN. NEWS 29, 36 (1976). "Because of the logarithmic nature of the pH scale, pH 4 is 10 times more acidic than pH 5 and 100 times more acidic than pH 6." RESEARCH SUMMARY, supra note 1, at 3.
22. Crowther & Rustan, The Nature, Distribution and Effects upon Vegetation of Atmospheric Impurities in and near an Industrial Town, 4 J. AGRI. SCI. 25 (1911), cited in Likens, Bormann & Johnson, Acid Rain, 14 ENVIRONMENT 33, 34-35 (1972). The authors report that substantial amounts of acid were added to the soil of Leeds, England by rain during 1907 and 1908.
24. Lewis & Grant, Acid Precipitation in the Western United States, 207 SCIENCE 176, 176 (1980).
25. See, e.g., Likens, supra note 3, at 43.
27. Id. at 767.
28. Id. at 292.
end of this century. By that time, it is anticipated that emission standards, gradually imposed, will stabilize and perhaps lower the total amount of sulfur oxides emitted into the atmosphere. This should have a corresponding impact on the level of acidity in precipitation.

The problem of acid precipitation has interstate and international significance. Because of the mobile character of sulfur and nitrogen oxide emissions, pollution released in one state can cause or contribute to the adverse effects of acid precipitation in another state miles away. Therefore, reductions in sulfur and nitrogen oxide emissions by a given state will not be enough to control the ecological and economic effects of acid precipitation falling within that state. The regional nature of acid precipitation poses a serious pollution control problem. Concerned environmentalists and government officials have looked to federal regulation for its solution—specifically, to the provisions of the Clean Air Act.

The purpose of this article is to examine those portions of the Clean Air Act Amendments of 1977 which may lead to a resolution of the problem of acid precipitation. First, the article sketches the ecological and economic damage caused by acid precipitation and demonstrates the need to address the problem through federal ac-

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29. Between 1979 and 2000, sulfur dioxide emissions are expected to increase by about 12 percent and nitrogen dioxide emissions by about 61 percent. Effects of Gaseous Emissions, supra note 11, at v.

30. Costle, New Source Performance Standards for Coal-Fired Power Plants, 29 J. Air Poll. Cont. A. 690 (1979). Nitrogen oxides are more difficult to control than sulfur oxides and the possibility of stabilizing their emission into the atmosphere is less likely. Wetstone, Air Pollution Control Laws in North America and the Problem of Acid Rain and Snow, 10 Envir. L. Rep. 50,001, 50,011 (1980).


32. Wetstone, The Need for a New Regulatory Approach, 22 Environment 9, 9 (1980). It is estimated that approximately four million metric tons of sulfur dioxide pollution is released into Canada by United States sources while about one-quarter of that amount is released by Canadian sources into the atmosphere of the United States each year. Id. A discussion of the international consequences of acid precipitation is beyond the scope of this article.

33. Research Summary, supra note 1, at 3.

34. It is estimated that, of the acid precipitation falling in New England, 44 percent is caused by local pollution sources, 37 percent is from United States sources to the west and south of the region, and 18 percent is due to Canadian sources. The problem is even more pronounced in New York and New Jersey where only 28 percent of the acidity in the precipitation is caused by local sources. The states to the west and south of the area account for 46 percent, New England is responsible for about 12 percent, and Canada for about 13 percent. 1980 Hearings, supra note 2, at 19.


36. Id.
tion. Next, the article analyzes the application of the Act’s emission standards to the acid precipitation problem. Examination of the emission standards requires a somewhat extensive review of various provisions of the Act. This discussion also considers the means included in the Act to enforce the substantive rights created by Congress through the emission standards. Finally, the article summarizes the conclusions reached as a result of the analysis of the emission standards and suggests ways in which federal regulation of acid precipitation may be improved.

II. THE CONSEQUENCES OF ACID PRECIPITATION

A. Ecological Consequences

The ecological impact of acid precipitation depends upon the capacity of the receiving area to neutralize the acidic content of the rain and snow. The extent to which acids can be neutralized (or buffered) is determined by the composition of the bedrock and soils in the affected area. Where the bedrock and soils are composed of alkaline minerals such as carbon, a chemical exchange with the acids in the precipitation is facilitated. This exchange “ties up” the hydrogen ions in the precipitation which cause acidity and, in so doing, restores the natural pH of the environment. Conversely, where the primary bedrock component is a “hard” rock, such as granite, quartzite, or quartz sandstone, the natural weathering processes are hindered. It is through these processes that the chemical ions needed to buffer the acid in precipitation are released. As a result, the ion exchange proceeds too slowly to neutralize the incoming acid.

To the extent that the acid precipitation cannot be neutralized, damage to the environment gradually occurs. Certain fresh-water

38. Id. Ions are atoms which are either negatively charged (anion) or positively charged (cation). The hydrogen ion which causes the acidity in precipitation is a cation. Its positive charge is neutralized by combining with a negatively charged anion such as those contained in alkaline nutrients. Id.
40. Id.
41. See text at notes 46-66 infra. The likelihood of damage from a steady imposition of acid precipitation grows stronger as time passes. This is because the buffering capacity of an area in the form of anions capable of countering the acid in precipitation is gradually depleted. Thus, an area with a sufficient buffer at present may not have such protection in the future if the precipitation falling on it continues to be acidic. Wetstone, Air Pollution Control Laws in North America and the Problem of Acid Rain and Snow, 10 ENVIR. L. REP. 50,001, 50,002 (1980).
and soil systems in some areas of the United States lack a sufficient buffer to counteract acid precipitation.42 Tests of soil samples from the eastern United States reveal that large portions of the area are acid sensitive and will probably suffer from long-term acid exposure.43 In fact, injury to fresh-water and soil systems has already been detected.44 The documented evidence indicates the potential of acid precipitation to cause environmental harm.45

1. Water Systems

Acid precipitation has an adverse effect on fresh-water systems. Scientists have noted disturbances in biological function at all levels of the food chain from simple microorganisms to various fish and animal species. Acidification of fresh water causes a decrease in the activity of those microorganisms which decompose organic matter.46 Consequently, replenishment of the water’s nutrient supply usually accomplished through decomposition is hindered.47 Acidity also facilitates the growth of peat moss as an underwater rather than a terrestrial plant. The moss forms a thick matting on the bottom of acidified ponds and lakes which leads to a substantial nutrient impoverishment of the waters.48

Higher organisms are also directly affected by an increase in the acidity of water. For example, snails and crayfish are particularly sensitive to acid and die out rapidly when the pH is lowered.49 Studies also indicate that fish populations often react poorly to increased acidity in their environment. For many species of fish, acidity interferes with reproduction and causes gradual extinction.50

42. OFFICE OF RESEARCH AND DEVELOPMENT, EPA, SENSITIVITY OF SOIL REGIONS TO ACID PRECIPITATION 10 (1980) (EPA-600/3-80-013). Areas identified as sensitive include parts of the southeastern United States, the Appalachian highlands, the Adirondacks, and the New England states. Preliminary research also indicates that areas outside of the east, such as sections of Minnesota, Wisconsin, and upper Michigan, are susceptible to damage from acid precipitation. RESEARCH SUMMARY, supra note 1, at 5, 9.


45. See text at notes 46-66 infra.


47. Id.

48. Id.

49. Almer, Dickson, Elkstrom, Hornstrom & Miller, Effects of Acidification of Swedish Lakes, 3 AMBIO 30 (1974).

50. Beamish, Acidification of Lakes in Canada by Acid Precipitation and the Resulting Ef-
are also seriously affected by the run-off of melting acidic snow which may release aluminum ions into the fresh-water bodies.\textsuperscript{51} High levels of aluminum in water are toxic to fish, causing damage to their gills and inhibiting oxygen intake.\textsuperscript{52} Decreases in animal and fish populations also have ramifications for those species not directly affected by acid precipitation. Insect pests such as mosquitoes and midges can proliferate when their natural predators are depleted by increased acidity.\textsuperscript{53} Acidity can also indirectly affect birds and animals which depend on aquatic life for a portion of their food. Depletion of their prey could force the migration of these animals from the affected area.\textsuperscript{54}

2. Soil Systems

Acid precipitation can have a significant impact on the fertility and productivity of the soil upon which it falls.\textsuperscript{55} The lowering of the pH level in soil affects microorganisms in soil in much the same way as it does microorganisms in water. The decomposition of organic debris by microorganisms in soil decreases when acid is introduced into the environment.\textsuperscript{56} This slows the recycling of valuable nutrients into a form available for use by vegetation. Moreover, increased acidity inhibits the "fixing" of nitrogen\textsuperscript{57} by microorganisms within the root


\textsuperscript{53} Babich, Davis & Stotzky, Acid Precipitation: Causes and Consequences, 22 Environment 7, 12 (1980).

\textsuperscript{54} Babich, Davis & Stotzky, Acid Precipitation: Causes and Consequences, 22 Environment 7, 12 (1980).

\textsuperscript{55} See generally EPA, Effects of Sulfuric Acid on Two Model Hardwood Forests: Throughfall, Litter Leachate and Soil Solution (1980) (EPA-600/3-80-014).


\textsuperscript{57} Denison, Caldwell, Bormann, Eldred, Swanberg & Anderson, The Effects of Acid Rain on Nitrogen Fixation in Western Washington Coniferous Forests, 8 Water, Air & Soil Pollution 21, 21 (1977). Only certain bacteria, algae, and fungi are able to utilize the nitrogen available in the atmosphere in satisfying their nitrogen need. These bacteria absorb (fix) the free nitrogen and change it into compounds which plants can use in their own tissues. Without the bacterial catalyst, plants and animals would not be able to obtain this necessary element. Babich, Davis & Stotzky, Acid Precipitation: Causes and Consequences, 22 Environment 7, 10 (1980).
nodules of plants and consequently deprives the vegetation of an elemental nutrient. Acidity in precipitation also stimulates the leaching of minerals from soil particles. The leached minerals are easily washed away into the watershed thus isolating them from use by plants. In addition, leaching releases certain heavy metals which are toxic to plants and animals even in minute quantities. This effect of acidity has the potential to be particularly dangerous if the leached minerals enter a watershed which supplies human populations.

The effect of acidity on soil is to decrease its fertility which, in turn, hampers the growth of vegetation. Acid precipitation is linked to reductions in the growth rate of a variety of trees and plants. In addition, there is evidence that direct contact with acid precipitation can lead to damaged foliage in some types of vegetation. The precise effect of this damage on forest and agricultural yields is still being evaluated. In this and in all other recorded instances of damage to fresh-water and soil systems attributable to acid precipitation, the price being paid is a heavy one both environmentally and economically.

B. Economic Consequences

Attempts to quantify the harm caused by acid precipitation have proven difficult. The problematic task includes measuring the

59. Likens & Bormann, Acid Rain: A Serious Regional Environmental Problem, 184 SCIENCE 1176, 1178 (1974). Leaching describes a process whereby the electrostatic bonds between minerals and soil particles are broken thus freeing the mineral.
60. Id.
62. EPA, EFFECTS OF ACID PRECIPITATION ON SOIL LEACHATE QUALITY (1980) (EPA-600/3-80-015). There has been little assessment of the health implications of acid precipitation but it seems that this pollutant is not directly adverse to human health. See, e.g., Ferris, Health Aspects of Fossil Fuel Fired Power Plants—Air Pollution, in EPA, SYMPOSIUM ON ENERGY AND HUMAN HEALTH: HUMAN COSTS OF ELECTRIC POWER GENERATION 177, 191 (1980) (EPA-600/9-80-030).
63. See Agricultural Productivity and Env't Quality: Hearings before the Subcomm. on Natural Resources and Env't of the Senate Comm. on Science and Technology and the Subcomm. on Conservation and Credit of the House Comm. on Agriculture, 96th Cong., 1st Sess., 216 (1979).
65. See Evans, Gmur & Da Costa, Leaf Surface and Histological Perturbations on Leaves of Phaseolus Vulgaris and Helianthus Annuus after Exposure to Simulated Acid Rain, 64 AM. J. BOTANY 903 (1977); Evans & Curry, Differential Responses of Plant Foliage to Simulated Acid Rain, 66 AM. J. BOTANY 953 (1979).
66. See, e.g., RESEARCH SUMMARY, supra note 1, at 7-12.
damage attributable to acid precipitation, eliminating other possible sources of the environmental harm, and placing a dollar value on the proven economic loss.\(^67\) Almost inevitably, the estimates of economic devaluation are uncertain.\(^68\) Despite the difficulty in assessing the precise loss caused by acid precipitation,\(^69\) the documented evidence of damage done to fresh-water and soil systems and to animal and plant life inexorably leads to the conclusion that the costs of this pollution problem are rising even if such costs are not yet specifically quantified.

The considerable economic burden placed on an area affected by acid precipitation is best illustrated by a specific example. The lakes of the New York Adirondack Mountains are exhibiting signs of severe reaction to the increasingly acid precipitation falling in the area. The decline of fish populations in those mountains is estimated to cause a loss of $15 million per year in recreational income.\(^70\) Attempts by the New York State Government to revive the acidified lakes and ponds by adding lime in order to raise the water’s pH level have cost an additional $150,000 per year in materials and labor.\(^71\) It is further estimated that $70,000 more per year would be required to monitor the lakes and assess the status of the fish populations within them.\(^72\)

The economic cost of acid precipitation can also be estimated through a simulation of the impact of a pollution source on a particu-
lar area. One such study[^73] recreated the complete chain of air pollution from a fossil-fuel-fired power plant. The study estimated the level of pollution emissions, traced their dispersal within a 500-mile circumference, and then assessed their economic impact on the affected area. Based on this model, an estimate of the damage caused to the environment, to material goods[^74], and to human health by each emitted pollutant[^75] was reached.[^76] The economic impact of acid precipitation predicted as a result of this simulation was $770,000 in damage each year.[^77] By evaluating the impact of pollution from a plant on areas up to 500 miles away, the study also suggested the importance of another characteristic of acid precipitation—that is, the pollution's interstate nature.

### C. Interstate Consequences

Sulfur and nitrogen compounds, the pollutants most responsible for acid precipitation, are extremely mobile. They are capable of remaining in the atmosphere for as long as five days during which time they can be transported many hundreds of miles.[^78] Because of the prevailing weather pattern in the United States, the high levels of acid precipitation in the northeast are partly attributable to pollution sources in the midwest.[^79] For example, one recent study measured


[^74]: Acid precipitation exacts a toll on many man-made objects. Sulfur compounds are linked to the accelerated corrosion of metals and the pitting of marble, concrete, and limestone. Damage to buildings made of these materials has resulted. *EFFECTS OF GASEOUS EMISSIONS*, supra note 11, at 33. In addition, sulfur pollutants cause the deterioration of some textiles and reduce the strength of paper and leather products. *Id.* Pollutants formed from nitrogen oxide emissions also damage textile materials and dyes and corrode some metals. *Id.*

[^75]: In addition to acid precipitation, the pollutants which were studied for their economic impact were sulfur dioxide, particulates, nitrogen oxide, carbon monoxide, and sulfates. Mendelsohn, *supra* note 73, at 78.

[^76]: *Id.*

[^77]: *Id.*

[^78]: Babich, Davis & Stotsky, *Acid Precipitation: Causes and Consequences*, 22 *ENVIRONMENT* 7, 8 (1980). The mobility of emissions is enhanced by the use of tall smokestacks which release the pollutants higher in the atmosphere and, thus, disperse them over a broader area. Since 1970, 175 smokestacks higher than 500 feet have been constructed in the United States, almost all of them for the electric power industry. Wetstone, *Air Pollution Control Laws in North America and the Problem of Acid Rain and Snow*, 10 *ENVIR. L. REP.* 50, 001, 50, 010 (1980).

[^79]: To some extent, the reverse is also true. That is, some of the acid precipitation falling in the midwest is caused by eastern sources. However, because of the prevailing meteorological pattern, states in the east derive more of their acid precipitation from transported pollution than do midwest states. *See 1980 Hearings*, supra note 2, at 158. Exacerbating the effect caused by the weather is the fact that sources in the midwest emit a great deal more sulfur
the amounts of sulfates deposited at three isolated sites in New York State.\textsuperscript{80} The researchers found that the concentrations of sulfate depended upon the origin of the air mass passing over the state. On days of low concentration, the air mass originated over central Canada. When the sulfate concentrations were high, the air had passed through the industrial areas of the Ohio River Valley. The authors concluded that the high sulfate levels were caused by sulfur dioxide emissions in Ohio, southwestern Michigan, and eastern Pennsylvania.\textsuperscript{81}

The mobility of the pollutants which cause acid precipitation discourages efforts by industry to use anti-pollution devices to control their sources' emissions. Because of the interstate transport of pollutants and the prevailing west to east weather pattern, those states which emit the greatest amounts of sulfur and nitrogen oxides have less incentive to reduce their pollution levels since they do not suffer from acid precipitation to a degree proportional to their emissions.\textsuperscript{82} Industry in those states is reluctant to shoulder the cost of abating acid precipitation because the ultimate benefit is not, in large part, to their immediate area but to one far distant.\textsuperscript{83} On the other hand, states which are seriously affected by acid precipitation cannot eliminate the pollution from out of state which is causing a significant portion of their problem.\textsuperscript{84} To compensate for pollutants originating out of state, industry in areas affected by acid precipitation would have to reduce their own emissions even further and thus increase their costs for pollution abatement.

Despite the considerable cost involved, control of acid precipitation is an increasingly important priority of officials in states affected by


81. \textit{Id.} at 583.

82. See note 78 \textit{supra}.

83. For the ten year period of 1976-85, the cost of air pollution abatement was projected at $289 billion. \textit{Council on Environmental Quality, Environmental Quality} 327 (1977). For that investment, benefits in the form of decreased health costs and increased life spans will be valued at $10 billion per year by 1985. \textit{Congressional Research Service for the Senate Comm. on the Envt' and Public Works, 96th Cong., 1st Sess., The Status of Envt'l Economics: An Update} 100 (1979).

84. See text at notes 78-81 \textit{supra}. 

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this problem.\textsuperscript{85} The ecological and economic consequences which have prompted this governmental concern are rapidly becoming apparent.\textsuperscript{86} Yet, the interstate mobility of the pollution prohibits an adequate resolution of the problem by individual states. Instead, effective control requires a coordinated reduction in emissions of sulfur and nitrogen oxides in all states. The logical mechanism for achieving this reduction is the federal Clean Air Act. The nationwide pollution emission standards set through the Act bring a comprehensive approach to the acid precipitation problem which offers the best hope of solving it.

III. THE CLEAN AIR ACT\textsuperscript{87} AND ACID PRECIPITATION

The Environmental Protection Agency (EPA) is currently reviewing the Clean Air Act to determine what regulatory options, if any, are available to control acid precipitation.\textsuperscript{88} An examination of the Act reveals that a solution to acid precipitation may be reached through those provisions which determine the amount of pollution

\textsuperscript{85} See generally 1980 Hearings, supra note 2.

\textsuperscript{86} See text at notes 46-66 supra.


Because this article concerns the control of acid precipitation, it concentrates on those sections of the Clean Air Act which regulate major sources emitting sulfur dioxide and nitrogen dioxide in such a way that their long-distance transport is facilitated. For this reason, Part B of Subchapter I (42 U.S.C. §§ 7450-7459) and all of Subchapter II (42 U.S.C. §§ 7521-7574) are not discussed.

\textsuperscript{88} 1980 Hearing, supra note 2, at 11. The EPA has undertaken extensive research into the effects of acid precipitation. Existing projects include:

- identifying areas sensitive to acid precipitation;
- testing crops with artificially created acid precipitation;
- studying fresh water ponds and lakes in Wisconsin and Michigan for possible damage due to acid precipitation;
- increasing the number of pH monitoring stations;
- investigating the regional transport of acid precipitation to those areas which are sensitive to it;
- estimating damages to monuments and buildings;
- estimating the costs of acid abatement.

\textit{Id.} at 10-11.
emissions permitted.89 The applicability of these emission standards depends on the answers to three questions: what pollutant does the source emit?; where is the pollution source located?; and when was that source built? Consequently, the potential use of the emission standards to decrease the amounts of sulfates and nitrates in the atmosphere will depend on the answers to those questions.

Before discussing the emission standards of the Act, a difficulty attendant to controlling acid precipitation should be mentioned. This is the problem of establishing causation. Under the Clean Air Act, a state which believes that its own pollution control program is being impeded by the emissions released from out-of-state sources can attempt to have the emissions from the offending sources reduced.90 Thus, a state which has reason to believe that its acid precipitation problem is the result of emissions entering from another region theoretically has a remedy available to address the problem. However, the long-distance transport of the pollutants which cause acid precipitation is a barrier to establishing a sufficient connection between the emission and the harm which is needed to force emission abatement. Air quality models are the means by which the impact of a pollutant emitted by a source is estimated.91 These models have such technical limitations that the EPA restricts their applicability to an area within fifty kilometers of the pollution source.92 Beyond that range, any attempt to attribute the pollution entering an area to a particular facility is not supportable by models. Accurate extrapolation of the source of pollution from its impact on an area is complicated by the fact that generally no one source is responsible for long-range pollution. Instead, the emissions from many sources cumulate to form an air pollution mass which then causes ecological and economic damage.93


90. See text at notes 245-54 infra.

91. Modeling entails the use of mathematical formulii to estimate the pollution concentration which would occur in the vicinity of a plant emitting given levels of pollution. NATIONAL EMISSION STANDARDS STUDY: REPORT OF THE SECRETARY OF HEALTH, EDUCATION, AND WELFARE, 91ST CONG., 2d SESS. 31-32 (1970).


The chemical transformation which usually occurs during the production of acid precipitation further complicates the tracing of this pollution. It is feasible that sulfur and nitrogen oxides emitted in one state could be changed into sulfates and nitrates over another and, finally, fall as sulfuric and nitric acid in yet a third. Establishing the contribution made by the emissions of a particular source in one area to the acid precipitation in another requires proof of the extent to which sulfur and nitrogen oxides are converted into sulfates and nitrates. Also required is proof of the amount of the transformed pollutants which are transported out of the local area in which they were released and establishment of the percentage of sulfates and nitrates which are eventually incorporated into precipitation. Finally, the extent of the damage caused by acid precipitation when it falls to the earth must be measured. To a large degree, the reliance which is placed on proof of the impact of emissions from a source before pollution abatement is ordered will determine the ability of a state to reduce the importation of acid precipitation. Consequently, control of acid precipitation through the Clean Air Act depends on both its emission standards and its provisions to enforce those standards.

A. A History of Federal Clean Air Legislation

To place in proper perspective the current provisions of the Clean Air Act, a brief review of the history of federal legislation in this area is necessary. The history of the Clean Air Act began in 1955 when Congress enacted the first piece of legislation dealing with air pollution—the Air Pollution Control Act of 1955. Under this Act, the Surgeon General, acting in the name of the Secretary of Health, Education and Welfare, was authorized “to prepare or recommend research programs for devising and developing methods for eliminating or reducing air pollution.” The Act did not grant regulatory or enforcement powers to the federal government.

94. See text at notes 9-12 supra.
95. See generally Wetstone, Air Pollution Control Laws in North America and the Problem of Acid Rain and Snow, 10 ENVIR. L. REP. 50,001, 50,001-02 (1980).
96. See 1980 Hearings, supra note 2, at 412.
98. Id. § 2(a).
fact, it specifically declared state and local governments the proper agents for pollution control.\textsuperscript{100} Similarly, no provisions for federal solution of interstate air pollution disputes were included. The role of the federal government was, instead, seen as one of coordinating the efforts of state and local agencies by disseminating information valuable to their pollution abatement programs.\textsuperscript{101}

Congress replaced the Act of 1955 with a second major anti-air pollution measure, the Clean Air Act of 1963.\textsuperscript{102} This Act continued the research orientation adopted by the Congress of 1955.\textsuperscript{103} Two new provisions, added in 1963, distinguished the later effort from the 1955 legislation. These changes were a federal grant-in-aid system to help finance state, local, and regional air pollution control agencies and a federal program to abate particularly difficult pollution control problems.\textsuperscript{104}

Included in the 1963 federal abatement program were specific provisions for remedying interstate air pollution which threatened the health or welfare of the citizens of the receiving state.\textsuperscript{105} Where such interstate pollution existed the Secretary of Health, Education and Welfare was authorized to call a pollution abatement conference in order to attempt a cooperative reconciliation of the states' positions.\textsuperscript{106} Based on the information received through the conference, the Secretary could recommend any appropriate remedial action.\textsuperscript{107} If the offending state did not respond to cooperative measures, the Secretary could, as a final resort, request the Attorney General to bring an abatement suit against the state.\textsuperscript{108} The conference procedure was intended to be "a practical remedy" which struck a "reasonable balance between the primary rights of the States to control air pollution within their boundaries and the rights of States seriously affected by pollution from another State."\textsuperscript{109} The legislative

\begin{footnotes}
\textsuperscript{100} Pub. L. No. 84-159, § 1, 69 Stat. 322 (1955).
\textsuperscript{106} Id. § 5(e)(1)(A). Participants at such a conference would include representatives of the Air Pollution Control Boards from each of the state, local, and regional governments involved as well as federal government spokesmen. \textit{Id.}
\textsuperscript{107} Id. § 5(d).
\textsuperscript{108} Id. § 5(e)-(f).
\end{footnotes}
history of the 1963 Act makes clear, however, that the primary role given the states in the Air Pollution Control Act of 1955 was not diminished by the new interstate air pollution abatement provisions.110

Four years later, Congress passed a second major revision111 of the 1955 Act entitled the Air Quality Act of 1967.112 With this Act, Congress attempted to bring some uniformity to state efforts at air pollution control by authorizing the Secretary to establish Air Quality Criteria intended to specify the danger to public health and welfare posed by pollutants at various levels of concentration.113 The states were required to use these criteria as guidelines for the promulgation and enforcement of air quality standards "adequate for the protection of public health" and achievable "through the application of feasible control techniques."114 The possibility of conflicting state standards was to be further alleviated by the power of the Secretary to create Air Quality Control Regions (AQCR's) within which pollution control would be uniform.115 Since the AQCR's were supposed to reflect a logical regulatory scheme, their boundaries could include parts of different states.116 If a state failed to establish air quality standards, the Secretary could do so in its stead.117

The 1967 attempt to establish national guidelines for air pollution control was a failure. The establishment of AQCR's, a step required before the states were obligated to promulgate air quality standards,
did not take place within a reasonable time. Even where timely federal action was taken, the separate evaluation and promulgation of emission standards by several states caused a wasteful duplication of effort. In 1970, therefore, Congress once again undertook the task of amending the Clean Air Act. The result was a much stronger federal role in establishing and enforcing air pollution standards.

The Clean Air Act Amendments of 1970 authorized the Environmental Protection Agency to establish three types of national emissions standards. These included the primary and secondary National Ambient Air Quality Standards (NAAQS’s); the New Source Performance Standards (NSPS’s); and the National Emissions Standards for Hazardous Air Pollutants (NESHAP’s). In providing for national standards, the Act departed significantly from the past practice of relying on the states to propose and enforce adequate pollution control strategies. Furthermore, the NAAQS’s and the NESHAP’s were “health based” standards in that permitted emissions levels were to be determined solely by health criteria without regard for the cost or technological feasibility of achieving the reduction. The purpose of such standards was, first, to protect the public health and, second, to force the development of pollution control techniques, or designate air quality regions was inexcusable in light of the congressional mandate in 1967.” Trumbull, Federal Control of Stationary Source Air Pollution, 2 ECOLOGY L. Q. 283, 293 (1972). See also H.R. REP. NO. 91-1146, 91st Cong., 2d Sess., reprinted in [1970] U.S. CODE CONG. & AD. NEWS 5356, 5357.


125. La Pierre, Technology-Forcing and Federal Environmental Protection Statutes, 62 IOWA L. REV. 771, 776 (1977). The use of health based criteria is limited to the Clean Air Act and toxic pollutant control under the Federal Water Pollution Control Act. Fear of economic disruption is the reason given for the general reluctance to impose standards without regard to available technology. Id.
control technology.126 Each state was required to promulgate implementation plans sufficient to enforce the standards set by the Administrator.127 If a state failed to promulgate a plan, the Administrator was authorized to do so.128 The Administrator could also enforce a state implementation plan (SIP) by issuing a compliance order129 and, if necessary, enforce a compliance order by instituting a civil action against the offending party.130 Also included in the 1970 Amendments were two new provisions allowing the use of citizens’ suits to enforce emission standards. Private citizens were given standing to challenge noncompliance with an emission standard by a polluter or failure by the Administrator to perform mandatory functions.131 The Administrator’s actions were also open to review upon a petition by a private party.132

In the 1970 Amendments, Congress changed the provisions by which interstate air pollution disputes were addressed. Instead of retaining the conference procedure first established in the Clean Air Act of 1963, the Amendments required the inclusion of “adequate provisions for intergovernmental cooperation” within each SIP.133 Subsequently, the EPA interpreted this mandate as necessitating an information exchange among the states whereby the state air pollution control agencies would inform each other of factors which might significantly affect the air quality of an adjoining region.134 The most recent amendments to the Clean Air Act135 retain the

In contrast with the NAAQS’s and the NESHAP’s, the NSPS’s standards are technologically based. The 1970 statute required NSPS’s “achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction) the Administrator determines has been adequately demonstrated.” Clean Air Act Amendments of 1970, Pub. L. No. 91-604, § 111(a)(1), 84 Stat. 1676, 1683 (1970).

128. Id. § 110(c).
129. Id. § 113(a)(2).
130. Id. § 113(b).
131. Id. § 304(a).
132. Id. § 307(b)(1).
133. Id. § 110(a)(2)(E).
134. 40 C.F.R. § 51.21(c) (1972). In National Resources Defense Council v. EPA, 483 F.2d 690 (8th Cir. 1973), the court of appeals upheld the adequacy of this information exchange. The “Congress has left to the sound discretion of the Administrator the determination of what degree of governmental cooperation and other measures are necessary to insure noninterference with the attainment and maintenance of national standards.” Id. at 692-93.
basic structure of federal emission standards built into the 1970 legislation and, at the same time, address particular problems with which the earlier Acts did not deal. The 1977 Amendments require that the states revise their SIP provisions which pertain to the attainment and maintenance of NAAQS’s. The new SIP’s must incorporate new regulations protecting those areas of the state which enjoy air quality cleaner than that stipulated by the NAAQS’s. The purpose of these revisions is to prevent the significant deterioration of clean areas of the country. Alternatively, any state which contains areas not in compliance with the NAAQS’s must include provisions in their revised SIP’s which will ensure the attainment of the NAAQS’s within five years of the Act’s passage. Meanwhile, reasonable further progress towards NAAQS’s attainment is required. This section on nonattainment areas was added to ensure the “realization of the dual goals of attaining air quality standards and providing for new economic growth.” Nevertheless, economic growth may be hampered by both the prevention of significant deterioration (PSD) and the nonattainment regulations.

The 1977 Amendments also modified the approach previously taken in controlling emissions from new sources. The NSPS’s now must reflect “the degree of emission limitation and the percentage reduction achievable through application of the best technological system of continuous emission reduction.” Requiring the best technological system eliminates the incentive to use fuels with low

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138. Clean Air Act Amendments of 1977, 42 U.S.C. §§ 7501-7508 (Supp. III 1979) (Part D—Plan Requirements for Nonattainment Areas). See text at notes 222-44 infra. All areas of the country are subject to either the PSD or the nonattainment regulations of the Act since all must either be in “attainment” or “nonattainment” of the NAAQS’s. If an area has achieved the NAAQS’s for one pollutant but has not been able to do so for another, then both PSD and nonattainment regulations must be included in the revised SIP.
141. This is especially true with regard to PSD because it obviates the state’s choice between economic growth and environmental purity. See Hines, A Decade of Nondegradation Policy in Congress and the Courts: The Erratic Pursuit of Clean Air and Clean Water, 62 Iowa L. Rev. 643, 667 n.101 (1977); Comment, Increment Allocation Under Prevention of Significant Deterioration: How to Decide Who is Allowed to Pollute, 74 Nw. U.L. Rev. 936, 938 (1980).
pollutant content as the sole means of achieving the NSPS's promulgated in 1970.\textsuperscript{143} Relying on technology similarly discourages the use of excessively tall smoke stacks, a technique which industry had previously used to disperse pollution high into the atmosphere thereby lessening its impact on the local area. Because pollution levels in an area cannot exceed an amount specified by the NAAQS's, it is most conducive to economic growth to place the best anti-pollution devices on each new plant. The smaller the amount of the area's pollution increment which is used by each new plant, the more industrial sources which can be built in an area.\textsuperscript{144}

The interstate abatement procedures of the Clean Air Act were also amended in 1977.\textsuperscript{145} Each state is required to include provisions within its SIP which will ensure the prevention of interstate air pollution.\textsuperscript{146} The 1977 Amendments also stipulate a procedure by which the pollution program adopted by each state can be protected from interference from out-of-state emissions.\textsuperscript{147} This procedure enables a state to petition the Administrator for the abatement of emissions which prevent the attainment or maintenance of a NAAQS in the petitioning state or which interfere with its PSD regulations.\textsuperscript{148}

Ultimate state control of pollution regulation has been a theme of federal clean air legislation since the passage of the 1955 Air Pollution Control Act. In each successive piece of legislation since 1955, however, one can trace Congressional attempts to reconcile the contradiction between state-by-state pollution regulation and the interstate character of pollution problems. Significantly, although federal responsibility for air pollution regulation has gradually increased over the past twenty-five years, the Act's present system of emission control is still based on state oversight of local pollution sources with particular standards determined by the quality of the air in the local area. To the extent that individual states retain control of emission

\textsuperscript{143} For example, under the 1970 Act, coal-burning industries would forego expensive pollution control equipment because burning low sulfur coal reduced their emissions enough to achieve the NSPS's for sulfur dioxide. The 1977 change in § 7411 was expected to make the sulfur content of the fuel irrelevant. This, it was hoped, would eliminate some of the competitive advantage enjoyed by coal mining areas abundant in low sulfur coal and would free the low sulfur supply for older plants which could not economically retrofit with effective pollution control technology. H.R. REP. No. 294, 95th Cong., 1st Sess. 184-95, \textit{reprinted in} [1977] U.S. CODE CONG. & AD. NEWS 1077, 1262-74.

\textsuperscript{144} \textit{Id.} at 185, U.S. CODE CONG. & AD. NEWS at 1264.


\textsuperscript{146} \textit{Id.} § 7410(a)(2)(E)(ii).

\textsuperscript{147} \textit{Id.} § 7426.

\textsuperscript{148} \textit{Id.} § 7426(b) provides a procedure to resolve disputes in addition to that established under §§ 7604 and 7607. These latter are not limited to interstate pollution problems.
limitations, the Act's capacity to deal with interstate pollution is diminished. The tension between state and federal regulation of air pollution and the consequences of this tension on interstate pollution control can be illustrated by an examination of the national emission standards set up under the Act.

**B. The National Emission Standards and Acid Precipitation**

1. National Ambient Air Quality Standards (NAAQS's)

a. NAAQS's for Existing Pollution Sources

The 1977 Clean Air Act Amendments require the EPA, as a first step in the control of pollution, to publish Air Quality Criteria Documents for those pollutants believed injurious to the public health or welfare. In each Criteria Document, the EPA sets forth the various adverse effects caused by particular pollutants as their concentration in the atmosphere increases. The Administrator of the EPA, using the information in the documents as a guide, then establishes two national standards for each pollutant. The primary National Ambient Air Quality Standard indicates the level of pollution in the atmosphere at which the protection of human health is not threatened. The secondary National Ambient Air Quality Standard, the more stringent of the two, is designed to prevent "any known or anticipated adverse effects of a pollutant." Such effects include damage to agricultural and forest vegetation, to textile and building materials, and to less obvious values such as visibility. Thus, the NAAQS's control strategy is a two-step process with attainment of the primary standard the first goal. Seven pollutants are currently subject to NAAQS's. These are sulfur dioxide, nitrogen dioxide, lead, ozone, total suspended particles (TSP), hydrocarbons, and carbon monoxide.

The second step in the NAAQS's regulatory scheme is the adoption by each state of a plan which provides for the "implementation,  

149. *Id.* § 7408(a)(1).
150. *Id.* § 7408(a)(2).
151. *Id.* § 7409.
152. *Id.*
154. Attainment of the secondary standards is also mandatory but, unlike the primary standards, the Act does not specify a date by which attainment must be achieved. Instead, it gives the states a reasonable time in which to do so.
155. *Id.* §§ 50.4-50.12 (1980). The two pollutants for which national quality standards have been established and which are of concern for this article are sulfur dioxide and nitrogen dioxide.
maintenance and enforcement" of the primary and secondary NAAQS's.\textsuperscript{156} To facilitate the creation of the states' implementation plans, the EPA has divided the states into Air Quality Control Regions (AQCR's).\textsuperscript{157} Testing is conducted to determine whether the air quality within each region is better or worse than the NAAQS's established for the seven criteria pollutants.\textsuperscript{158} Those AQCR's which have ambient air pollution levels better than the NAAQS's are considered "attainment" areas; those in which the air quality is worse than the NAAQS's are "nonattainment" areas.\textsuperscript{159} Once the quality of the air within its boundaries is known, the state can devise a SIP designed to regulate its pollution sources in such a way that the NAAQS's are attained and maintained.

After it adopts an implementation plan, a state must submit that SIP to the Administrator for approval. The Administrator reviews the plan and determines whether it complies with the requirements for implementation plans listed in section 7410(a)(2) of the Act.\textsuperscript{160} If

For sulfur dioxide, the national primary ambient air quality standard is eighty micrograms per cubic meter (0.03 parts per million) as an annual arithmetic mean, or 365 micrograms per cubic meter (0.14 parts per million) for the maximum twenty-four hour concentration, not to be exceeded more than once per year. \textit{Id.} § 50.4.

The corresponding primary standard for nitrogen dioxide is 100 micrograms per cubic meter (0.05 parts per million) annual, arithmetic mean. \textit{Id.} § 50.11. The EPA is in the process of revising the NAAQS's for both these pollutants as required by §§ 7408(c) and 7409(d)(1) of the Act. On Jan. 31, 1980, the EPA established a standard review docket in advance of a decision on a revised standard for nitrogen dioxide. 45 Fed. Reg. 6,958 (1980). The Agency is also investigating revision of its sulfur dioxide standard. It made available for public comment an external review draft of air quality criteria for particulate matter and sulfur oxides on April 11, 1980. 45 Fed. Reg. 24,913 (1980). The second external draft became available on Jan. 29, 1981. 46 Fed. Reg. 9,746 (1981).

\textsuperscript{156} Clean Air Act Amendments of 1977, 42 U.S.C. § 7410(a)(1) (Supp. III 1979). The 1970 Act required all states to attain the primary NAAQS's within three years after approval of a given state's implementation plan. Pub. L. No. 91-64, 84 Stat. 1676, 1680 (1970). Secondary standards were to be achieved within a "reasonable" time. \textit{Id.} Most states were unable to comply with the 1975 deadline for all pollutants. Therefore, Congress set new time limits for state compliance in the 1977 Act. States have until Dec. 31, 1982 to meet the primary NAAQS's for each criteria pollutant. 42 U.S.C. § 7502(a)(1) (Supp. III 1979). An extension of up to five years is available if the state can demonstrate that attainment of the primary NAAQS's for photochemical oxidants or carbon monoxide is impossible by Dec. 31, 1982. \textit{Id.}

\textsuperscript{157} 42 U.S.C. § 7407(b) (Supp. III 1979).

\textsuperscript{158} \textit{Id.} § 7407(d)(1).

\textsuperscript{159} The classification of an area as attainment or nonattainment is important primarily because it determines whether an area will be subject to the PSD or to the Nonattainment procedures of the Act. See text at notes 199-244 \textit{infra.}

\textsuperscript{160} Section 7410 outlines eleven basic elements which each SIP must incorporate before the Administrator can approve the plan. A SIP must:

- provide for the attainment of the primary NAAQS's as expeditiously as possible and for the secondary NAAQS's within a reasonable time;
- include emission limitations necessary to achieve or maintain the NAAQS's;
all the requirements are fulfilled, the Administrator must approve the SIP. If, instead, the Administrator finds that the plan does not meet the stipulations of the Act, he must promulgate an adequate substitute for the state. In virtually every state, the major portion of air pollution regulation is accomplished through the applicable state plan.

Most areas of the country are classified as attainment for sulfur dioxide and nitrogen dioxide. Despite this achievement, ecological and economic problems due to acid precipitation are, reportedly, worsening. The reason for the ineffectiveness of NAAQS's with regard to acid precipitation control is that these standards are intended to eliminate the danger to health posed by excessive amounts of sulfur dioxide and nitrogen dioxide in the atmosphere, not to achieve safe levels of sulfates and nitrates. The standards established for these initial pollutants do not provide for the impact of secondary pollutants formed through chemical reactions in the at-

- include provisions on monitoring air quality;
- insure enforcement of emission limitations and regulation of source construction;
- prevent interstate pollution impacts;
- ensure adequate state funding, personnel, and authority for full implementation;
- require inspection of motor vehicles;
- provide mechanisms to revise the plan when necessary;
- prohibit construction in nonattainment areas after June 30, 1979 if a SIP revision according to Part D is not approved;
- comply with sections 7421, 7427, and Part C;
- require a permit fee to cover the costs of preconstruction review.


161. Id.

162. Id. § 7410(c)(1). Ohio is the only state for which the Administrator has implemented a substitute plan. 41 Fed. Reg. 36,324 (1976). See Wetstone, Air Pollution Control Laws in North America and the Problem of Acid Rain and Snow, 10 ENVIR. L. REP. 50,001, 50,006 (1980).

163. The state plans also include those national standards issued by the Administrator under NSPS and NESHAP. See text at notes 255-306 infra.

164. Thirty-seven out of fifty-one SIP's (including the District of Columbia) register air quality in attainment of the sulfur dioxide and the nitrogen dioxide NAAQS's. See 40 C.F.R. §§ 52.50-52.2631 (1980). Of the remaining fourteen states, twelve report violations of the sulfur dioxide NAAQS's in at least one air quality region. Id. (These states include Alabama, Arizona, Iowa, Michigan, Mississippi, Montana, New Mexico, Ohio, Pennsylvania, Tennessee, and Utah). One state (Colorado) reports a violation of only the nitrogen dioxide standard. 40 C.F.R. § 52.325 (1980). Illinois is in violation of the NAAQS's for both pollutants in the AQCR covering Cook County. Id. § 52.727.

165. See text at notes 46-77 supra.

166. See H.R. REP. No. 294, 95th Cong., 1st Sess. 122-27, reprinted in [1977] U.S. CODE CONG. & AD. NEWS 1077, 1201-05. Even in those areas of the country most affected by acid precipitation, the NAAQS's would permit an increase in the total amount of sulfur dioxide in the atmosphere. The Administrator of the EPA calculated that a 20 percent increase in emissions of this pollutant in the northeast would not cause a NAAQS's or a SIP violation. 1980 Hearings, supra note 2, at 296.
mosphere after emission. Thus, attainment of safe levels of sulfur and nitrogen oxides in a local area is not sufficient to protect a distant area from an adverse reaction due to sulfates and nitrates.167

This difficulty with using the present NAAQS's to control acid precipitation can be remedied by setting new primary and secondary standards sufficient to control the levels of sulfates and nitrates in the atmosphere. A NAAQS's modification to achieve this end would entail either stricter standards for sulfur dioxide and nitrogen dioxide or an entirely new standard for sulfates and nitrates. Regardless of which tack is taken, it would first be necessary to determine how much of a reduction in emissions is needed to control acid precipitation. Once an effective reduction is known, the new NAAQS's could mandate the attainment of this lesser level and allow industry to decide how best to achieve the goal.168 The most difficult step in the process of implementing more stringent sulfur dioxide and nitrogen dioxide standards would be in establishing the appropriate levels of those pollutants at which acid precipitation is reduced. The EPA has taken the position that any control strategy for acid precipitation is dependent on improving the “understanding of the emissions transport, transformation, and deposition processes under a variety of conditions.”169 Such improvements are necessary to effectuate the suggested strengthening of the sulfur dioxide and nitrogen dioxide standards. Without adequate proof of the dynamics of sulfur dioxide and nitrogen dioxide emissions and acid precipitation, the Agency could expect a great deal of opposition to any proposed stricter NAAQS's.170 Taking into account the Agency's stand on imposing acid precipitation regulations,171 it is doubtful that a change in the NAAQS's for these pollutants will be the method chosen to counteract the acid precipitation problem.172

167. See text at notes 78-86 supra.
169. 1980 Hearings, supra note 2, at 412 (EPA response to written Committee questions).
170. The dispute between Ohio and the EPA over sulfur dioxide emission limitations illustrates the reluctance of the electric power industry to accept the present sulfur dioxide NAAQS's. Since 1973, the U.S. Court of Appeals for the Sixth Circuit has heard six challenges to the validity of the emission standard for this pollutant: Buckeye Power, Inc. v. EPA, 481 F.2d 162 (6th Cir. 1973); Buckeye Power, Inc. v. EPA, 525 F.2d 80 (6th Cir. 1975); Northern Ohio Lung Ass'n v. EPA, 572 F.2d 1143 (6th Cir. 1978); Cleveland Electric Illuminating Co. v. EPA, 572 F.2d 1150, cert. denied, 439 U.S. 910 (1978); Cincinnati Gas & Electric Co. v. EPA, 578 F.2d 660 (6th Cir. 1978); Republic Steel Corp. v. Costle, 621 F.2d 797 (6th Cir. 1980).
171. See text at note 169 supra.
172. In addition, the lack of an adequate understanding of “emission transport, transforma-
An alternative to implementing a more stringent sulfur dioxide or nitrogen dioxide standard is to establish a standard regulating the amount of sulfate and nitrate in the atmosphere. This alternative is, seemingly, more attractive than a different sulfur dioxide or nitrogen dioxide standard. The promulgation of such NAAQS’s would not depend on the connection between the emission source and the damaged area. As long as convincing evidence is presented that sulfates and nitrates threaten the health or welfare of the populace, there would be no need to identify the particular source causing the pollution. The EPA has conducted studies on the need for a sulfate standard but has concluded that the current evidence of health effects is inadequate to warrant promulgation of a national quality standard for this pollutant. Any new NAAQS’s then, will have to await a change in the Agency’s position.

Another reason for the lack of success under NAAQS’s regulation in the control of acid precipitation is the focus of this pollution control strategy on local area impact. The federal requirements for SIP’s contained in section 7410 of the Act obligate the states to set pollution regulations which will prevent interstate pollution in

\[\text{tion and deposition} \] would impede effective enforcement measures. It would be difficult to establish that a SIP revision to implement the new standard was actually adequate to do so. Without the information to prove a SIP’s reasonableness or unreasonableness, it is doubtful that another state could successfully challenge the adequacy of a revision.

173. Implementation of an enforcement plan for a sulfates or nitrates NAAQS would require reduction in sulfur dioxide or nitrogen dioxide. This is because most sulfates and nitrates result directly from the transformation of these gaseous precursors. Cogbill & Likens, Acid Precipitation in the Northeastern United States, 10 WATER RESOURCES RESEARCH 1133, 1135 (1974). The difficulty in this is determining what reductions in the original pollutants are needed to bring about a change in the acidity of precipitation. The atmospheric formation of sulfates and nitrates and their transportation over long distances present significant implementation difficulties for a NAAQS. The same problem attends any attempted strengthening of sulfur dioxide and nitrogen dioxide standards.

174. See Clean Air Act Amendments of 1977, 42 U.S.C. §§ 7408, 7409 (Supp. III 1979). Relying solely on health effects to promulgate a sulfate or nitrate standard is perfectly compatible with the spirit of the Act. Establishment of NAAQS’s is based on the impact of the pollution, not on technological feasibility or cost of control. La Pierre, Technology-Forcing and Federal Environmental Protection Statutes, 62 IOWA L. REV. 771, 776 (1977). There is no reason why the lack of proof as to causation should be a barrier to the promulgation of NAAQS’s for sulfates and nitrates.


amounts which interfere with another state's control strategy.\textsuperscript{177} The NAAQS's focus, however, leads to state implementation plans which do not take into account the interstate consequences of their sources' emissions. To attain the NAAQS's it is sufficient that the recorded amounts of pollution in a local area be within federal parameters. As a practical matter, once a SIP has been approved, the state has little reason to develop emission limitations designed to prevent pollution problems beyond the state borders.

This situation is exacerbated by the methods used by the states to determine pollution limitations which will comply with section 7410. These methods are unable to evaluate the interstate impact of the emissions from a particular source. Before setting its regulations, the state conducts modeling studies on a plant to estimate the pollution impact of the source on the local area. The accuracy of the models is limited by their technological capabilities\textsuperscript{178} and by their varying application by each state.\textsuperscript{179} The models can determine whether the impact of a source's pollution on its surrounding area is or is not within attainment levels and, in doing so, they are a useful and necessary device for pollution control.\textsuperscript{180} Regulations developed in response to data from these studies, however, do not take into account the effects of the source's emissions on an area outside the model's range.\textsuperscript{181} For purposes of controlling interstate pollution, the weakness of modeling in predicting impact outside of the local area is important. Without an accurate estimate of pollution impact on the quality of air at some distance from the source, an emission limitation adequate to prevent that impact is not likely to be imposed. Significantly, the inability of models to predict interstate impact also leaves the EPA without a technique for establishing that a SIP will not comply with section 7410's requirement to prevent interstate air pollution. Thus, in most situations, SIP's will not be disapproved because they are insufficient to prevent interstate impact.\textsuperscript{182}

\begin{itemize}
\item \textsuperscript{177} Id. § 7410(a)(2)(E)(i).
\item \textsuperscript{178} See text at notes 91 and 92 supra.
\item \textsuperscript{179} Environmental Protection Agency Memorandum on Proposal for Determining Compliance with Sulfur Dioxide Standard, 10 ENVIR. REP. (BNA) (Curr. Dev.) 1872, 1873-75 (Jan. 18, 1980).
\item \textsuperscript{180} Clean Air Act and Increased Coal Use: EPA Oversight: Hearings before Subcomm. on Env't, Energy and Natural Resources of the House Comm. on Gov't Operations, 96th Cong., 1st Sess. 3 (1979) (statement of Robert J. Rauch, Staff Att'y, Environmental Defense Fund).
\item \textsuperscript{181} Carter, Uncontrolled SO\textsubscript{2} Emissions Bring Acid Rain, 204 SCIENCE 1179, 1182 (1979).
\item \textsuperscript{182} No SIP has ever been denied approval by the Administrator because it caused an adverse interstate pollution impact. 40 C.F.R. § 51, subpts. B-DDD (1980).
\end{itemize}
In a similar manner, the stress on local pollution impact found in the NAAQS's leads to the use of monitoring procedures which underestimate interstate pollution impacts. After a SIP has been approved and implemented, the individual states monitor the general condition of the air to ensure continued compliance with the national standards in the local area.\textsuperscript{183} However, monitoring procedures do not measure the actual impact of the pollution emissions on other states. In order to gauge, somewhat, this interstate impact, the state would have to measure the pollution as it is emitted from the stack and, thus, register all the source's pollutants including those which disperse far beyond the immediate area.\textsuperscript{184} Instead, monitoring is conducted at ground level and in a location where the air quality is considered representative of that in the entire local area. As a consequence, monitoring as well as modeling practices underestimate the distant impact of local emissions and thereby artificially deflate the NAAQS's limitation imposed on a pollution source.\textsuperscript{185}

The focus of the NAAQS's on local pollution levels inhibits the effectiveness of this regulatory scheme in controlling acid precipitation. In order to end the wide-ranging variety of emission limitations for the same types of sources which now are in effect in the different states,\textsuperscript{186} the EPA would have to require each existing major source of sulfur dioxide and nitrogen dioxide located in attainment areas to use Reasonably Available Control Technology (RACT) in the control of emissions. States in which the problem of acid precipitation is particularly severe have asserted that this change in the implementation of NAAQS's is the most equitable means of reducing the total amounts of sulfur dioxide and nitrogen dioxide emitted into the atmosphere.\textsuperscript{187}

\textsuperscript{183} Monitoring of pollution levels is required by 42 U.S.C. § 7410(a)(2)(C) (Supp. III 1979). Monitoring assesses the impact of sources on the air quality of an area after a SIP has been approved. Modeling, to the contrary, estimates the pollution impact of a particular new or existing source to determine what the SIP regulations for that source should be.

\textsuperscript{184} See Wetstone, \textit{Air Pollution Control Laws in North America and the Problem of Acid Rain and Snow}, 10 ENVIR. L. REP. 50,001, 50,005-07 (1980).

\textsuperscript{185} Carter, \textit{Uncontrolled SO\textsubscript{2} Emissions Bring Acid Rain}, 204 SCIENCE 1179, 1182 (1979).

\textsuperscript{186} The variability in allowed emissions depending on the particular location of the source is a major complaint of those states affected by acid precipitation. \textit{See generally} 1980 Hearings, \textit{supra} note 2. It is clear that some states emit much more of the pollutants preliminary to acid precipitation than do others. The discrepancy in tonnage emitted is due to both different emission limitations applied by the states and the different number of sources within each state.

\textsuperscript{187} Letter from James K. Hambright, Director, Bureau of Air Quality Control, Department of Environmental Resources, Commonwealth of Pennsylvania, to Robert Miller, Air Programs Branch, Region V, EPA (May 16, 1980).
The suggested RACT policy is not a new pollution control strategy. All existing pollution sources located in nonattainment areas are already subject to this uniform requirement by the EPA. That Agency defines RACT in its regulations on SIP implementation as those "devices, systems, process modifications, or other apparatus or techniques, the application of which will permit attainment of the emissions limitations set forth in Appendix B to this part." In Appendix B, the EPA gives form to the RACT definition by providing examples of the emissions reductions achievable when known anti-pollution technology is applied to various sources. In this manner, the EPA indicates the emissions limitations expected of those states which have nonattainment areas. With regard to sulfur dioxide, the pollutant most responsible for acid precipitation, the regulations state that although "nationally applicable generalizations about degrees of control of sulfur oxides emissions" is not possible, the parameters of adequate control using RACT can be delineated. Thus, the Agency concludes that "[t]echnology has been demonstrated which will allow 70 percent removal of sulfur oxides from combustion gases of most existing fuel burning units." Similarly, the regulations state that emissions of nitrogen oxides from gas and oil-fired fuel burning equipment can be reduced by about 50 percent. It is clear then, that the requirement of RACT for all existing major sulfur dioxide and nitrogen dioxide sources would have a significant impact on the amounts of pollution emitted.

Despite the equity and environmental arguments in favor of RACT, requiring this control strategy for all existing sources located in attainment areas is contrary to the Clean Air Act Amendments. Under the Act, the states are given the authority to develop implementation plans which reflect their own needs. If a state has already attained the NAAQS's for sulfur dioxide and nitrogen dioxide without requiring RACT, there are no provisions in the Act authorizing the EPA to impose a more stringent emission limita-

188. See text at notes 225-27 infra.
190. Id. app. B.
191. Id. app. B § 3.1. The document suggests alternative methods which would constitute RACT. These include using natural gas, low sulfur coal, and residual oil; desulfurization of oil and coal before combustion; desulfurization of fuel gases; shutdown or relocation. Id.
192. Id. app. B § 1.0. " 'Fuel-burning equipment' means any furnace, boiler, apparatus, stack, and all appurtenances thereto, used in the process of burning fuel for the primary purpose of producing heat or power by indirect heat transfer." Id.
tion. Since most areas of the country are in attainment of both sulfur dioxide and nitrogen dioxide NAAQS’s, the possible application of RACT to control acid precipitation is severely limited. In those areas which are nonattainment, RACT for existing sources is already required. As the Act presently stands, then, the EPA cannot eliminate the wide variations in emission limitations imposed in different states through the device of a uniform emission requirement for each polluting facility. Consequently, the causes of the problems inherent in NAAQS’s which prevent this control strategy from solving the acid precipitation difficulty are not likely to be remedied in the near future.

b. NAAQS’s for New Pollution Sources

Although employing a uniform control strategy to control all existing pollution sources is not possible under the present Act, the NAAQS’s regulatory scheme does impose uniform emissions limitations on new sources within each AQCR. For areas which are in attainment for the criteria pollutants, the appropriate limitations on emissions from new sources are contained in Part C of Subchapter I of the Act entitled the Prevention of Significant Deterioration of Air Quality. Nonattainment areas are controlled by the emissions requirements of Part D of Subchapter I—Plan Requirements for Nonattainment Areas. Both of these sections of the Act may be useful in the control of acid precipitation.

i. PSD Policy

In the 1977 Clean Air Act, Congress officially ratified the EPA’s policy of preventing the deterioration of air quality in clean regions of the United States. The primary goal of the PSD legislation is “to ensure that economic growth will occur in harmony with the preservation of existing clean air resources to prevent the develop-

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195. The Administrator is obligated to approve a plan which is sufficient to attain and maintain the NAAQS’s. A state can, if it wishes, require RACT as part of its SIP even though such a stringent control strategy is not necessary to attain the national standards. Id. § 7416.

196. However, even in areas which are nonattainment, EPA regulations stipulate that the state may take into account the social and economic impact of such emission limitations. 40 C.F.R. § 51.1(o) (1980).


ment of any new nonattainment problems." 200 Each AQCR which is in attainment for any criteria pollutant is designated as either Class I or II. 201 The classification determines the maximum allowed increase on the baseline concentration 202 of any pollutant within the air of that region. 203 The states can then (with limited exceptions) redesignate each attainment area and, thus, determine their own priorities in land use control. 204

The provisions of PSD provide that no new pollution source may be built in an attainment area unless certain preconstruction requirements are met. 205 In general, the proposed new source is subject to a permit procedure intended to establish that its emissions will not cause, or contribute to, air pollution exceeding either the increment allowed in the area or a national emission standard. 206 In addition, the proposed facility is required to use the Best Available Control Technology (BACT) "for each pollutant subject to regulation under this Chapter emitted from, or which results from, such facility." 207

BACT for each new source ensures the maximum degree of reduc-

201. 42 U.S.C. § 7472 (Supp. III 1979). The 1977 Amendments necessitated a revision of all state SIP's in order to implement the provisions of newly enacted Parts C and D of Subchapter I. A Class I area receives the greatest amount of protection under PSD while Class II regulations are more stringent than Class III. Id. § 7473(b).
202. Baseline concentration is the level of criteria pollutant which exists in the attainment area in which the source wants to build at the time of the baseline date. The baseline date is the earliest date after Aug. 7, 1977 on which the first completed application for a building permit is submitted by a major source under PSD regulations. 45 Fed. Reg. 52,676, 52,731 (1980) (to be codified at 40 C.F.R. § 51.24(13)(15)).
203. 42 U.S.C. § 7473(a)-(b) (Supp. III 1979) specifies the increments of sulfur dioxide and TSP allowed in any classified area. The Act requires the Administrator to ascertain appropriate increments for the other five criteria pollutants as well. Id. § 7476. The Administrator has submitted several PSD schemes for the remaining pollutants for public comment but has not promulgated final rules. 45 Fed. Reg. 30,088 (1980).
204. 42 U.S.C. § 7474 (Supp. III 1979). Certain areas of the country must be classified Class I including national wilderness areas and parks. Id. § 7472(a).
205. Id. § 7475(a).
206. Id. § 7475(a)(3). The regulations implementing § 7475 elaborate on the requirements outlined in the statute. A new plant in a PSD area must ensure that it will:
1) apply the Best Available Control Technology (BACT);
2) conduct an analysis of air quality to ensure its compliance with the applicable emission standards and PSD increments;
3) analyze the impact of its emissions on soils, vegetation, and visibility;
4) ensure that its emissions will not adversely impact on a Class I region;
5) allow adequate public participation in the review process; and
6) begin construction within a reasonable period of time.
tion in emissions from such source while also taking into account considerations of energy, environment, and cost.208

The applicability of the PSD regulations to a particular facility depends on that source’s location, the types of pollutants it emits, and the timing of its construction.209 First, the area in which the source is located must be in attainment for any one of the criteria pollutants before the PSD regulations apply.210 Second, within such an attainment area, the construction of any facility large enough to constitute a major stationary source or a major modification of such a stationary source must go through the permit procedure.211 A major stationary pollution source is one which is included in a list of twenty-eight source categories212 and which emits “100 tons per year or more of any pollutant subject to regulation under the Act, or any other source type which emits or has the potential to emit213 such pollutants in amounts equal to or greater than 250 tons per year.”214 A major modification of a pollution source is a change which results in a significant net increase in the emissions of a major source.215 Third, and finally, major pollution sources are subject to PSD requirements only if they receive their pollution control permits after March 1, 1978, or received such permits216 before March 1,

210. Id.
211. Id.
213. 'Potential to emit' means "the capability at maximum design capacity to emit a pollutant after the application of all required air pollution control equipment and after taking into account all federally enforceable requirements restricting the type or amount of source operation." 45 Fed. Reg. 52,676, 52,677 (1980). This definition was promulgated in response to the decision by the Court of Appeals for the D.C. Circuit in Alabama Power Co. v. Costle, 606 F.2d 1068 (D.C. Cir. 1979), modified, 10 ENVIR. L. REP. 20,001 (D.C. Cir. 1979). In that case, the court reviewed the 1978 PSD regulations promulgated by the EPA and, in the process, upheld some provisions while invalidating others. One of the regulations invalidated defined a polluter’s ‘potential to emit’ as the estimated emissions of a source without considering anti-pollution devices. 40 C.F.R. § 51.24(b)(3) (1980). The court reasoned that any equipment designed into the facility for the purpose of controlling emissions must be assumed to do so. Therefore, it was inappropriate to exclude any air pollution control device when calculating the potential emissions of a plant. 10 ENVIR. L. REP., at 20,006-08.
215. The source must have been "major" before the modification in order for the PSD regulations to apply. After the modification, the emissions of any pollutant regulated under the Act (not necessarily the one for which the source is major) must have increased by greater than de minimis amounts. Alabama Power Co. v. Costle, 10 ENVIR. L. REP. 20,001, 20,035 (D.C. Cir. 1979).
1978, but did not begin construction until after March 19, 1979.\textsuperscript{217} Once a source becomes subject to PSD review, it must meet the pre-construction requirements for each pollutant which the source emits in greater than \textit{de minimus} amounts unless the area is in nonattainment for that particular pollutant.\textsuperscript{218}

Insofar as the PSD provisions of the Act impose uniform emission limitations on particular sources of pollution, they will slow the increase in acid precipitation. However, the limited applicability of PSD due to its location, size, and timing requirements prevent the use of this control strategy as a tool for curbing the emissions of existing, less-controlled sources within attainment areas.\textsuperscript{219} Further, the EPA only requires PSD preconstruction review procedures for those sources located in the attainment areas of a state.\textsuperscript{220} PSD does not apply to a source in a nonattainment area even where it emits pollution which has a deleterious impact on the air quality of an attainment area. Such a source is, however, subject to EPA’s regulations concerning pollution emitters located in nonattainment areas.\textsuperscript{221}

\textbf{ii. Nonattainment Policy}

Those areas of the country which were in violation of any NAAQS’s at the time of the Act’s passage in 1977 are subject to the provisions of Part D, Title I, Plan Requirements for Nonattainment Areas.\textsuperscript{222} This Part of the Act obligates those states with nonattainment areas

\begin{itemize}
  \item \textsuperscript{217} EPA chose the March 1, 1978 deadline date as a compromise between the contradictory provisions of 42 U.S.C. §§ 7465(a) and 7468(a). The choice was upheld in Citizens to Save Spencer County v. EPA, 600 F.2d 844 (D.C. Cir. 1979). See discussion in Tkachenko, \textit{Prevention of Significant Deterioration: The 1978 Regulations}, 3 HARV. ENVT'L L. REV. 275, 286 (1979).
  \item \textsuperscript{218} 45 Fed. Reg. 52,676, 52,711 (1980).
  \item \textsuperscript{219} Of course, the PSD policy may encourage states to impose tighter restrictions on their existing sources in order to increase the increment in pollution emissions available for new sources.
  \item \textsuperscript{220} 45 Fed. Reg. 52,676, 52,712 (1980). In its 1978 regulations, the EPA attempted to require PSD preconstruction review procedures for sources in nonattainment areas in which emissions would cause significant deterioration in a clean area. 43 Fed. Reg. 26,380, 26,398 (1978). In Alabama Power Co. v. Costle, 606 F.2d 1068 (D.C. Cir. 1978), \textit{modified}, 10 ENVT'L L. REP. 20,001 (D.C. Cir. 1979), the court decided that the preconstruction review procedures of the Act were not a proper basis for regulations requiring a review of all sources, regardless of their location, which happen to impact on an attainment area. \textit{Id.} at 20,014. Thus, the court concluded that the EPA regulations based on impact were invalidly promulgated. The court suggested several alternative sections of the Act which authorize the Administrator to address the problem of interstate pollution. \textit{Id.} at 20,015-16. The EPA, however, has not acted on the court’s suggestions.
  \item \textsuperscript{221} See text at notes 222-44 infra.
  \item \textsuperscript{222} 42 U.S.C. §§ 7501-7508 (Supp. III. 1979).
\end{itemize}
to revise their SIP's so as to assure compliance with the NAAQS's by December 31, 1982.\textsuperscript{223} Without such a revised SIP, the Act prohibits further construction of major stationary sources emitting that pollutant which standard is being violated.\textsuperscript{224}

The revised SIP's are required to contain control provisions applicable to both existing and new major sources.\textsuperscript{225} For existing major sources in the nonattainment area, the new SIP must stipulate the implementation of Reasonably Available Control Technology (RACT) as an emission limitation.\textsuperscript{226} The RACT requirement is to be promulgated and enforced by the state as "expeditiously as practicable" so as to "provide . . . reasonable further progress" towards attainment of the NAAQS's.\textsuperscript{227} Further, the revised SIP must set up a permit procedure which evaluates major sources proposed for the nonattainment area according to the requirements of the Act.\textsuperscript{228} Through the permit procedure, approval of the construction of a new or modified source is allowed if three conditions are met. First, the new or modified source must insure that total allowed emissions in the area after operations begin will be sufficiently less than present total allowed emissions so that "reasonable further progress" towards attainment will be achieved.\textsuperscript{229} Thus, a source must "offset"\textsuperscript{230} its projected new emissions with reductions from currently operating sources. The proposed new source must also comply

\textsuperscript{223} Id. § 7502(a)(1). The Act provides an extension until Dec. 31, 1987 for those states which can prove that attainment for photochemical oxidants or carbon monoxide is impossible by 1982. Id. § 7502(a)(2).

\textsuperscript{224} Id. § 7502(a)(1).

\textsuperscript{225} Id. § 7502(b).

\textsuperscript{226} Id. § 7502(b)(2). See text at notes 186-96 supra.


\textsuperscript{230} The Act's Requirements for Nonattainment Areas continues, with some changes, the EPA's Offset Policy adopted in 1976 and intended to avoid the alternative of prohibiting all construction in nonattainment areas after the required date for compliance with NAAQS's. 41 Fed. Reg. 55,524 (1976). The 1977 Amendments place implementation of the policy in state rather than federal hands and permit a three and one half year delay (until Dec. 31, 1982) before NAAQS's attainment must be achieved. 42 U.S.C. § 7502(a)(1) (Supp. III 1979). The EPA's original Offset Policy was superceded for the most part on July 1, 1979 either by a revised SIP meeting the requirements of Part D or by the Act's prohibition on new source construction if no acceptable SIP was approved by that date. On that date, SIP revisions in response to the 1977 Amendments were due. \textit{Id}.
with the Lowest Achievable Emissions Rate (LAER)\textsuperscript{231} possible for that type of source.\textsuperscript{232} Finally, the owner or operator of the source is required to demonstrate that other sources owned or operated by him are in compliance with any applicable emission limitations.\textsuperscript{233}

The applicability of emission controls to a particular new source under the nonattainment provisions of the Clean Air Act depends on the same factors which determine the applicability of PSD regulations—the location of the source, the type of pollutant(s) it emits, and the timing of its construction. First, the section 7503 permit procedures apply in those geographic areas which are nonattainment for a NAAQS pollutant.\textsuperscript{234} Second, the only sources subject to nonattainment preconstruction review are major emitters\textsuperscript{235} of one of the criteria pollutants.\textsuperscript{236} In addition, such major sources are subject to section 7503 review only if the pollutants which they emit in such large quantities are also the pollutants for which that area is nonattainment.\textsuperscript{237} Third, the permit procedures can be applied to a major source proposed to be built in a nonattainment area only after the SIP revision required by Part D is approved by the EPA.\textsuperscript{238}

The control strategy outlined in the nonattainment regulations of the Act is more effective in reducing the incidence of acid precipitation than the strategy outlined in the Act’s PSD section. The reason for the relative utility of the nonattainment policy in controlling acid precipitation is that this control strategy reduces the absolute levels

\textsuperscript{231} 42 U.S.C. § 7501(3) (Supp. III 1979). The Lowest Achievable Emissions Rate is either the most stringent emission limitation contained in any SIP for the same type of source or the most stringent emission limitation actually achieved by that type.

\textsuperscript{232} Id. § 7503(2).

\textsuperscript{233} Id. § 7503(3).

\textsuperscript{234} Id. §§ 7502(a), 7502(b)(6). Sources located in attainment areas but causing NAAQS’s violations in nonattainment areas are required by the EPA to undergo a preconstruction review procedure somewhat different from that imposed on sources either by PSD or nonattainment regulations. 45 Fed. Reg. 31,307, 31,311 (1980) (to be codified at 40 C.F.R. § 51 app.S § III(B)). The suggested elements of proof include:

1) that LAER is imposed;
2) that all major sources owned or operated by the applicant are in compliance with their applicable emission limitations;
3) that a positive net air quality improvement in the affected area will occur.

\textsuperscript{40} C.F.R. § 51 app.S § IV(A) (1980).

\textsuperscript{235} See text at notes 211-15 supra.

\textsuperscript{236} 40 C.F.R. § 51 app.S § II(A)(4) (1980).

\textsuperscript{237} Id. § 51 app.S § I. This differs from PSD regulations which require the emission of 100 tons per year of any pollutant regulated under the Act. 45 Fed. Reg. 52,676, 52,730 (1980) (to be codified at 40 C.F.R. § 51.24(b)(1)(i)(a)).

\textsuperscript{238} 42 U.S.C. § 7502(a), 7502(b)(6) (Supp. III 1979).
of pollution emitted into the atmosphere through the imposition of RACT and LAER.\textsuperscript{239} A newly formulated EPA policy may extend the effectiveness of the nonattainment emission limitations to new or modified sources locating in attainment areas. The new policy requires a section 7503 review for sources locating in attainment areas whose emissions will have an adverse impact on the air quality of nonattainment areas.\textsuperscript{240} The value of this new requirement for acid precipitation control depends on the interpretation given to LAER as opposed to BACT.\textsuperscript{241} If LAER is considered a more stringent emission limitation than BACT, the application of the former to a pollution source in an attainment area would result in lower levels of pollution in the ambient air.

The primary impediment to the utility of the nonattainment control strategy in reducing levels of sulfates and nitrates is that this control limitation is not generally applicable. Most of the country is in attainment for the sulfur dioxide and nitrogen dioxide NAAQS's and is subject to PSD requirements.\textsuperscript{242} This situation is not extremely significant in the case of new sources since the BACT requirement under PSD is comparable in its stringency to LAER. The situation is important, however, to the control of existing sources because the PSD regulations contain no provisions similar to the RACT strategy of Part D of the Act.\textsuperscript{243}

Both the PSD and the nonattainment provisions of the Act are based on the level of emissions permitted under the NAAQS's.\textsuperscript{244} Any change, therefore, in the national standard for sulfur dioxide or nitrogen dioxide would alter the operation of these two control strategies. A more stringent NAAQS for sulfur dioxide would place

\textsuperscript{239} Since the emission levels in PSD areas are less than in nonattainment areas, these regions contribute less to the acid precipitation problem. However, the PSD regulations do not require a reduction in the total amount of pollutants in the air. Yet, a reduction is what is required to control acid precipitation.


\textsuperscript{241} See, e.g., Raffle, Prevention of Significant Deterioration and Nonattainment Under the Clean Air Act—A Comprehensive Review, 10 ENVIR. REP. (BNA) (Monographs No. 27) (1979), suggesting that a difference between the level of control required by BACT and that by LAER is unlikely. Both control strategies are phrased in such absolute terms that it is difficult to imagine one without the other. Use of the best available control technology seems to assure that the lowest possible emissions will be released. A single set of emission criteria for new pollution sources minimizes the problem of consistency in state and federal interpretation of BACT and LAER. Id. at 12.

\textsuperscript{242} Ironically, sources would qualify for nonattainment review only if more areas of the country were less clean than NAAQS's requirements.

\textsuperscript{243} See text at notes 199-221 supra.

\textsuperscript{244} See text at notes 199-243 supra.
more areas of the country in nonattainment status and trigger the RACT and LAER requirements of Part D. Similarly, the promulgation of a new sulfate or nitrate standard would activate the permit and emission limitation provisions of both the PSD and the non-attainment regulations.

c. NAAQS’s and Interstate Air Pollution Disputes

Under the NAAQS’s pollution control system, each state is allowed to emit pollutants until a particular concentration in the atmosphere is reached. As long as the federally stipulated NAAQS’s limit is not exceeded, a state can impose any emission standard believed appropriate on the existing sources of pollution within its boundaries. This reliance on local impact to determine pollution limitations seems to assume that each state emits pollutants in a vacuum. The weakness of this assumption is that it does not take into account air pollution which drifts across state lines and affects the air quality in areas far from the pollution source. In a typical interstate dispute, the state receiving the pollution alleges that emission control is less stringent in a neighboring state and that, therefore, the amount of pollution entering the air of the receiving state from beyond its borders is more than the amount going out of the receiving state into the air of neighboring areas. This situation, the receiving states claim, is inequitable. The state in which the pollution source is located counters that under the Clear Air Act all states choose appropriate emission limitations within the same federal guidelines. Thus, the emitting state continues, a state challenging the emission limitations of a source in compliance with its SIP is essentially questioning the right of the emitting state to set those local pollution requirements. This is inconsistent with the emphasis of the Act on local control and, consequently, the receiving state which relies solely on an equity argument to abate the emissions of sources complying with another state’s SIP would not be successful.

Fortunately, section 7410 provides additional means by which a state can protect itself against interstate pollution. This section allows a state to claim that emissions from a source violate the Act by interfering with the pollution control plans of neighboring states. Section 7410(a)(2)(E)(i) stipulates that all SIP’s must prohibit the emission of pollutants in amounts which prevent the attainment or maintenance of the NAAQS’s in another state or interfere with efforts to prevent the significant deterioration of air quality. A SIP
which does not prevent interstate impact is invalidly promulgated and can be altered to insure compliance with section 7410.246

The interstate abatement provision contained in section 7410 is of limited use to a state affected by acid precipitation. Under that section, a state is limited to claiming an interstate impact only by pollutants regulated under the Act. The pollutants which directly cause acid precipitation are not criteria pollutants.246 Furthermore, sulfates and nitrates are not regulated under the PSD provision.247 Thus, under present regulations, interstate transport of these pollutants cannot interfere with a state's nonattainment or PSD policy. A state affected by acid precipitation caused by emissions from out-of-state sources can only abate that pollution by challenging the impact of sulfur dioxide and nitrogen oxide emissions on the quality of its air. A successful challenge would indirectly achieve a reduction in the levels of sulfates and nitrates since they are the products of the atmosphere transformation of sulfur dioxide and nitrogen dioxide.

The ability of a state to allege a section 7410 violation requires proof that interference with its pollution control by emissions from out-of-state sources is occurring. It is clear that this prohibition against interference with another state's nonattainment or PSD program contained in section 7410 does not preclude all emissions from one state which happen to drift into the air of another.248 Since some air pollution emitted in a state is almost inevitably transported across state lines, an expansive reading of section 7410 would force a state to prohibit new sources from locating within a certain distance of another state in order to prevent incidental pollution impact.249 Such an interpretation is probably not what Congress intended in enacting the interstate impact SIP requirement. If, however, section 7410 is to have any meaning, it must permit a finding that at some level of emission concentration a sufficient interference with the prerogatives of another state is occurring to warrant reductions in the emissions of a source.

247. 42 U.S.C. § 7475(a)(4) (Supp. III 1979). PSD covers all major sources of any pollutant regulated under the Act's NAAQS's, NSPS's, or NESHAP's provisions. Sulfates and nitrates are not regulated under any of these provisions.
248. 45 Fed. Reg. 17,048, 17,049 (1980). The provisions of the Clean Air Act "evidence Congressional intent to protect against unreasonable interstate interference with State programs to maintain the NAAQS and create margins of growth, as well as efforts to attain the standards, prevent significant deterioration of air quality and protect visibility." Id. (emphasis added).
Any attempt by a state to establish a significant interference with its air pollution control program is hindered by the difficulty of proving that pollution from a particular emission source is causing an adverse impact on a distant area. The difficulty of establishing this proof is a formidable barrier to the use of the Clean Air Act to remedy the acid precipitation problem. As the distance between the affected area and the source of the pollution grows, the possibility of establishing a connection between one and the other becomes increasingly unlikely. Nevertheless, much of the pollution which causes acid precipitation is emitted from sources many miles from the complaining state.

Even where the states in question border upon one another, the difficulty of proving pollution impact is only slightly lessened. In such a situation, a state could attempt to prove significant interference by arguing that the amount of pollution emitted is excessive when compared with the total amount of increment available to the states in that region. Neighboring states enjoy equal opportunity to use the pollution increment available at their common boundary. The complaining state has to argue that the emissions from the source which are affecting its air quality exceed an equitable share of the increment allocated between the states. This argument will probably be effective only when the air quality of the state in which the source is located is worse than that stipulated by the NAAQS's. This is so because, in addition to affording protection to the receiving state's pollution control program, the Act also protects the strong interest of the emitting state to establish a pollution control program responsive to its own ecological and economic priorities. Given the emitting state's economic interest in allowing its sources to pollute and the technical difficulty in tracing pollution impact, it is most likely that a state in attainment of the NAAQS's will not be considered as allowing emissions in excess of the appropriate increment. If, however, the state in which the source is located is nonattainment for the pollutant, then the allocation of available increment has already occurred and, in fact, the state in violation has exhausted more than its share. Because the margin of pollution increase al-

250. See text at notes 199-221 supra.
251. The EPA has never issued regulations on the appropriate means to resolve interstate disputes. However, in its 1978 PSD regulations, the EPA briefly discussed the allocation of increment consumption between bordering states. The EPA concluded that projected consumption of over one half of the increment available at the state line would lead to permit denial. 43 Fed. Reg. 26,388, 26,402 (1978).
252. Id.
allowed has been exceeded, some of the emissions going beyond the borders of the state have no equitable justification and unduly interfere with the receiving state’s pollution program.

Alternatively, a receiving state could assert that the relative impact of a neighboring state’s emissions on the air quality of the receiving state is severe enough to cause interference and warrant abatement. For example, in a Class I region, the increment allowed for sulfur dioxide emissions is only 25 micrograms per cubic meter over the baseline concentration, as measured during a three hour period.\(^{263}\) For the same pollutant in a Class III region, an increase of 700 micrograms per cubic meter is permitted.\(^{264}\) Given the same amount of pollution entering the area, interference with the PSD program in the Class I area is inevitably more severe than in the Class III area. Usually, however, the relative impact of pollution from an out-of-state source is less clear than in the situation above. For example, a state in which the increment for pollution is decreasing because of additional emissions from new sources within its borders may assert that out-of-state pollution is seriously interfering with its potential economic growth. The incoming emissions do hasten the complete exhaustion of the increment available in the area. However, the presence of local polluters makes it difficult to assess the relative contribution of in-state and out-of-state sources to the pollution content of the air. Also, as the affected state increases its own emissions, its position as petitioner for abatement of another state’s emissions weakens. By demonstrating its willingness to utilize its own increment for new pollution sources, the state will find it difficult to argue that a neighboring state should not be allowed to do so as well.

The provision of the Clean Air Act which is supposed to aid a state attempting to protect itself from interstate pollution is not very useful for the control of acid precipitation. First, section 7410 is available only to challenge the levels of sulfur dioxide and nitrogen dioxide entering the receiving state. Second, because of the difficulties of proving pollution impact, the section 7410 provision can only be effectively employed in disputes between contiguous states. Third, where there is such a dispute between neighboring states, proof of a significant interference with the receiving state’s pollution control program is needed before abatement is ordered. Consequently, for areas of the country affected by acid precipitation, the requirements of proof under section 7410 make the use of this section prohibitive.

\(^{253}\) 40 C.F.R. § 51.24(c) (1980).
\(^{254}\) Id.
2. New Source Performance Standards (NSPS's)\textsuperscript{255}

The NSPS's are the second of three national emission standards established by the federal government in the Clean Air Act Amendments of 1970.\textsuperscript{256} Amended by the 1977 clean air legislation, the emission control strategy now requires the Administrator to publish national standards of performance for those categories of stationary sources\textsuperscript{257} which cause or contribute significantly to air pollution injurious to the public health or welfare.\textsuperscript{258} Although polluters are regulated under NSPS's because of their emissions' adverse effect on public health, the NSPS's are not based on health criteria but on what is technologically feasible.\textsuperscript{259} All major sources built after the promulgation of a standard are required to reduce their emissions to the greatest degree possible, regardless of the air quality of the source's location. In this way, NSPS's regulation differs from that under the NAAQS's.\textsuperscript{260}

The Act provides two different definitions for the standards of performance which the Administrator is obligated to promulgate. The first one applies to all source categories except fossil-fuel-fired stationary sources and states that the term "standard of performance" means, simply, "establishing allowable emissions limitations" for each category of sources.\textsuperscript{261} In the case of fossil-fuel-fired stationary sources, the Act specifies a standard of performance which both establishes "allowable emission limitations" and requires "the achievement of a percentage reduction"\textsuperscript{262} in the emissions from such

\textsuperscript{255} The emission limitations imposed under PSD and nonattainment are derived from the quality of the air in which a source is located. Their purpose is to provide a means of enforcing the NAAQS's. A proposed new source must comply with both the NSPS's and either the PSD or the nonattainment provisions of the Act. Thus, a proposed source may be quite capable of performing at the level required by NSPS's but be unable to fulfill the permit specifications of PSD because its emissions, although highly controlled, still exceed the NAAQS's increment for the discharged pollutant.

\textsuperscript{256} See text at notes 122-24 supra.

\textsuperscript{257} 40 C.F.R. § 60 subpt. D-HH (1980).


\textsuperscript{259} Id. § 7411(a).

\textsuperscript{260} An example of the difference between NSPS's and NAAQS's regulation is provided by examining coal-fired power plants. These sources, controlled by NAAQS's, emit eighty-three pounds of sulfur dioxide for each ton of fuel burned. New plants using the best technological system of reduction will emit about twelve pounds of sulfur dioxide per ton. Costle, \textit{New Source Performance Standards for Coal Fired Plants}, 29 J. AIR POLL. CONTROL A. 690, 690 (1979).


\textsuperscript{262} A percentage reduction is that amount by which the emissions normally expected from the combustion of a fuel without pollution control are reduced.
category of sources." Hence, regardless of the sulfur or nitrogen content of the fuel used in combustion, technological control measures will always be necessary to ensure the percentage reduction. In developing all standards of performance, the Administrator is required to assume that the sources will apply the "best technological system of continuous emission reduction" in order to be able to achieve the emission level set for that source.

Of the twenty-eight source categories subject to standards of performance, control of the emission levels for electric power plants has the most potential for reducing the acidity in precipitation. Because of the NSPS's requirements, EPA expects that emissions of sulfur dioxide and nitrogen dioxide will be lower in 1995 than would otherwise have been the case if previous standards had remained in operation. However, despite the reductions achieved by individual plants, the total amount of sulfur dioxide and nitrogen dioxide emissions are projected to increase over the next fifteen years. There are several reasons for this projection. First, the electric power industry is expected to grow rapidly in the near future and, even though all of the industry's new plants will be strictly controlled, the combined emissions will be significant. Second, coal consumption is predicted to increase with much of the added tonnage

263. 42 U.S.C. § 7411(a)(1)(A)(i)-(ii) (Supp. III 1979). A percentage reduction is calculated on the basis of the emissions which a new plant would release if it burned a particular type of fuel without any pollution controls. Thus, an electric power plant which uses coal with a sulfur content of four pounds per million Btu's must reduce its emissions by 90 percent of the sulfur dioxide which would have resulted from burning that fuel without controls.


268. The EPA projected what sulfur dioxide emissions would be in 1995 under the 1971 and the 1978 regulations:

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Emissions (in metric tons)</th>
<th>Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1975</td>
<td>1995</td>
</tr>
<tr>
<td></td>
<td>1971 Standards 1978 Standards</td>
<td></td>
</tr>
<tr>
<td>Sulfur Dioxide</td>
<td>18.6</td>
<td>23.7</td>
</tr>
<tr>
<td>Nitrogen Dioxide</td>
<td>6.8</td>
<td>3.3</td>
</tr>
</tbody>
</table>

269. Approximately 300 new fossil-fuel-fired power plant boilers are expected to begin operation by 1995. Id. at 33,587.

270. Id.
earmarked for new power plants. Coal is the dirtiest of the fossil fuels and is, also, the one least controlled under the NSPS for electric power plants.\textsuperscript{271} Third, the NSPS's will not affect the amount of pollutants emitted by existing power plants except insofar as these facilities are replaced by new sources. The table below indicates that electric power plants controlled by SIP's and the earlier NSPS's strategy will continue to emit the major portion of sulfur dioxide attributable to all power plants in 1995.

1995—National Sulfur Dioxide Emissions from Utility Boilers\textsuperscript{272} [million tons]

<table>
<thead>
<tr>
<th>Plant Category</th>
<th>1975</th>
<th>1971 Standards</th>
<th>1979 Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Wet\textsuperscript{a}</td>
<td>Dry\textsuperscript{b}</td>
</tr>
<tr>
<td>SIP/NSPS Plants\textsuperscript{c}</td>
<td>15.5</td>
<td>15.8</td>
<td>16.0</td>
</tr>
<tr>
<td>New Plants\textsuperscript{d}</td>
<td>7.1</td>
<td>7.0</td>
<td>3.3</td>
</tr>
<tr>
<td>Oil Plants</td>
<td>1.0</td>
<td>1.0</td>
<td>1.3</td>
</tr>
<tr>
<td>Total National Emissions</td>
<td>18.6</td>
<td>23.7</td>
<td>23.8</td>
</tr>
<tr>
<td>Total Coal Capacity</td>
<td>205</td>
<td>552</td>
<td>554</td>
</tr>
</tbody>
</table>

a. Based on wet sulfur dioxide scrubbing costs.
b. Based on dry sulfur dioxide scrubbing costs.
c. Plants subject to existing state regulation or to the 1971 standard of 1.2 pounds of sulfur dioxide per million Btus.
d. Plants subject to the current NSPS regulation of 1.2 pounds of sulfur dioxide per million Btus and a 90 percent reduction.

The slight drop in projected emissions from the SIP/NSPS controlled plants between 1975 and 1995\textsuperscript{273} suggests that most of the power plants existing today will continue to operate until at least 1995. The table also indicates the marked difference between the emission levels expected from new power sources under the 1971 and the 1979 regulations. In part, this projected impact on new plant emissions is due to the percentage reduction requirement of the 1978 regulations.\textsuperscript{274} But the decrease in emissions is also attributable to

\textsuperscript{271} 40 C.F.R. §§ 60.43, 60.44 (1980).
\textsuperscript{272} 44 Fed. Reg. 33,580, 33,608 (1979). The figures for two other control strategies which were eventually rejected are not included.
\textsuperscript{273} The total national emissions of sulfur dioxide in 1975 were caused by SIP/NSPS and oil plants. If it is assumed that all the 1975 sulfur dioxide emissions of 18.6 million tons were a result of SIP/NSPS operation then the greatest possible drop in pollution emissions from these plants from 1975 to 1995 is estimated as 3.1 million tons.
the projected increased cost\textsuperscript{275} of building and operating these new plants because of additional pollution controls. The increased financial burden is expected to slow the construction of new plants and discourage their full capacity use once operation begins.\textsuperscript{276}

Although the NSPS's provisions contained in section 7411 are directed primarily toward the control and regulation of new or modified sources, they also may permit stricter control of existing sources. Section 7411(d) obligates the Administrator to prescribe regulations requiring the states to establish standards of performance for existing sources which emit designated pollutants.\textsuperscript{277} A designated pollutant is one which is not controlled under the NAAQS's or NESHAP's but for which standards of performance applicable to new sources of that pollutant have been promulgated.\textsuperscript{278} The purpose of section 7411(d) is to require the states to develop and submit plans for the control of those pollutants which pose a danger to the public but which are not otherwise regulated by national emission standards.\textsuperscript{279}

Following the promulgation of a standard of performance for a new source emitting a designated pollutant, the Administrator publishes a guidance document containing information relevant to the control of the emissions of that pollutant from existing plants.\textsuperscript{280} Within the guidance document, the Administrator identifies the pollutant as one which either endangers the public health or which, although not proven harmful to health, has an adverse effect on public welfare.\textsuperscript{281} The states, using information contained in the guidance

\textsuperscript{275} Id. The cost of complying with the NSPS's by electric utilities is considerable, ranging between $80 and $120 per kilowatt. This compares with a total cost for a new power plant of approximately $800 per kilowatt. \textit{Clean Air Act and Increased Coal Use: EPA Oversight: Hearings before the Subcomm. on Env't, Energy and Natural Resources of the House Comm. on Gov't Operations, 96th Cong., 1st Sess. 292 (1979) (testimony of Alan Crane, Leader, Office of Technical Assistance Coal Study Project).}

\textsuperscript{276} 44 Fed. Reg. 33,580, 33,605 (1980).

\textsuperscript{277} 42 U.S.C. § 7411(d) (Supp. III 1979).

\textsuperscript{278} (d)(1) The Administrator shall prescribe regulations which shall establish a procedure . . . under which each State shall submit . . . a plan which (A) establishes standards of performance for any existing source for any air pollutant (i) for which air quality criteria have not been issued or which is not included on a list published under Section 7408(a) or 7412(b)(1)(A) . . . but (ii) to which a standard of performance under this section would apply if such existing source were a new source . . . .

\textit{Id.}

\textsuperscript{279} 40 C.F.R. § 60.21(a) (1980).

\textsuperscript{280} 40 C.F.R. § 60.22(a) (1980).

\textsuperscript{281} Id. § 60.22(b).
document, submit emission control plans for the pollutant to the Administrator for approval. Ordinarily, because the cost of refitting existing sources with pollution control devices is usually greater than the cost of controlling new sources, the emission limitation specified in a state plan for a designated pollutant will be less strict than the standard of performance promulgated for a new source of the same type.

Because of its potential for reducing the emissions of existing sources of pollution, it has been suggested that section 7411(d) be employed as a means of solving the acid precipitation problem. The sulfates and nitrates directly causing acid precipitation are not criteria pollutants; neither are they regulated as "hazardous" under section 7412. Furthermore, standards of performance issued by the Administrator already apply to the source categories which contribute most substantially to the levels of these pollutants. The proponents of the use of section 7411(d) argue that the Administrator is under an obligation to require the submission of state plans regulating existing plants until a safe level of sulfates and nitrates is achieved. Regulation under section 7411(d) would not cause the same problems of proof presented by control under NAAQS's because NSPS's rely on technological capability, not air quality. The major interpretive question which must be answered before section 7411(d) can be used to control sulfates and nitrates is whether a "designated" pollutant is one which is caused by a source and not covered by NAAQS's or NESHAP's or is one which is directly emitted by a source and not covered by NAAQS's or NESHAP's.

In order for section 7411(d) to be implemented in a manner beneficiary...
cial to acid precipitation control, it must be interpreted to permit the regulation of any pollutant caused by a source category and not covered by another national standard. In that way, the sulfates and nitrates caused (although not directly emitted) by section 7411 sources could properly be considered designated pollutants. This interpretation of the meaning of section 7411(d) is supported by section 7411(b) which states that sources for which standards of performance are appropriate are those facilities which cause or contribute significantly to air pollution injurious to health. Therefore, under section 7411(b) the regulatory process is centered on the pollution problem caused by a source, not necessarily on the pollutant actually emitted. Other provisions of the Act and the regulations, however, suggest that the pollutants actually emitted dictate the imposition of new source control. For example, under the provisions of section 7411(a) a standard or performance is defined as establishing an allowable emission limitation for any air pollutant emitted from a category of sources found by the Administrator to cause or contribute to air pollution dangerous to the public health or welfare. 288

Furthermore, the regulations state that a designated pollutant is one whose emissions "are subject to a standard of performance for new stationary sources but for which air quality criteria have not been issued, and which is not included on a list published under section 108(a) [7408(a)] or 112(b)(1)(A) [7412(b)(1)(A)] of the Act." 289 These two definitions, when taken together, suggest strongly that a designated pollutant is one which is actually emitted by one of the sources regulated under the NSPS's and which is subject to emission limitations under the NSPS's alone. 290

If a designated pollutant under section 7411(d) must be one that is actually emitted by the source category, then use of that section is inappropriate to regulate existing sources which cause sulfate and nitrate pollution. The standards of performance issued for the new sources in question already regulate emissions of sulfur dioxide and nitrogen dioxide. 291 These pollutants cannot be designated because

289. 40 C.F.R. § 60.21(a) (1980).
290. To date, the Administrator has issued guideline documents for three pollutants under § 7411(d). These pollutants are fluorides emitted from five sources in the phosphate fertilizer industry, 40 C.F.R. § 60 subpts. T-X (1980), and from aluminum reduction plants, id. § 60 subpt. S; total reduced sulfur compounds emitted from Kraft pulpmills, id. § 60 subpt. BB; and sulfuric acid mist emitted from sulfuric acid plants, id. § 60 subpt. H. In all cases, the designated pollutant is a direct emission from the plant. Therefore, the implementation of the Act by the Administrator does not refute the suggestion contained in the Act and the regulations that a designated pollutant is one actually emitted.
291. Id. § 60 subpts. D, Da, G, H, J, P, Q, R, GG.
they are subject to NAAQS's regulation. Therefore, the Administra-
tor would not have the authority under section 7411(d) to force the
states to regulate existing sources of sulfur and nitrogen dioxide
emissions. If this interpretation is adopted, the NSPS's will continue
to act as a partial check on the rising amount of acidity in precipita-
tion through the control of new sources but will not be available to
limit sulfate and nitrate pollution caused by existing sources.\textsuperscript{292}

Emissions from a source regulated under the NSPS's can cause in-
terference with the pollution control plans of another state. In order
to protect its air quality, a receiving state can assert that a substan-
tial interference is occurring under section 7410 and attempt to
reduce the challenged emissions. A state in that situation is con-
fronted by the same difficulties in proving a section 7410 violation
faced by a state challenging the emissions of a plant under the
NAAQS's regulation.\textsuperscript{293} An additional consideration, however, may
hinder an attempt by a state to abate the pollution from a NSPS's
source. A NSPS's source is already subject to the most stringent
 technological pollution controls available.\textsuperscript{294} A request by a receiving
state to reduce those emissions further may be impossible to fulfill
without threatening the operation of the source. Thus, the economic
interests of one state would be pitted against the environmental con-
cerns of another. When the state in which the source is located is in
attainment for the pollutant causing the dispute, the balance of equi-
ties is in its favor and the Administrator would probably not shut
down the NSPS's source. Even if the source is in a nonattainment
location, the potential economic disruption of a source shutdown
would probably lead the Administrator to demand strong proof that
substantial impact on another state is caused by the source.

3. National Emission Standards for Hazardous Pollutants
(NESHAP's)

The third and final national emission standard established by the
Clean Air Act is the NESHAP's which are applicable to those
pollutants considered hazardous to human health.\textsuperscript{295} Under section
7412 of the Act, the Administrator is authorized to prescribe an
emission standard for each pollutant "which may reasonably be an-
ticipated to result in an increase in mortality or an increase in serious

\begin{itemize}
  \item \textsuperscript{292} See text at notes 266-76 \textit{supra}.
  \item \textsuperscript{293} See text at notes 245-54 \textit{supra}.
  \item \textsuperscript{294} See text at notes 259-65 \textit{supra}.
  \item \textsuperscript{295} 42 U.S.C. § 7412 (Supp. III 1979).
\end{itemize}
irreversible, or incapacitating irreversible, illness."

After the promulgation of a NESHAP, the construction of a new or modified source which emits the hazardous pollutant cannot begin until the Administrator finds that the proposed source will not violate the standard. Existing sources of the pollutant are given ninety days after promulgation of the standard in which to comply with its provisions. Although the Administrator establishes the NESHAP's, a state may take over enforcement of the standard if it submits an implementation plan for hazardous pollutant control which the Administrator decides is adequate.

As it stands today, the NESHAP's control program is not helpful in resolving the acid precipitation problem. Only four pollutants are currently regulated by NESHAP's. Emission standards under section 7412 apply to asbestos, beryllium, Mercury, and vinyl chloride. None of these pollutants cause or contribute to the problem of acid precipitation. Thus, if the NESHAP's strategy is to be useful in the control of acid precipitation, a new hazardous emission standard for the pollutants responsible for this pollution—sulfates and nitrates—must be promulgated. Unfortunately, this is unlikely to happen. The precursor pollutants of sulfates and nitrates are both regulated under the NAAQS's provisions of the Act. There is, then, no justification for additional regulation under NESHAP's.

A barrier to the issuance of NESHAP's for sulfates and nitrates is the Administrator's reluctance to regulate pollutants under section 7412, limiting his action to those pollutants "whose presence in trace concentrations in the ambient air will cause or contribute to . . . damage to health." The emission standards for asbestos, beryllium, and Mercury were established in April, 1973 and, since that time, only one other pollutant has been designated as hazardous under the Act. The United States House of Representatives be-

296. Id. § 7412(a)(1).
297. Id. § 7412(c)(1)(A).
298. Id. § 7412(c)(1)(B).
299. Id. § 7412(d)(1).
301. If additional controls on sulfur dioxide and nitrogen dioxide emissions become necessary because of new information on health or welfare dangers, the Administrator could promulgate adequate measures through the NAAQS mechanism.
304. This pollutant is Vinyl Chloride. 41 Fed. Reg. 46,560 (1976). For a discussion of the Ad-
came so impatient over the Administrator's inaction under section 7412 that it was prepared to force him to institute proceedings leading to the regulation of radioactive pollutants, arsenic, cadmium, and polycyclic organic matter by including such a provision in its version of the Clean Air Act Amendments. Despite the evidence cited by the House in support of hazardous emission regulation for these pollutants, the Administrator has not yet promulgated standards for them. Thus, the NESHAP's control program offers very little hope for the control of acid precipitation.

C. Procedural Mechanisms to Protect Against Interstate Pollution

To the extent that the Clean Air Act creates a substantive right to be free of interstate air pollution, it provides procedural mechanisms which allow states to assert that right. Three provisions of the Act offer the means through which a state affected by interstate pollution can attempt to force the abatement of emissions from the offending source in another state. The pertinent provisions are contained in sections 7426, 7607, and 7604. These three sections permit administrative and judicial review of actions taken by federal officials or by a pollution source when the actions are alleged to result in interstate pollution. If the challenged actions are found to improperly affect the air quality of another state, the reviewing administrative agency or court can order appropriate abatement measures. The choice of review procedure depends on the particular situation faced by a receiving state. The following chart illustrates the procedural differences among the three provisions.
## Procedural Mechanisms to Enforce the Substantive Rights
### Created in the Clean Air Act

<table>
<thead>
<tr>
<th>Petitioner</th>
<th>Respondent</th>
<th>Basis for Complaint</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>Pollution source</td>
<td>Source is in violation of section 7410 (a)(2)(E)(i)</td>
</tr>
<tr>
<td><strong>Reviewing Body</strong></td>
<td><strong>Time Limitations</strong></td>
<td><strong>Appropriate Relief</strong></td>
</tr>
<tr>
<td>Administrator of the EPA</td>
<td>Petitions may be brought whenever a violation is suspected. Administrator must hold a hearing within sixty days.</td>
<td>The rule promulgated through the challenged action is invalidated. Promotion of a new rule which protects the pollution control plans of the petitioner is ordered.</td>
</tr>
<tr>
<td>United States circuit court of appeals. A nationally applicable rule must be challenged in the D.C. Circuit.</td>
<td>Petition must be brought within sixty days of promulgation of the final rule. The petitioner must also have registered a protest against the rule with the Administrator during the public comment period before promulgation.</td>
<td>Compliance with the violated emission standard or noncompliance order is ordered. Performance of the nondiscretionary, administrative act or duty is ordered.</td>
</tr>
<tr>
<td>United States district court</td>
<td>Notice of the violation must be given to the Administrator, the state, and the source 60 days before a suit is filed. The suit is prohibited if the Administrator or the state initiates an enforcement action against the source.</td>
<td></td>
</tr>
<tr>
<td>Source is in violation of an emission standard or a noncompliance order; or the Administrator fails to perform a nondiscretionary act or duty.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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Appropriate Relief (cont.)

Section 7426 is the only one of the three procedural provisions which is directed solely at the abatement of interstate pollution problems. First enacted in 1977, this provision was “intended to establish an effective mechanism for prevention, control, and abatement of interstate air pollution.” Toward that end, section 7426 sets up a petition procedure whereby a state or its political subdivision can assert that the emissions of a source in another state violate section 7410(a)(2)(E)(i). The only ambiguity which arises with reference to the basic procedures of section 7426 is whether a petition can be brought against more than one source. The statutory language speaks of a petition against “any major source” which emits or would emit a pollutant in violation of section 7410(a)(2)(E)(i). This suggests that a petition can allege that only one source is the cause of a section 7410 violation. Under this interpretation, a state would be forced to bring separate proceedings against each individual source in another state which it believes contributes to the degradation of its air. Such a piecemeal process would place an expensive and time-consuming burden on the state attempting to protect its air quality. Furthermore, because pollution in an area is usually attributed...
able to the emissions of many sources, proving that one particular source is responsible for violations of the NAAQS’s or PSD requirements is a difficult if not impossible task. A consolidated petition process premised on a comprehensive review of the impact of emissions from major sources within a particular area would better serve the purpose of section 7426.\textsuperscript{314} A complete review of all sources would permit an accurate assessment of the contribution of each to the pollution in the air of the petitioner state. This would allow the Administrator to allocate the burden of reducing emissions (if a reduction is called for) among many sources rather than placing the entire weight of his order on one source. A consolidated petition process also would permit the petitioning state to argue a position more accurately reflecting reality—that the impact of all those sources of a particular pollutant located in an area violate section 7410(a)(2)(E)(i).

There is substantial doubt whether the provisions of section 7426 can be used effectively to combat acid precipitation. Section 7410 of the Act outlines the substantive factors which must be proved if a petitioning state is to succeed. Consequently, the effectiveness of section 7426 in protecting a state against acid precipitation rests on the utility of section 7410. Unfortunately, the difficulty in proving the violation of section 7410\textsuperscript{315} limits the effective use of the section 7426 petition procedure to disputes between neighboring states.\textsuperscript{316}

2. Section 7607—Review of Administrative Decisions

Section 7607 establishes procedures whereby any person may petition for judicial review of a final action by the Administrator which the petitioner has reason to believe will cause the permitted emissions of a source to violate section 7410(a)(2)(E)(i). A state wishing to use section 7607 to abate acid precipitation must argue that the Administrator is responsible for the interstate pollution because he permitted the operation of the source at excessively high emission levels. Under section 7607, the petitioner, in addition, must assert


\textsuperscript{315} See text at notes 245-54 supra.

\textsuperscript{316} The three petitions which have been filed under § 7426 have all involved neighboring states—West Virginia and Ohio, reported in 8 ENVIR. REP. (BNA) (Curr. Dev.) 1460 (Jan. 27, 1978); Kentucky and Indiana, 45 Fed. Reg. 17,048 (1980); New York, New Jersey and Connecticut, 45 Fed. Reg. 72,702 (1980).
that the Administrator's responsibility stems from his arbitrary and capricious act which allowed the interstate pollution to occur.  

A state presenting a petition under section 7607 must first prove that the emissions from a source violate or will violate section 7410. Proof of this pollution impact is an important step in establishing that the Administrator's approval of the state's SIP was an arbitrary act. If the petitioner can establish that the emission levels permitted a challenged source violate section 7410, the receiving state must then assert that the excessive pollution results from administrative action. The connection between the Administrator and the excessive emissions would be made by a showing that the source in question operates in accordance with a federally approved SIP. Finally, the petitioning state must show that the action taken by the Administrator in approving the SIP was a final action covered under section 7607. Under the broad interpretation of what constitutes a "final action" by the Administrator a review by a United States circuit court of appeals would be appropriate whenever the challenged source operates under an approved SIP.

A decision by a circuit court in favor of the petitioner would necessarily invalidate the Administrator's action which was challenged through section 7607. An appropriate order by the court would be to require the Administrator to refrain from approving a SIP unless it stipulates emission levels which do not violate section 7410. A decision in favor of the petitioner would be beneficial to that state in two ways. First, it would reduce the level of emission in the state whose SIP approval was challenged as violating section 7410. Second, a decision in favor of the petitioner would encourage the Administrator to scrutinize more closely SIP's submitted by the states to ensure compliance with section 7410.

A section 7607 petition is premised on the petitioner's ability to prove a violation of section 7410. Thus, a petitioner under section 7607 encounters the same difficulties in showing the connection be-

317. For example, Pennsylvania filed a § 7607 petition for review alleging that the Administrator's suspension of the Ohio Implementation Plan as it applied to two particular sources of sulfur dioxide and nitrogen dioxide is prohibited by § 7410. Pennsylvania v. EPA, No. 80-3147 (6th Cir., filed June 9, 1980). The action by the Administrator, Pennsylvania asserts, was procedurally deficient under § 7410(4), and further, was arbitrary and capricious since it will result in a violation of the NAAQS's for sulfur dioxide. Brief for Petitioner at 5. The petitioner also claims that the EPA failed to consider the interstate air pollution effects of its action as required by § 7410(a)(2)(E)(i). Id. at 27.

318. See Harrison v. PPG Industries, Inc., 446 U.S. 578 (1980) interpreting "final action" of the Administrator very broadly so as to include any final regulatory decision.
between the pollution source and the pollution impact as does a petitioner under section 7426. Because of the problem of proving impact, a petition under section 7607 by a state affected by acid precipitation is only likely to succeed when the challenged administrative actions affect the emissions of sources located in states bordering on the petitioner.

3. Section 7604—Citizens Suits

A third section of the Clean Air Act which has possible use as an abatement device for interstate pollution is that provided in section 7604. This section provides that any person may commence a civil suit in United States district court against any other person who is alleged to have violated a pollution "emission standard or limitation" or a noncompliance order issued by the state or the Administrator. A suit may also be brought under section 7604 against the Administrator of the EPA when he fails to perform a nondiscretionary act or duty.

A section 7604 suit is useful in acid precipitation control whenever a source is in violation of its applicable emission requirement. The plaintiff can, through the private action provided in section 7604, force a reduction in sulfur and nitrogen pollution by proving the occurrence of the violation. In the context of interstate pollution control, the need to prove only a violation of a standard or limitation relieves the party suing under section 7604 of evidential problems associated with sections 7426 and 7607. A state alleging a violation of an emission standard does not have to show an adverse impact of that violation on its air quality. In an appropriate situation, then, a suit under section 7604 against a pollution source would be preferred over a petition under section 7426. However, as a strategic tool in an

319. See text at notes 245-54 supra.
320. See Skillern, Private Environmental Litigation: Some Problems and Pitfalls, 9 St. Mary's L. J. 675, 685 (1978). The provisions for civil action under § 7604 have some utility as a supplement to the § 7426 petition process. A finding by the Administrator through § 7426 that a source is violating § 7410(a)(2)(E) is automatically construed to mean that the polluter is not in compliance with its state's plan. Assuming that the Administrator takes no further action, a plaintiff could bring an action directly against the polluting source and claim noncompliance with an emission standard or limitation based on the finding under § 7426.
321. 42 U.S.C. § 7604(a)(1) (Supp. III 1979). An "emission standard or limitation" is a "schedule or timetable of compliance, emission limitation, standard of performance or emission standard." Id. § 7604(f)(1).
322. Id. § 7604(a)(1).
323. Id. § 7604(1)(2).
324. See text at notes 245-54 supra.
attack on acid precipitation, the limits of section 7604 are apparent. First, section 7604 can only be used against those sources which are violating a pollution limitation or a noncompliance order and are not the subject of a proceeding by state or federal officials for that violation. Second, for those sources in attainment areas, forcing compliance with SIP levels is all that is possible under section 7604. However, compliance with SIP requirements, geared as they are towards attainment and maintenance of NAAQS's, is not enough to assure a beneficial impact on the amount of acidity in precipitation. Thus, section 7604 provides a limited means by which states can lessen the sulfur dioxide and nitrogen dioxide emissions from stationary sources.

If the source causing the harm to the receiving area is in compliance with all the requisite pollution standards and limitations, there is no possibility of a direct suit against that source using section 7604. The affected state is left with the alternative argument under section 7604 that the interstate impact of the source's emissions is due to a failure on the part of the Administrator to perform a nondiscretionary duty. A fundamental obstacle to a citizen's suit against the Administrator's inaction, however, is the interpretation given the term "nondiscretionary act or duty." In general, the courts have read this phrase "in light of the Congressional intent . . . to limit the number of citizen suits which could be brought against the Administrator and to lessen the disruption of the Act's complex administrative process." Accordingly, most Administrator decisions with regard to the approval of SIP's are considered to be within the Administrator's discretionary power and, thus, not challengable under section 7604. In a recent decision, for example, a plaintiff sued the EPA on the authority of section 7604 alleging that the Administrator failed to perform his statutory duty by refusing to revise the New York and New Jersey implementation plans so as to abate the interstate transport of pollutants into Connecticut. In that suit, it was alleged that the EPA had a nondiscretionary duty to pro-

325. The plaintiff would essentially be arguing that the emissions from the source in another state interfere with the attainment of the NAAQS's or with the implementation of the PSD program in the affected state. In accord with § 7410(a)(2)(E)(i), the Administrator had a duty to refuse to approve a SIP allowing the source to emit pollutants in such large amounts.
mulgate federal regulations to control the interstate transport of pollution. The district court disagreed. It found that no mandatory duty to control interstate transport existed under the Act because on its face, it rests "primary authority in the states to deal with these problems." The court stated further that regional regulation would simply undermine the statutory scheme. Since most actions by the Administrator regarding SIP's are discretionary, direct actions against him under section 7604 to abate interstate air pollution are generally not available. Thus, a state afflicted by acid precipitation can remedy the situation using section 7604 only when the source is in violation.

IV. CONCLUSION

The increased acidity of the precipitation falling in the United States presents a serious threat to the environment. Damage to aquatic and terrestrial life as well as to man-made materials has already been recorded. Rising amounts of the pollutants which cause acid precipitation will exacerbate the harm caused in the future. It is impossible for a state affected by acid precipitation to protect itself from the danger posed by this pollution solely by internal regulation. The long distance transport of sulfur dioxide and nitrogen dioxide means that some of the acid precipitation affecting a state is caused by sources located in other states. The interstate transport character of acid precipitation suggests that federal resolution of this problem through the Clean Air Act is appropriate.

The limitations of the Clean Air Act in resolving interstate pollution problems are revealed in an analysis of its provisions on emission standards and their application to acid precipitation. Those portions of the Act which delineate permitted pollution levels are not very helpful to those states searching for a solution to this serious pollution problem. The National Ambient Air Quality Standards (NAAQS's) cannot be used to reduce the emissions of existing sources in attainment areas below the point necessary to attain and maintain the national standards. However, achieving attainment status for sulfur dioxide and nitrogen dioxide is not enough to prevent the adverse effects of acid precipitation. The New Source Performance Standards (NSPS's), by basing pollution levels on techno-
logical capability, impose the highest degree of control possible on all new sources and help prevent further acidification from occurring. But their beneficial impact on the levels of sulfates and nitrates in the atmosphere will be gradual and depends on the replacement of older, less controlled sources. Consequently, the NSPS’s do not help a state interested in immediate action against acid precipitation. It is also unlikely that the Administrator will use the National Emission Standards for Hazardous Air Pollutants (NESHAP’s) to control acid precipitation. Promulgation of a standard under NESHAP’s requires a finding that sulfates and nitrates are hazardous pollutants. Given the Administrator’s reluctance to categorize a pollutant as hazardous, it is doubtful that this step will be taken with regard to the pollutants causing acid precipitation.

Major obstacles also limit the use of the procedures of the Act to control acid precipitation. Both sections 7426 and 7607 appear at the outset to be of great utility in controlling acid precipitation. Theoretically, a state affected by acid precipitation could invoke one of those two sections against any emission source which causes or contributes to the air pollution problem in its state. However, the difficulties in proving a violation of section 7410 by the sources which cause acid precipitation restrict the applicability of both of these sections to disputes between contiguous states. The third enforcement provision, section 7604, eliminates the need to prove a substantial interference with an air pollution control program. This section is useful when it can be applied against an out-of-state source in violation of a State Implementation Plan (SIP) or noncompliance order. In such an action, a receiving state’s officials would be standing in stead of the federal and emitting state’s officials with original responsibility to enforce the provisions of the Act. Without a violation of a SIP or noncompliance order, however, section 7604 cannot be used to abate interstate air pollution.

States can continue to employ the Act’s emission standards in an attempt to remedy the acid precipitation problem but it is doubtful that their efforts will be successful. To accomplish a reduction, a change in the Act itself or in its implementation is necessary. An alteration in the Act would reflect an acknowledgment of the inadequacy of state-by-state control and emission limitations based on the local air quality. It would also reflect a need to account for secondary pollutants, such as sulfates and nitrates, often caused by initial pollutants and not dealt with adequately by the Act in its present form. Two possible changes in federal air pollution control would result in a desirable reduction in sulfur dioxide and nitrogen dioxide in the at-
mosphere. The first is a tightening of the NAAQS's for these two pollutants by the Administrator. Such a change in the implementation of the Act is well within the authority of the Administrator. The Act itself requires a review of the NAAQS's by the Administrator and authorizes him to set any new standards indicated as necessary. After determining the appropriate emission limitation for sulfur dioxide and nitrogen dioxide such that the level of acidity in precipitation is reduced, the Administrator can promulgate new NAAQS's and require the states to submit SIP's designed to attain the new standards within a certain number of years. The stricter NAAQS's would, eventually, lead to reduced amounts of sulfates and nitrates in the air.

The appropriateness of effectuating this administrative change depends on whether a more stringent limitation for sulfur dioxide and nitrogen dioxide can reverse the current tendency towards increasingly acidic precipitation. If a sufficient lowering of sulfates and nitrates cannot be assured through changed NAAQS's for the primary pollutants then a more difficult option might be advocated by states afflicted by acid precipitation. This option would impose certain uniform pollution controls on all major sources of sulfur dioxide and nitrogen dioxide. Such controls might include pretreatment of fuels to remove some of their pollutants before combustion or retrofitting pollution sources with fuel gas desulfurization units. Of all the uniform pollution control options available, requiring Reasonable Available Control Technology (RACT) for existing pollution sources would be the most effective in containing acid precipitation. RACT would ensure that the gap which now exists between actual emission limitations and potential emission limitations would be closed. In this manner, the greatest reduction possible in sulfur dioxide and nitrogen oxide emissions could be achieved. However, requiring any specific technology for existing sources in attainment areas goes beyond the current authority of the Administrator. The guidelines for SIP implementation and enforcement contained in section 7410 would have to be revised to accommodate the new control strategy. Such a revision would signal a significant shift away from state control of pollution problems. Although state authorities would retain responsibility for implementing and enforcing RACT, the states would lose much of their flexibility in determining emission limitations for particular sources. Overall, a uniform technological requirement would favor the control of interstate pollution at the expense of local authority over air pollution regulation.