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ALTERNATIVES FOR REGULATORY CONTROL OF ACID RAIN IN THE NORTHEASTERN UNITED STATES

*Deborah J. Hartman**

I. Introduction

Scientific evidence indicates that an increase in acidity in our environment presents one of the most serious problems of the decade.[1] The threat comes from the skies—in the form of acidic precipitation, more commonly referred to as "acid rain." Acid rain is rainfall or other forms of precipitation composed in part of sulfuric or nitric acid.[2] Acid precipitation is in the process of destroying thousands of rivers and lakes in the Northeastern United States and Canada, rendering

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1. The recent surge of media coverage reflects the growing concern about the effects of acid rain. *See, e.g.*, Hoyle, *The Silent Scourge*, TIME MAG., Nov. 8, 1982, at 38 (describing acid rain as the "subtle but lethal . . . ecological issue of the '80s"); Shabecoff, *A Debate: Are Enough Data in Hand to Act Against Acid Rain?*, N.Y. Times, Nov. 14, 1982, at 20E, col. 1 (scientist recommends immediate action to deal with acid rain); Begley & LaBrecque, *Watch Out for Acid Fog*, NEWSWEEK, Dec. 13, 1982, at 98 (a California study indicated that the chemistry of "acid fog" is "100 times as acidic as acid rain," and it is being linked to vegetation damage and human respiratory problems); *Acid rain a national risk: group*, Chicago Trib., Nov. 9, 1982, § 1, at 3, col. 1 (Midwest ed.) (cites a recent report revealing that acid rain is of national concern); *Acid Rain: North of the Border and at Home*, Wall St. J., Sept. 21, 1982, at 35, col. 1 (letters to the editor present mixed views about the need to curb acidity in the environment).

2. Acidity is found in wet deposition such as snow, hail, dew, fog and rain, as well as in dry deposition, such as dust. The prevailing view is that coal and oil fueled electrical generating plants and industrial boilers emit sulfur dioxide (SO_2). Automobile emissions are major contributors to the presence of nitrogen oxides (NO_x) in the atmosphere. Once aloft, the SO_2 and NO_x combine with other elements to form dilute solutions of sulfuric and nitric acid which eventually becomes acid rain. While small quantities of SO_2 are naturally present in the atmosphere, man-made pollution causes 87% of the sulfur dioxide in the eastern United States. NATIONAL CLEAN AIR COALITION, ACID RAIN 4-5 (1981) (position paper). This acidity present in the atmosphere eventually falls to earth in the form of precipitation. This process is described in detail in Glass, *Mounting Acid Rain*, EPA J., July/Aug. 1979, at 25; Likens, Wright, Galloway & Butler, *Acid Rain*, 241 SCI. AM. 43 (Oct. 1979) [hereinafter cited as Likens]. A discussion of mobile sources, e.g., automobiles, is beyond the scope of this Article, which focuses primarily on sulfur emissions and their effects. The most thorough compilation of data and statistical analysis is contained in the Senate Committee on Environment and Public Works hearings on the Clean Air Act. *Clean Air Act Oversight (Field Hearings), Hearings Before the Sen. Comm. on Env't and Public Works*, 97th Cong., 1st Sess. (1981) [hereinafter cited as *Field Hearings*].

them unable to support fish and plant populations.[3] Moreover, forests, crops and soils are damaged[4] and structures made of limestone, marble, and even steel, are corroded.[5] Scientists also believe that acid rain leads to contamination of the food chain and the drinking water supply.[6]

The chemistry of precipitation, particularly its acid content, has been changing over time. Acidity commonly is measured by numerical values on a pH scale. The scale ranges from zero through fourteen. Zero represents the most acidic measure; seven represents a neutral solution; and fourteen represents an alkaline solution.[7] Evidence exists

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3. *See generally* AMERICAN FISHERIES SOCIETY, ACID RAIN/FISHERIES 45-93 (1982) (proceedings of an International Symposium on Acidic Precipitation and Fishery Impacts in Northeastern North America); J. BRIDGE & F. FAIRCHILD, NORTHEAST DAMAGE REPORT OF THE LONG RANGE TRANSPORT & DEPOSITION OF AIR POLLUTANTS (April 1981) (prepared for the Northeast States for Coordinated Air Use Management and the New England Interstate Water Pollution Control Comm'n), *reprinted in Field Hearings, supra* note 2, at 518, 558-61; *Trout Loss Blamed on Acid Rain*, THE SCOTSMAN, Nov. 26, 1982, at 6, col. 3 (acid rain blamed for the death of over 10,000 rainbow trout at a Scottish fish hatchery); Critical Assessment Document Draft: Acidic Deposition Phenomenon and its Effects, ch. 4 (Effects on Aquatic Chemistry); *id.* ch. 5 (Effects on Aquatic Biology) (unpublished manuscript reviewed by the author; to be published by the U.S. Environmental Protection Agency in final draft in 1983) [hereinafter cited as Critical Assessment Draft].

4. *See generally* Critical Assessment Draft, *supra* note 3, ch. 2 (Effects on Soil Systems); *id.* ch. 3 (Effects on Vegetation).

5. It is believed that acid precipitation washes down the surfaces of buildings and sculptures, corrodes their surfaces, and chemically transforms marble into a brittle plaster material. *See* Nriagu, *Deteriorative Effects of Sulfur Pollution on Materials*, in 2 SULFUR IN THE ENVIRONMENT 1, 19-33 (J. Nriagu ed. 1978); Critical Assessment Draft, *supra* note 3, ch. 7 (Effects on Materials); *Another Heritage At Risk*, TIME MAG., Nov. 8, 1982, at 42 (acid rain damages European monuments); Tanner, *Urban Pollution is Turning Glory That Was Rome to Dust*, N.Y. Times, Mar. 16, 1980, at 53, col. 1 (acid rain corrodes monuments in Rome).

6. *See generally* Hamilton, *Health Issues*, 5 CAN.-U.S. L.J. 47 (1982) (at the proceedings of the Canada-United States Law Institute's symposium on the transnational implications of acid rain, Dr. Hamilton expressed concern that certain metals will be "leached out" of drinking water causing high toxicity); J. BRIDGE & F. FAIRCHILD, *supra* note 2, *reprinted in Field Hearings, supra* note 2, at 565-70. It has also been suggested that acidified drinking water will "mobilize" toxic metals in the water pipes and contaminate the drinking water. Wetstone, *Air Pollution Control Laws in North America and the Problem of Acid Rain and Snow*, 10 ENVTL. L. REP. (ENVTL. L. INST.) 50001, 50002 n.16 (1980) [hereinafter cited as *Rain and Snow*].

7. Alkalines have the capacity to neutralize acids. Therefore, regions which are composed of relatively few alkaline substances are particularly susceptible to acid rain damage. *See* U.S. COMPTROLLER GENERAL, THE DEBATE OVER ACID PRECIPITATION: —OPPOSING VIEWS—STATUS OF RESEARCH app. I at 2 (1981) [hereinafter cited as DEBATE OVER ACID PRECIPITATION]. To understand the magnitude of the problem it is important to know that the pH scale is logarithmic. For example, rainfall with a pH 4.6 is 10 times more acidic than rain with a pH 5.6. *Id.* at 2 n.1.

of rain with a pH range from 6 to 7.6 almost two hundred years ago.[8] Today, however, normal rainfall has a pH of approximately 5.6 and precipitation with a pH of less than 5.6 is considered acidic.[9] Rain falling in the eastern and parts of the western United States, as well as Canada and other countries around the world, has been measured as having a pH between 4 and 5, with some precipitation having a pH as low as 2.3—the acidity of vinegar and lemon juice.[10] Thus dramatic increases in the acidity of precipitation around the world are evident.

While the phenomenon of acid rain is not yet completely understood,[11] this trend in increased acidity has been linked to the increase in the use of fossil fuels and the resulting rise in sulfur and nitrogen oxide emissions from the tall stacks used by utility and smelter plants.[12] Growing evidence indicates that acid rain results from the long distance transport and chemical transformation of sulfur dioxide and nitrogen oxide emissions.[13] When sulfur dioxide (SO_2) and nitrogen oxide (NO_X) are emitted, they tend to remain in the atmosphere for four or more days. When combined with moisture, SO_2 and NO_X are transformed into sulfuric and nitric acid, respectively.[14] While aloft, these compounds can be carried hundreds to thousands of miles away by the wind, crossing many political, geographical and jurisdic-

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8. *See* Likens, *supra* note 2, at 43. *But see Old Ice Age Indicates Acid Was Present in Rain Long Ago*, Wall St. J., Sept. 18, 1980, at 13, col. 1 (samples from 350-year-old glaciers in Antarctica and the Himalayas measured 4.8 to 5.1 pH).

9. Likens, *supra* note 2, at 43-44.

10. NATIONAL WILDLIFE FEDERATION, ACID RAIN: A PROBLEM IN NEED OF IMMEDIATE LEGISLATIVE REMEDY 3 (1981). According to the National Wildlife Federation in 1978, Kane, Pa., had a rainfall which measured 2.3 pH—almost 1000 times more acidic than normal water. Moreover, the increase in acidity is evident throughout the United States. For instance, since the 1950's precipitation in southern Florida has increased eight times and portions of the east, northwest and southwest United States receive rainfall which is 20 to 40 times more acidic than normal rainfall. *Id.* For a discussion of the international aspects of acid rain and long range transport of pollutants see Rosenkranz & Wetstone, *Acid Precipitation—National and International Responses*, 22 ENV'T 6 (1980).

11. Likens, *supra* note 2, at 43, 49.

12. *See A Statement By The Canadian-American Committee to Accompany The Report on Acid Rain: An Issue in Canadian-American Relations, reprinted in* J. CARROLL, ACID RAIN: AN ISSUE IN CANADIAN-AMERICAN RELATIONS v (1982); Critical Assessment Draft, *supra* note 3, ch. 1-9 (discusses the transport and transformation of emissions associated with acid deposition.

13. *See, e.g.*, Glass, *supra* note 2, at 26; NATIONAL COMMISSION ON AIR QUALITY (NCAQ), TO BREATHE CLEAN AIR 1-2 (1981) [hereinafter cited as BREATHE CLEAN AIR).

14. When pollutants are emitted from tall stacks, residence time tends to increase, *see* Likens, *supra* note 2, at 44-45. Residence time is the amount of time the compounds remain in the atmosphere.

tional boundaries before falling back to the earth as acidic precipitation.[15] Thus the impacts of sulfur dioxide emissions are often felt long distances from their source.

At present, the federal statute designed to alleviate air pollution—the Clean Air Act[16]—fails to address environmental degradation resulting from the long range transport of pollutants.[17] Under the Clean Air Act, air pollution is measured at ground level,[18] an area to which air pollution does not confine itself. Moreover, air quality is affected by the long range transport of pollutants. Although certain Clean Air Act provisions address interstate pollution, they are not enforced adequately.[19] Widespread calls for amending the Act to control the growing problem of acid rain in the Northeastern United States and Canada have given rise to myriad proposals.[20]

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15. *See generally Acid Rain: An International Concern*, 30 J. OF THE AIR POLLUTION CONTROL A. 1089-97 (1980); Barnes, *The Long Range Transport of Air Pollution: a Review of European Experience*, 29 J. OF THE AIR POLLUTION CONTROL A. 1219-34 (1979); 10 U.S. COUNCIL OF ENVTL. QUALITY, ANNUAL REPORT: ENVIRONMENTAL QUALITY-1979, at 70-71 (1979); Rosenkranz & Wetstone, *supra* note 10, at 6.

16. Clean Air Act of 1963, Pub. L. No. 88-206, 77 Stat. 392, *amended by* Pub. L. No. 89-272, 79 Stat. 992 (1965), *amended by* Pub. L. No. 89-675, 80 Stat. 954 (1966), *amended by* Pub. L. No. 90-148, 81 Stat. 485 (1967), *amended by* Pub. L. No. 91-604, 84 Stat. 1676 (1970), *amended by* Pub. L. No. 95-95, 91 Stat. 685 (1977) (currently codified at 42 U.S.C. §§ 7401-7642 (Supp. IV 1980)). *See* notes 89-134 *infra*.

17. *See, e.g.*, Lee, *Interstate Sulfate Pollution: Proposed Amendment to the Clean Air Act*, 5 HARV. ENVTL. L. REV. 71, 83-88 (1981) (recommends amending the Act to deal with long range transport of pollutants); BREATH CLEAN AIR, *supra* note 13, at 3.9-3 (existing control programs do not address the phenomenon of long range pollutant transport).

18. Clean Air Act §§ 109-110, (codified at 42 U.S.C. §§ 7409-7410 (Supp. IV 1980)). *See* note 35 *infra*.

19. *See* BREATHE CLEAN AIR, *supra* note 13, at 3.8-8 to 3.8-14.

20. *See* notes 84-133 *infra* and accompanying text. *See, e.g.*, Gallogly, *Acid Precipitation: Can the Clean Air Act Handle It?*, 9 B.C. ENVTL. AFF. L. REV. 687 (1981) (recommends setting stricter standards for permissible SO_2 and NO_x emissions); Lee, *Interstate Sulfate Pollution: Proposed Amendments to the Clean Air Act*, 5 HARV. ENVTL. L. REV. 78, 78-81 (1981) (proposes a regional approach); Ostrov, *Interboundary Stationary Source Pollution—Clean Air Act Section 126 and Beyond*, 8 COLUM. J. OF ENVTL. L. 37, 93 (1982) (recommends that Congress amend the Act to require major sources of pollutants to employ reasonably available control technology); Note, *Interstate Air Pollution: Unresolved Issues*, 3 HARV. ENVTL. L. REV. 291 (1979) (suggests a regional approach to consider effects of air pollution between noncontiguous states); *Rain and Snow*, *supra* note 6, at 50009 (recommends public participation to bring about emphasis on long range transport controls). *See also* Hirsch & Abramovitz, *Clearing the Air: Some Legal Aspects of Interstate Air Pollution Problems*, 18 DUQ. L. REV. 74, 98 (1979) (advocates formation of interstate compacts); Lutz, *Managing A Boundless Resource: U.S. Approaches to Transboundary Air Quality Control*, 11 ENVTL. L. 321, 361 (1980) (suggests three potential approaches: interregional management, interstate management and international management).

Due to incomplete knowledge of the causes and effects of acid rain, differing approaches toward its regulation have emerged. The three prevalent attitudes concerning the acid rain dilemma correspond to the three major interest groups involved in the debate: industry, environmental organizations and Congress. Industry, adopting a familiar stance, argues that acid rain regulation, if enacted at all, should be postponed until thorough studies are completed.[21] Environmental groups assert that enough information is known already and immediate regulatory action is essential to prevent irreparable injury to the environment.[22] Congress, until recently, had taken an intermediate approach, advocating further study before the initiation of any legislative action. This view is exemplified by the Acid Precipitation Act of 1980 which established a ten-year study of the causes and effects of acid rain.[23] Currently, some members of Congress advocate im-

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21. *See, e.g.*, EDISON ELECTRIC INSTITUTE, BEFORE THE RAINBOW: WHAT WE KNOW ABOUT ACID RAIN 15 (1980) ("I cannot over emphasize the importance of knowing what responsibility the industry has for acid deposition. Unless we know that, we cannot judge the efficacy of any control strategy . . . ," (quoting Dr. Ralph Perhac, Director of the Electric Power Research Institute)); PEABODY COAL CO., IMPROVING THE EFFECTIVENESS OF THE CLEAN AIR ACT (Apr. 1981), *reprinted in Field Hearings, supra* note 2, at 801, 813 ("Do not amend the Clean Air Act to control acid rain because such action is premature and could be detrimental to the economic health and energy independence of the United States."); ATLANTIC RICHFIELD CO., POSITION PAPER (1981), *reprinted in Field Hearings, supra* note 2, at 377, 378 ("refrain from any premature effort at remedial regulation"). *See also* DEBATE OVER ACID PRECIPITATION, *supra* note 7, at 7, 15, 32-37 (discusses the varying opinions about the responsibility for acid rain).

22. *See, e.g.*, NATIONAL CLEAN AIR COALITION, ACID RAIN 1 (1981) (position paper) (the potential destruction from delay makes acid rain control an issue for urgent attention); NATIONAL WILDLIFE FEDERATION, ACID RAIN A PROBLEM IN NEED OF IMMEDIATE LEGISLATIVE REMEDY ii (1981) (5 or 10 more years of study will only confirm the facts already known and documented).

23. The Acid Precipitation Act of 1980, Pub. L. No. 96-294, 94 Stat. 770 (currently codified at 42 U.S.C. §§ 8901-8905 (Supp. IV 1980)). For a legislative history see 11 ENV'T REP. 180-84 (1980). The Acid Precipitation Act sets forth congressional findings and declarations:

> The Congress finds and declares that acid precipitation resulting from other than natural sources—
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> (1) could contribute to the increasing pollution of natural and man-made water systems;
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> (2) could adversely affect agricultural and forest crops;
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> (3) could adversely affect fish and wildlife and natural ecosystems generally;
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> (4) could contribute to corrosion of metals, wood, paint, and masonry used in construction and ornamentation of buildings and public monuments;
>
> (5) could adversely affect public health and welfare; and
>
> (6) could affect areas distant from sources and thus involve issues of national and international policy.

mediate action to amend the Clean Air Act, while others agree with industry that further study is needed.[24] This Article will define regulatory options for curbing acid rain in the northeastern United States. The first section will discuss those provisions of the Clean Air Act which address interstate air pollution. The second section examines the prominent proposals for amending the Clean Air Act to provide for acid rain regulation as enunciated by legislators, commentators and environmental organizations. The third section presents a two-pronged recommendation for broadening the Clean Air Act to prevent and control acid rain. The initial recommendations relate to the adoption of a statutory scheme to achieve regional reduction in sulfur dioxide emissions through a regional air quality "bubble."[25] Additional recommendations include amendments needed to implement the regional bubble theory within the context of the existing Clean Air Act.

II. The Current Statutory Framework

The primary purpose of the Clean Air Act[26] is to improve the quality of the nation's air, "so as to promote the public health and welfare and the productive capacity of its population."[27] Its goal is to ensure that all areas throughout the country attain and maintain national ambient air quality standards (NAAQS).[28] To reach this goal, the Act provides that federal research,[29] financial assistance[30] and air pollution control programs[31] assist state and local governments. The

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42 U.S.C. § 8901(a) (Supp. IV 1980).

> The Congress declares that it is the purpose of this subchapter—
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> (1) to identify the causes and sources of acid precipitation;
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> (2) to evaluate the environmental, social, and economic effects of acid precipitation; and
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> (3) based on the results of the research program established by this subchapter and to the extent consistent with existing law, to take action to the extent necessary and practicable (A) to limit or eliminate the identified emissions which are sources of acid precipitation, and (B) to remedy or otherwise ameliorate the harmful effects which may result from acid precipitation.

Id. § 8901(b).

24. *See* notes 89-134 *infra* and accompanying text.

25. The concept of an emissions "bubble" is discussed at notes 144-45 *infra* and accompanying text.

26. Clean Air Act §§ 101-315, 42 U.S.C. §§ 7401-7642 (Supp. IV 1980). *See* note 16 *supra*.

27. Clean Air Act § 101(b)(1), 42 U.S.C. § 7401(b)(1).

28. *See id.* § 109, 42 U.S.C. § 7409. *See* note 47 *infra* and accompanying text.

29. Clean Air Act § 101(b)(2), 42 U.S.C. § 7401(b)(2).

30. *Id.* § 101(b)(3), 42 U.S.C. § 7401(b)(3).

31. *Id.* § 101(b)(4), 42 U.S.C. § 7401(b)(4).

Environmental Protection Agency (EPA) is the federal agency charged with the development, implementation and regulation of anti-pollution measures.[32] Under the Act, however, "prevention and control of air pollution at its source is the primary responsibility of States and local governments."[33] Therefore, the Act allocates specific duties and obligations between the EPA and the States.

A. Air Quality Standards

Under the Clean Air Act, the Administrator of the EPA preliminarily is directed to perform two basic, but crucial, tasks. First, the Administrator must establish a list enumerating each pollutant that may pose a danger to the public when emitted into the atmosphere.[34] Second, the list is used to set NAAQS.[35] These standards represent a minimum acceptable level for each pollutant determined by the Administrator to require regulation, for the protection of the public's health and welfare.[36] The Act sets forth two categories of National Ambient Air Quality Standards—primary and secondary. Primary NAAQS designate the highest acceptable level of a particular pollutant which protects the public's health with "an adequate margin of safety."[37] These standards are developed by considering only deleteri-

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32. *Id.* § 301, 42 U.S.C. § 7601.

33. *Id.* § 101(a)(3), 42 U.S.C. § 7401(a)(3).

34. *Id.* § 103, 42 U.S.C. § 7408. Specifically, the Administrator is directed to publish and occasionally revise a list of pollutants the emissions of which cause or contribute to air pollution which may reasonably be anticipated to endanger public health, and the presence of which in the air results from numerous diverse mobile or stationary sources. *Id.* § 103(a)(1), 42 U.S.C. § 7408(a)(1). The Administrator must also report scientific data to help understand the effects of the pollutants listed. This information should include variable factors which may alter the effects of the pollutant on public health and welfare as well as any known adverse effects on the environment. *Id.* § 103(a)(2), 42 U.S.C. § 7408(a)(2).

35. *Id.* § 109, 42 U.S.C. § 7409. Ambient air is defined as "that portion of the atmosphere, external to buildings, to which the general public has access." 40 C.F.R. § 50.1(e) (1982).

36. The development of national ambient air quality standards does not preclude a state from enunciating more stringent standards. 42 U.S.C. § 7416. *See* 40 C.F.R. § 50.2(d) (1982).

37. Clean Air Act § 109, 42 U.S.C. § 7409(b)(1) (Supp. IV 1980), which provides: "National primary ambient air quality standards, prescribed under subsection (a) . . . shall be ambient air quality standards the attainment and maintenance of which in the judgment of the Administrator, based on such criteria and allowing an adequate margin of safety, are requisite to protect the public health." *Id.* When developing primary ambient standards the Administrator is directed to consider both the population as a whole and individuals with specific health conditions which might be exacerbated by pollution in the air. J. ARBUCKLE, M. JAMES, M. MILLER, T. SULLIVAN & T. WATSON, ENVIRONMENTAL LAW HANDBOOK 169 (5th ed. 1978) [here-

ous effects on human health.[38] Secondary standards are proscribed "to protect the public welfare from any known or anticipated adverse effects associated with the presence of such air pollutant in the ambient air."[39] These latter standards differ from the primary standards in that they are broader, referring to the effects on the total environment.

B. State Implementation Plans

States are responsible for both the attainment and maintenance of NAAQS. The key mechanism to carry out this obligation is the State Implementation Plan (SIP).[40] Each state is required to formulate a comprehensive plan "which provides for implementation, maintenance, and enforcement"[41] of both primary and secondary ambient air quality standards. The SIP must include programs to attain the

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inafter cited as J. ARBUCKLE]. It is also clear that NAAQS shall not be considered to permit significant deterioration of existing air quality. 40 C.F.R. § 50.2(c) (1982).

38. J. ARBUCKLE, *supra* note 37, at 69.

39. Clean Air Act § 109(b)(2), 42 U.S.C. § 7409(b)(2) (Supp. IV 1980). Currently, seven pollutants are subject to NAAQSs: sulfur dioxide, carbon monoxide, ozone, lead, hydrocarbons, nitrogen dioxide, and particulate matter. 40 C.F.R. §§ 50.4-.12 (1982).

40. Clean Air Act § 110, 42 U.S.C. § 7410 (Supp. IV 1980). Before adopting its SIP, the state is required to give notice and hold public hearings. The Administrator is charged with the responsibility of approving and disapproving the SIPs. However, the Administrator is directed to approve a SIP which provides that (1) primary ambient air quality standards will be attained as expeditiously as possible and secondary standards will be attained in a reasonable time; (2) attainment and maintenance will be secured by timetables and restrictions on emissions; (3) monitoring methods will be established; (4) stationary sources are prohibited from emitting pollutants in excess of specified amounts; and (5) no new source will be constructed in a nonattainment area if the emissions from that new facility will contribute to concentrations of the pollutant for which NAAQSs are exceeded. *Id.* § 110(a)(2)(A)-(I), 42 U.S.C. § 7410(a)(2)(A)-(I).

Additional state responsibilities include the maintenance of a state agency comprised of members who represent the public's interest to enforce the Act. *Id.* § 128(1), 42 U.S.C. § 7428(1). Therefore, potential conflicts of interest must be disclosed. Also states must review SIPs periodically and report to the EPA. *Id.* § 124(a), 42 U.S.C. § 7424(a). Three specific aspects of the SIP must be reviewed. First, the state must determine the extent to which compliance with its SIP depends upon the use of petroleum products or natural gas by major fuel burning stationary sources. Second, the state must determine the extent to which the SIP will be inadequate in the future because of the dependence on petroleum and natural gas. Finally, the state must determine the extent to which compliance with the SIP depends upon employing coal which is not available within the region. *Id.*

41. *Id.* § 110(a)(1), 42 U.S.C. § 7410(a)(1). See BREATHE CLEAN AIR, *supra* note 13, at 2.2-5, for the Commission's recommendations for the SIP process. Specific State's Plans are reported at 40 C.F.R. §§ 52.50-.2827 (1982). For the purposes of the SIP, states are subdivided into air quality regions. 40 C.F.R. §§ 5.1(m), 81.11-.437 (1982).

NAAQSs as well as to satisfy the statutory mandate of prevention of significant deterioration (PSD) of high quality air.[42]

Specific provisions of the Clean Air Act, however, set forth concrete guidelines and restrictions for the content of State Implementation Plans. For example, the EPA Administrator is directed to determine the maximum heights permitted for the proposed construction of industrial smoke stacks.[43] Further guidelines are provided for the construction of new stationary sources.[44] The Administrator categorizes these stationary sources, and issues regulations aimed at limiting permitted emissions and attaining percentage reductions of harmful emissions.[45] Existing sources are also regulated, although they are subject to less stringent standards of performance.[46] Specific regulations govern areas with clean air and provide necessary measures to preserve air quality.[47] To protect the clean areas both intra- and interstate prevention of significant deterioration is required.[48] Toward

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42. Under the PSD program, the Act requires that the SIP:

> "contain[] adequate provisions (i) prohibiting any stationary source within the States from emitting any air pollutant in amounts which will (I) prevent attainment or maintenance by any other State of any such national primary or secondary ambient air quality standards, or (II) interfere with measures required to be included in the applicable implementation plan for any other State under part C to prevent significant deterioration of air quality or to protect visibility. . . .

Clean Air Act § 110(a)(2)(E), 42 U.S.C. § 7410(a)(2)(E) (Supp. IV 1980). *See* 40 C.F.R. §§ 51.10-.24 (1982) (addressing SIP contents and requirements).

43. Clean Air Act § 123, 42 U.S.C. § 7423 (Supp. IV 1980). The primary consideration is good engineering practice which means "the height necessary to insure that emissions from the stack do not result in excessive concentrations of any air pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies and wakes which may be created by the source itself." *Id.* § 123(c), 42 U.S.C. § 7423(c). However, the height of the stack shall not exceed two and a half times the height of the plant, except where necessary. *Id.*

44. Clean Air Act § 111, 42 U.S.C. § 7411 (Supp. IV 1980). A new stationary source is a building, structure, facility or installation which emits or may emit air pollution, the construction of which began after regulations pursuant to the 1977 Amendments of the Clean Air Act were promulgated. *Id.* § 111 (a)(2), (3) 42 U.S.C. § 7411(a)(2), (3).

45. *Id.* § 111(a)(1)(A)(i), (ii), 42 U.S.C. § 7411(a)(1)(A)(i), (ii).

46. Id. § 111(d), 42 U.S.C. § 7411(d). *See* B. ACKERMAN & W. HASSLER, CLEAN COAL/DIRTY AIR 14-16 (1981) (retrofitting existing stacks with wet scrubbers is extremely costly).

47. Clean Air Act § 170, 42 U.S.C. § 7470 (Supp. IV 1980). The Act provides that its purpose is "to preserve, protect, and enhance the air quality in national parks, national wilderness areas, national monuments, national seashores, and other areas of special national or regional natural, recreational, scenic, or historic value . . ." *Id.* § 170 (2), 42 U.S.C. § 7470(2).

48. *Id.* § 170(4), 42 U.S.C. § 7470(4). Two classifications of "clean air areas" are enumerated. Class I includes national parks and wildlife preserves. *Id.* § 171(a), 42 U.S.C. § 7471(a). Class II encompasses all other areas. *Id.* § 171(b), 42 U.S.C. § 7471 (b).

that end, SIPs must take into account emission restrictions necessary to prevent air quality deterioration and "best available control technology" must be utilized (BACT). Sulfur dioxide as well as nitrogen oxide is specifically addressed and maximum allowable increases in emission of these pollutants are established.[49] In addition, the statute covers areas which have failed to attain the NAAQS.[50] Where these "nonattainment areas" exist within a state, the SIP must provide for means to accelerate attainment. Methods of acceleration include immediate reduction in emissions by adopting reasonably available control technology (RACT),[51] and placing restrictions on new sources such as mandating compliance with the "lowest achievable emission rate."[52]

C. Interstate Pollution Abatement

State cooperation is an important theme in the Clean Air Act. Consequently, states are encouraged to form compacts[53] to prevent and control air pollution.[54] Significantly, under section 126, entitled Interstate Pollution Abatement,[55] each SIP must include a directive to provide notice to all nearby states which may be affected by the construction of a new source.[56]

On the other hand, section 126 of the Act permits an aggrieved state to petition the Administrator for a finding that a major source in another state emits or will emit pollutants in amounts which will prevent attainment or maintenance of NAAQS's by the petitioning

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49. *Id.* § 173, 42 U.S.C. § 7473, deals with SO_2. NO_x is addressed in *id.* § 176, 42 U.S.C. § 7476.

50. *Id.* § 201(2), 42 U.S.C. § 7501(2).

51. *Id.* § 202(b), 42 U.S.C. § 7502(b).

52. *Id.* § 203, 42 U.S.C. § 7503(2). Lowest achievable emissions rate (LAER) is defined as either the lowest rate required by the state or the lowest rate achieved in practice. *Id.* § 201, 42 U.S.C. 7501(3). *See Draft Guidelines For Deciding BACT Exclude National Weighing Factors*, 9 ENV'T REP. (BNA) 67 (May 19, 1978) (sets forth guidelines to determine the best control technology available).

53. A compact is a negotiated agreement between states. Clean Air Act § 102(c), 42 U.S.C. § 7402(c) (Supp. IV 1980). *See* note 54 *infra*.

54. Clean Air Act § 102(a), 42 U.S.C. § 7402(a). (Supp. IV 1980). Compacts may cover mutual assistance to prevent and control air pollution, as well as create joint agencies to effect the compact agreement. However, for a compact to be binding and enforceable, the consent of Congress is required. *Id.* § 102(c), 42 U.S.C. § 7402(c).

55. *Id.* § 126, 42 U.S.C. § 7426. Written notice to nearby states is required of proposed new or modified sources which are subject to restrictions against significant deterioration of air quality and which may contribute to levels of pollution which exceed the NAAQS. *See* Alabama Power Co. v. Costle, 636 F.2d 323 (D.C. Cir. 1979) (interpreting 42 U.S.C. § 7426).

56. Clean Air Act § 126, 42 U.S.C. § 7426 (Supp. IV 1980).

state or will otherwise interfere with that state's SIP.[57] Since the statutory language ostensibly limits the petitioner to a single source, it is crucial to determine whether section 126 also applies to sources whose emissions have a regional impact on air quality. Section 126 also provides that "within sixty days after receipt of any petition . . . and a public hearing, the Administrator shall make such a finding or deny the petition."[58] If the Administrator finds a violation, several consequences follow for the state in violation. For example, the construction and operation of any major proposed new or modified sources found to cause interstate pollution will be banned.[59] Existing sources determined to be in violation will be permitted to continue in operation for no more than three months.[60] However, the Administrator has discretion to permit the continued operation of the existing source if it complies with emission limitations and follows a schedule for achieving compliance within three years.[61]

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57. *Id.* § 126(b), 42 U.S.C. § 7426(b). The section provides:

> Any State or political subdivision may petition the Administrator for a finding that any major source emits or would emit any air pollutant in violation of the prohibition of section 7410(a)(2)(E)(i) of this title. Within 60 days after the receipt of any petition under this subsection and after public hearing, the Administrator shall make such a finding or deny the petition.

Id.

Currently, several petitions are before the EPA, including nine separate petitions from the State of New York. *See* notes 61-64 *infra* and accompanying text. As a result of these controversial petitions, questions have been raised about the scope of § 126 (42 U.S.C. § 7426 (Supp. IV 1980)). It has been suggested that § 126 extends to situations where one or more out of state sources are alleged to be in continuous violation and therefore are hampering the petitioning state's efforts to maintain the NAAQS. Ostrov, *supra* note 20, at 74-75. While it appears that Congress did intend § 126 to cover an entire region whose various sources are preventing compliance by the petitioning state, *see id.* at 78-80, no court has yet addressed the question.

58. Clean Air Act § 126(b), 42 U.S.C. § 7426(b) (Supp. IV 1980).

59. *Id.* § 126 (c)(1), 42 U.S.C. § 7426(c)(1).

60. *Id.* § 126 (c)(2), 42 U.S.C. § 7426(c)(2).

61. At present the EPA has received 126 petitions from several states. *Hearings Before the House Subcomm. on Health and the Environment of the Comm. on Interstate and Foreign Commerce*, 97th Cong., 1st Sess. (1981) (statement of Walter C. Barber, Jr., Acting Administrator of the EPA). All of the petitions include extensive allegations of interstate pollution impacts from SO_2 emissions. In June, 1981, the EPA held a two day hearing, which encompassed these interstate pollution claims involving emissions from over 50 named Midwestern utilities and industrial plants. *See EPA Proposes Major Interstate Pollution Probe, Cites 50 Plants in 5 states*, Inside EPA, April 24, 1981, at 1 (weekly report). The hearing addressed the petitions filed by New York and Pennsylvania, although representatives of other states, the cited utilities, coal suppliers and the province of Ontario also testified. No findings have been made to date. Central Docket Section (A-130), No. A-81-09 (EPA Room 2902, 401 M. St., S.W. Wash., D.C. 20360). The EPA's position thus far is that it is too soon to take regulatory action in the face of scientific uncertainty. The EPA contends that present knowledge of the link between long-range transport of pollu-

The weaknesses and practical difficulties of the interstate provisions are evidenced by recent New York State petitions[62] and the EPA's failure to act upon them.[63] New York alleged that Midwestern utilities and industries in seven states are cumulatively contributing to violations of the national ambient air quality standards for particu-

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tants and acid rain is incomplete. Moreover, the EPA asserts that it is extremely difficult to discern the link between emissions from specific sources and the pollution which occurs hundreds or thousands of miles away. *See Interstate Pollution Termed Burden; EPA Urged To Control Under Clean Air Act*, 12 ENV'T REP. (BNA) 286 (June 26, 1981); Statement of David Wooley, Special Assistant Attorney General of New York, before the EPA hearing panel, *reprinted in EPA Proposes Major Interstate Pollution Probe, Cites 50 Plants in 5 States*, Inside EPA, April 24, 1981, at 1 (weekly report). There are no findings to date of impermissible interstate air pollution. *See, e.g.*, Final Determination in Kentucky's 126(b) Petition Against Indiana, 42 Fed. Reg. 6624, 6628 (1982) (the EPA determined that the Indiana plant neither causes nor contributes to a violation of the NAAQS in Kentucky); *Indiana Power Plant Does Not Generate Excessive Interstate Pollution, EPA Says*, 12 ENV'T REP. (BNA) 1332 (Feb. 19, 1982). In addition, the EPA rejected a petition submitted by New York State challenging the Agency's approval of a SO_2 emission limit of 105,162 pounds per hour on Oct. 24, 1980. *See Plant's Sulfur Dioxide Limit Maintained by EPA, Rejecting Request Made by New York*, 12 ENV'T REP. (BNA) 1397 (Mar. 5, 1982).

62. New York alleged in nine separate petitions that utilities in Ohio, Illinois, Indiana, Michigan, Tennessee, Kentucky and West Virginia are creating interstate pollution impacts in New York. Additionally, New York argued that recent State proposals to relax the SO_2 emissions limits for midwestern utilities would, if approved, further aggravate the impacts created by interstate pollution which is carried to New York. *See* Petition of the State of New York for Disapproval of Proposed Revision of State Implementation Plan and Comments, *in re* Proposed Revision to the Michigan State Implementation Plan: Sulfur Dioxide Emission Limits for the Consumers Power Cobb Plant, Before the EPA (Jan. 16, 1981) (submitted by N.Y. Att'y Gen. Robert Abrams). *See also* New York State Memorandum of Law in Support of Petition for Interstate Pollution Abatement, *in re* Interstate Air Pollution Abatement Proceedings Under 126 of the Clean Air Act, Before the EPA 12-13 (Dec. 23, 1981) [hereinafter cited as Memorandum of Law]. While New York asserts that its citizens suffer grave health, environmental and economic harm from interstate pollution arriving from the Midwest, the EPA contends that the allegations are based in theory rather than in fact. *Allegations Termed "Theoretical,"* 12 ENV'T REP. (BNA) 287 (June 26, 1981) (statement of Charles M. Taylor, Director of the Office of Air Pollution Control, Ohio, EPA).

63. A hearing on the petitions was held June 18-19 (1981). For purposes of the hearing, the EPA combined the New York petitions with those from Pennsylvania and Maine. Ontario, Canada also participated in the proceedings. For a survey of the petitions filed see Ostrov, *supra* note 20, at 66-73. At the termination of the hearing, the EPA took no action, but agreed to consider the petitions further. In response to inquiry from the petitioning states as to the time frame for proposed action, the EPA stated that "given the complexity and volume of issues raised in these Section 126 petitions . . . the time frame . . . is difficult to predict. . . ." Nevertheless, the Agency assured that the petitions would be resolved "as expeditiously as practicable." Letter from Robert M. Perry to Gregory Sample, David R. Wooley & Thomas Au, at 2 (Dec. 30, 1982). *See* Final Determination in Kentucky's 126(b) Petition Against Indiana, 47 Fed. Reg. 6624 (1982); *Indiana Power Plant Does Not Generate Excessive Interstate Pollution*, 12 ENV'T REP. (BNA) 1332 (Feb. 19, 1982).

lates and sulfur dioxide in the state.[64] The EPA, however, has repeatedly declared that there is insufficient scientific evidence to justify regulatory action in this area.[65] In response, New York argued that the EPA cannot use "scientific uncertainty" as a guise for inaction. Therefore proceedings on the New York petitions reveal that although the Clean Air Act provides for interstate enforcement and penalties,[66] these provisions have not been effectively implemented.

D. Criticisms of the Act

Two ultimate goals in the battle against acid rain must be kept in mind: (1) Sulfur and nitrogen oxide emissions must be reduced [67] and (2) long range transport of air pollutants, particularly SO_2 and NO_x,

64. Although New York does not pinpoint exact sources of the emissions transported to New York, it presents studies which support a clear causal connection. The New York petition relies largely on the findings of the "ORBES" Report. UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, THE OHO RIVER BASIN ENERGY STUDY (ORBES): MAIN REPORT (1981) [hereinafter cited as ORBES]. The ORBES Report determined that coal is the primary fuel source of the Ohio River Basin Region, and as much as 95% of the regional electric utility plants are coal fired in some states. *Id.* at 5. The Report concluded that utility SO_2 emissions from the Ohio River Basin Region constituted over half of all SO_2 and sulfate pollution in southeastern Canada. *Id.* at 7. Moreover, long range transport of utility emissions from the region was emphasized as a major contributor to air pollution in the northeastern United States. *Id.*

Another study, relied upon by New York in its petitions concluded: "Although claims have been made that direct evidence linking power-plant emissions to the production of acid rain is inconclusive . . . we find the circumstantial evidence for their role overwhelming." Evidence Summary: Sulfates Transported into New York State—Impacts and Origins, Central Docket Section (A-130), No. A-81-09, EPA, Oct. 7, 1981 [hereinafter cited as Evidence Summary].

65. *See Hearings Before the Subcomm. on Arms Control, Oceans, International Operations, and Environment of the Sen. Comm. on Foreign Relations*, 97th Cong., 2d Sess. (1982) (statement of Kathleen M. Bennett, Ass't Admin. for Air, Noise, and Radiation, U.S.E.P.A.). She stated:

> [T]here are major uncertainties in many critical areas, particularly the transport and transformation of possible precursor emissions, the effects of acid deposition . . . [w]ithout such a firm foundation on which to base our decision on whether controls are necessary . . . any regulatory action at this time would involve substantial guesswork.

Id. at 9.

66. Where a state is in violation of its SIP, the EPA Administrator is empowered to issue a compliance order or to bring a civil suit. Where the state fails to comply with requirements under 42 U.S.C. § 7410(a)(2)(I) (Supp. IV 1980) by building a new source which violates emission requirements, the Administrator may ban the proposed construction.

On the other hand, where the source owner or operator is in violation of the Act, the Administrator may bring a civil suit, seek an injunction, and impose monetary penalties. Clean Air Act § 113, 42 U.S.C. § 7413(a), (b) (Supp. IV 1980).

67. Scientific data indicates that irreparable harm is occurring to all aspects of the environment. *See* notes 2-6 *supra* and accompanying text.

must be restricted. The fundamental flaw in the current Clean Air Act is its inability to achieve either of these goals effectively.[68] The central provisions intended to reduce emissions—National Ambient Air Quality Standards,[69] New Source Performance Standards,[70] and Prevention of Significant Deterioration[71]—fail to restrict SO_2 and NO_x emissions adequately.

At present, the NAAQS concentration limits are too lenient. It is possible for older power plants subject to these provisions to meet the concentration limits while still emitting large quantities of pollutants.[72] By contrast, new facilities are subject to more stringent requirements under the New Source Performance Standards (NSPS). However, the retirement of old stationary sources is not fast enough for these NSPSs to have a recognizable effect in the immediate future.[73] Similarly the provisions for the Prevention of Significant Deterioration do not adequately address the acid rain problem. While PSD provisions subject power plants in clean air regions to Best Available Control Technology (BACT)—a fairly strict requirement—BACT does not bring about a reduction of either sulphates or nitrates.[74] Finally, no attainment provisions which are applicable to regions which exceed NAAQSs require proposed power plants to limit their emissions to the "Lowest Achievable Emissions Rate" (LAER).[75] The new facility must obtain local "offsets,"[76] i.e., decreases in emissions from the other sources, to ensure that net emissions in the region will not be increased. While offsets can have a beneficial role in acid rain regulation, the probable result in this situation is an increase in the total emissions despite minimal local effect.

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68. *See* BREATHE CLEAN AIR, *supra* note 13, at 2.1-68 to-70; DEBATE OVER ACID PRECIPITATION, *supra* note 7, at 33-36.

69. Clean Air Act § 109, 42 U.S.C. § 7409 (Supp. IV 1980). *See* notes 35-37 *supra*.

70. Clean Air Act § 111, 42 U.S.C. § 7411 (Supp. IV 1980). *See* notes 44-46 *supra*.

71. Clean Air Act §§ 170-179, 42 U.S.C. §§ 7470-7479 (Supp. IV 1980). *See* notes 47-48 *supra*.

72. DEBATE OVER ACID PRECIPITATION, *supra* note 7, at 33.

73. *Id.* at 34.

74. *Id.* at 35.

75. *See* note 52 *supra*.

76. The EPA adopted the use of "offsets" for nonattainment areas in 1976. When new emissions will be introduced, they must be more than offset by concurrent reductions from existing sources in the same area. This type of "bargain for emissions" policy can also be adopted to cover sources within multiple regions, as well as single and multiple sources within a single plant. *See* del Calvo y Gonzalez, *Markets in Air: Problems and Prospects of Controlled Trading*, 5 HARV. ENVTL. L. REV. 377, 379, 399 (1981). Recently the EPA's definition of the term "source" for the purpose of offsets has been challenged in the federal courts. *See* note 141 *infra*.

The current Clean Air Act also fails to address the phenomenon of long range transport of pollutants, namely sulfur and nitrogen oxides.[77] Air pollution does not confine itself to ground level; nevertheless, the Clean Air Act requires the measurement and regulation of air pollution in terms of ambient air quality at the ground level.[78] Moreover, under the Act, the emphasis is on the state's internal borders.[79] Measuring the quality of ground level ambient air fails to supply adequate information in two respects: (1) it gives an inaccurate picture of the local levels of air pollution; and (2) it does not reflect the total regional "loading" of pollutants.[80]

The Council on Environmental Quality reported that within a single city, wide variations in the measurements of local air quality are possible since the readings depend on the location of the monitoring sites.[81] Moreover, acid rain is caused by the total level of pollutants loaded into the atmosphere. As noted in a recent study of regulatory strategies to regulate acid rain, "tremendous quantities of pollution can be released without violating ambient standards, so long as there is sufficient dispersion."[82] Thus pollution emitted from tall stacks can escape the local air quality monitors, and yet cause serious acid rain problems in areas downwind from the source.

III. The Proposed Amendments

In recognition of the present shortcomings of the Clean Air Act, numerous proposals for its amendment have been offered from environmental agencies, legislators and legal commentators.

A. Commentators' Proposals

One recent approach, enunciated by two commentators,[83] is the adoption of uniform technological standards for all major sources of

77. *See, e.g.*, Lee, *supra* note 20, at 76-77 (only by controlling regions will the problem of acid rain be diminished); BREATHE CLEAN AIR, *supra* note 13, at 3.9-1 to .9-6 (existing control programs under the Act do not directly address the phenomenon of long range transport).

78. *See* 40 C.F.R. § 50.1(e) (1982).

79. The State Implementation Plan process, as it is presently structured, by definition limits the approach to an in-state pollution control program. *See* BREATHE CLEAN AIR, *supra* note 13, at 3.9-1.

80. 2 U.S. COUNCIL OF ENVTL. QUALITY, ANNUAL REPORT: ENVIRONMENTAL QUALITY-1971, at 214.

81. *Id.* This phenomenon is due to the influence of local sources near the monitors.

82. WETSTONE & REED, FINAL REPORT: INSTITUTIONAL ASPECTS OF TRANSPORTED POLLUTANTS 5-6 (1981) (report for the Environmental Law Institute).

83. *See generally* Gallogly, *supra* note 20 (proposes uniform standards); Ostrov, *supra* note 20 (same).

sulfur and nitrogen dioxide. The standard is expressed in terms of "reasonably available control technology" (RACT).[84] This uniform standard would permit a choice of a variety of control methods. RACT is a standard presently employed by the EPA in other contexts but under this approach its application would be broadened.[85] Although this move toward uniformity diminishes a state's authority, it is urged that to deal effectively with this widespread dilemma, greater federal control is needed.

Advocates of the RACT amendment to the Clean Air Act to control acid rain also recommend that administrative changes accompany the congressional action.[86] One commentator also supports tighter NAAQSs for SO_2 and NO_x—the acid rain precursors.[87] Similarly, another commentator recommends concomitant changes in the EPA's policies and administrative procedures. The latter proposes more stringent stack height requirements, greater enforcement of sources already in compliance as well as those sources which presently are in violation, and a reevaluation of the merits of coal conversion.[88] While the adoption of a RACT standard could help achieve emissions reductions, unless combined with a regional emissions limitation program, it is insufficient alone to solve the problem of regional emissions.

B. Congressional Recommendations for Further Study

Another unacceptable approach toward acid rain control suggested by some members of Congress is the call for further study at an

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84. *See* Gallogly, *supra* note 20, at 744; Ostrov, *supra* note 20, at 93.

85. Under the Clean Air Act, existing sources in nonattainment areas are required to implement reasonably available control technology as expeditiously as is practical. Clean Air Act § 202(b)(2), 42 U.S.C. § 7502(b)(2) (Supp. IV 1980). This requires implementing advanced control technology. *See* 40 C.F.R. § 51.1 (1982). One method is to retrofit the plant with "wet scrubbers." Wet scrubbers are used at coal fired plants to treat the coal so as to reduce SO_2 emissions. Dependence upon wet scrubbers to reduce emissions has been criticized. *See* B. ACKERMAN & W. HASSLER, CLEAN COAL/DIRTY AIR 14-17 (1981). Other methods of achieving reduced emissions are discussed at notes 102-06 *infra* and accompanying text.

86. Gallogly, *supra* note 20, at 744 (recommends amending the guidelines for SIP implementation and enforcement); Ostrov, *supra* note 20, at 82-86 (supports EPA administrative changes to maintain the status quo until Congress acts).

87. Gallogly, *supra* note 20, at 744. Gallogly concludes, "[t]o accomplish a reduction, a change in the Act itself or in its implementation is necessary." *Id.* at 743. Gallogly emphasizes two possible changes: more stringent NAAQSs for SO_2 and nitrates, and uniform pollution control options, requiring RACT. *Id.* at 744.

88. Ostrov, *supra* note 20, at 85. Ostrov noted that although "the statutory authority now available to the EPA may not be sufficient to remedy the problem of long range transport of SO_2 and sulfates, the EPA can take corrective action to mitigate the problem." *Id.* at 92. However, he emphasized that "Congress has the ultimate role in upholding the nation's commitment to air pollution control." *Id.* at 93.

accelerated pace. Two proposed bills[89] would reduce the ten year study established by the Acid Precipitation Act of 1980 to a period of five years. Clearly, further study of the causes and effects of acid rain without action can be likened to slowing down the rowing in a raft approaching a waterfall: it will buy more time, but it does not change its direction.

C. Congressional Suggestion to Ignore Acid Rain

A bill which has been endorsed by many industrial groups and the Reagan Administration omits any program for the control of acid rain. The bill, H.R. 5252,[90] was introduced by Representative Luken of Ohio. It has been criticized, not only for its failure to provide for any acid rain program, but for destructively weakening existing provisions of the Clean Air Act.[91] The bill focuses on changes in the administration of SIPs. Extensions to meet NAAQS deadlines are made easier to obtain. Additionally, the EPA is given greater discretion to refrain from imposing penalties for violations.[92] This increased discretion may lead to a weakening in the enforcement of air quality standards.

D. Congressional Proposals to Adopt a Regional Approach

Several bills have been introduced which would establish a regulatory scheme somewhat similar to the proposal outlined in a later section. They require an acid deposition region to be defined, and

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89. *See* H.R. 3471, 97th Cong., 1st Sess. § 202(c) (1981); H.R. 5055, 97th Cong., 1st Sess. §§ 2-3 (1981). H.R. 5055 provides in pertinent part:

> (b) Purposes—It is the purpose of this Act to provide for—(1) an accelerated effort to understand the causes and effects of acid precipitation; and (2) examination of the potential and feasibility of various techniques of controlling sulfur dioxide and nitrogen oxide emission, such as precombustion fuel treatment and inherently low-polluting combustion technologies, which may hold promise of reducing emissions of these pollutants.

H.R. 5055, 97th Cong., 1st Sess. § 2(b) (1981).

90. H.R. 5252, 97th Cong., 1st Sess. (1981).

91. *See* NATIONAL WILDLIFE FEDERATION, ACID RAIN UPDATE 11 (Apr. 15, 1982) (labels H.R. 5252 a "dirty air bill") (prepared by K. Kamlet & S. Howards for the Pollution and Toxic Substances Program, held in Albuquerque, New Mexico, Mar. 18-20, 1983) [hereinafter cited as ACID RAIN UPDATE]; J. Blodgett, Clean Air Amendments and the 97th Congress, Issue Brief No. IB81126, at 3-10 (Jan. 5, 1982) (Congressional Research Service); R. Jacobius, H.R. 5252: Clean Air Bill Set to Roll?, Environmental and Energy Study Conference Fact Sheet (Feb. 1, 1982) (Congressional Research Service). *See also Gramm To Introduce Air Act Amendment To Eliminate NSPS Percent Reduction Rule*, 12 ENV'T REP. (BNA) 1606 (Apr. 9, 1982); *House Panel Shortens HR 5252 Extensions, Defeats Waxman's Anti-Backsliding Measure*, 12 ENV'T REP. (BNA) 1707 (Apr. 23, 1982); *Acid Rain Proposal Approved*, 12 ENV'T REP. (BNA) 1739 (Apr. 30, 1982).

92. H.R. 5252, 97th Cong., 1st Sess. 17 (1981).

emission reduction targets for each state to be set in order to achieve a regional reduction in sulfur dioxide emissions.[93] Each state would be required to submit a plan for meeting its share of the regional reduction. Flexibility in the choice of compliance methods to achieve the state's required reduction would be afforded through the option of regional bubbling.[94] The bills present proposals for requiring the state to reach a stringent reduction in its sulfur dioxide emissions if a state fails to submit a plan in compliance.[95]

For instance, Senator Mitchell from Maine introduced S. 1706[96] creating a thirty-one state acid deposition impact region including all states east of the Mississippi River.[97] Sulfur and nitrogen oxides from stationary sources in the region are not to exceed the amounts emitted as of January 1, 1981.[98] A ten million ton reduction from the levels of SO_2 emitted in 1980 is to be achieved over a ten year period.[99] The states' shares are to be determined by a set formula.[100] However, states can agree to reallocate the required reductions.[101] The proposed bill provides for a mix of permissible methods to meet the required reduction: trading of emission reduction requirements,[102] early retirement of existing plants,[103] energy conservation,[104] coal washing,[105] and least

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93. These proposed bills include: S. 1706, 97th Cong., 1st Sess. § 181 (1981); S. 1709, 97th Cong., 1st Sess. § 181 (1981); S. 1718, 97th Cong., 1st Sess. § 181 (1981); H.R. 4816, 97th Cong., 1st Sess. (1981); H.R. 4829, 97th Cong., 2d Sess. § 181 (1981); H.R. 5555, 97th Cong., 2d Sess. § 181 (1982). *See Congress in 1981: Clean Air Act and Budget Skirmishes Set Stage for Action in 1982 Session*, 12 ENVTL L. REP. (ENVTL. L. INST.) 10001 (1982).

94. "Bubbling" is discussed at notes 144-45 *infra* and accompanying text.

95. *See, e.g.*, S. 1706, 97th Cong., 1st Sess. § 184 (1981) (the emission limitation is 1.2 pounds of sulfur per million British thermal units on a thirty-day average); H.R. 4829, 97th Cong., 2d Sess. § 185(c) (1981) (same standard); H.R. 5555, 97th Cong., 2d Sess. § 185(a)(1)(C) (1982).

96. S. 1706, 97th Cong., 1st Sess. (1981). The bill is entitled "Acid Deposition Control Act." The proposed bill is discussed in ACID RAIN UPDATE, *supra* note 91, at 2-4.

97. S. 1706, 97th Cong., 1st Sess. § 181(a). This amendment was endorsed by five Governors from New England States. *See Resolution On Acid Rain Adopted By New England, Canadian Officials*, 13 ENV'T REP. (BNA) 360 (July 9, 1982).

98. S.1706, 97th Cong., 1st Sess. § 182(a)(1981).

99. *Id.* § 182(b).

100. *Id.* § 183(a)(1). The formula requires a "reduction in annual sulfur dioxide emissions equal to that fraction of 10,000,000 tons which is the ratio of all the actual utility emissions in such State in excess of 1.2 pounds of sulfur per million British thermal units [Btus] to the total in all states in the region of all the actual utility emissions in excess of 1.2 pounds of sulfur per million British thermal units." *Id.*

101. *Id.* § 183(a)(2).

102. *Id.* § 185(a)(4).

103. *Id.* § 185(a)(2).

104. *Id.* § 185(a)(3).

105. *Id.* § 185(a)(5).

emissions dispatching.[106] Moreover, nitrogen oxide reductions can be substituted two-to-one for sulfur dioxide reductions.[107] The bill retains the present combination of state and federal enforcement. If a state fails to comply, S. 1706 provides for federal intervention.[108] Each state, however, would have two years to determine how the reduction in SO_2 emissions will be accomplished by the sources within its jurisdiction.[109]

The Dodd-Durenburger proposed bill, S. 1718,[110] also addresses interstate air pollution. It would expand section 126 to permit affected states to seek reduction of air pollution from "any source or sources" covered by the Act, rather than from only "any major source."[111] Furthermore, it would amend the SIP requirements to control emissions which are shown to interfere with another state's ability to meet NAAQS, rather than merely require control of emissions which prevent attainment or maintenance.[112] Other changes proposed for the petition process include extending the time period in which the Administrator must act upon a section 126 petition, and allowing a state to bring suit immediately if the Administrator should fail to act in the allotted time.[113] The amendment would also permit the court to

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106. *Id.* § 185(a)(1).

107. *Id.* § 185(b).

108. *Id.* § 184. Therefore, a federal mandatory emissions reduction standard is provided for any State which has not adopted such measures or received approval of them from the Administrator. *Id. See* note 95 *supra.*

109. S. 1706, 97th Cong, 1st Sess. § 183(b)(1) (1981).

110. S. 1718, 97th Cong., 1st Sess. (1981). *See* ACID RAIN UPDATE, *supra* note 91, at 5-6.

111. S. 1718, 97th Cong., 1st Sess. § 126(b)(1981). The Act currently provides that a [s]tate . . . may petition the Administrator for a finding that *any major source* emits or would emit any air pollutant in violation of . . . section 7410(a)(2)(E)(i) . . . ." 42 U.S.C. § 7426(b) (Supp. IV 1980) (emphasis added). Senate bill 1718, however, permits a petition to be filed against "any source or sources." S. 1718, 97th Cong., 1st Sess. § 126(b) (1981).

112. S. 1718, 97th Cong., 1st Sess. 1-2 (1981). A SIP must prohibit any stationary source within the state from emitting pollutants which "interfere" with the attainment and maintenance in another state. This standard would replace the current prohibition on emissions which "prevent" the attainment and maintenance of NAAQS elsewhere. *See* 42 U.S.C. § 7410(a)(2)(E)(i) (Supp. IV 1980); *see also* ACID RAIN UPDATE, *supra* note 91, at 5-6.

113. The Clean Air Act currently provides that "within 60 days after receipt of any petition under this subsection and after public hearing, the Administrator shall make such a finding or deny the petition." Clean Air Act § 126(b), 42 U.S.C. § 7426(b) (Supp. IV 1980). The Senate bill states "[w]ithin one hundred and twenty days after receipt of any petition under this subsection, during which time a public hearing shall be held, the Administrator shall make such a finding or deny the petition." S. 1718, 97th Cong., 1st Sess. § 126(b)(1981).

award the petitioning state all litigation costs and a penalty of $100,000.[114]

Another proposed bill in the Senate, introduced by Senator Moynihan, S. 1709,[115] is also control-oriented. Each state in the proposed acid precipitation mitigation region is required to achieve a substantial reduction in SO_2 emissions.[116] The bill deals primarily with revisions in the State Implementation Plan procedures. For example, S. 1709 requires the EPA Administrator to review applicable SIPs within ninety days of receiving proposed SIP amendments.[117] It also requires review of SIPs at least every three years.[118]

Additional proposals have been debated in the House of Representatives. Introduced by Representative D'Amours of New Hampshire, H.R. 4816[119] resembles the Mitchell-Stafford bill.[120] It differs, however, from S. 1706 in that it calls for a scheduled reduction in SO_2 emissions by large utilities for each of the three year periods before 1990.[121] To achieve these necessary reductions, the bill targets[122] the fifty utilities in the defined region having the highest SO_2 emissions in 1980, which are not subject to New Source Pollution Standards.[123] It also targets all other utilities, having a certain defined capacity, to meet stringent reductions in SO_2 emissions. Most important, the bill would permit a flexible mix of emission controls, including an EPA administered regional "bubbling."[124]

One of the last bills submitted to amend to Clean Air Act was introduced by Representative Waxman, chairman of the House Subcommittee on Health and the Environment. H.R. 5555[125] incorpo-

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114. S. 1718, 97th Cong., 1st Sess. 4 (1981). The penalty is assessed against the United States.

115. S. 1709, 97th Cong., 1st Sess. (1981). *See* ACID RAIN UPDATE, *supra* note 91, at 5; *Three Bills Introduced in Senate to Abate Acid Rain, Long-Range Pollution Transport*, 12 ENV'T REP. (BNA) 745 (Oct. 6, 1981).

116. S. 1709, 97th Cong., 1st Sess. § 183(a)(1) (1981). Each state is required to reduce, prior to December 31, 1991, SO_2 emissions from all major stationary sources by an amount equal to 85% of the actual 1980 SO_2 emissions rate. *Id.*

117. *Id.* § 185(a)(1).

118. *Id.* § 185(b)(2).

119. H.R. 4816, 97th Cong., 1st Sess. (1981).

120. *See* notes 96-108 *supra*.

121. H.R. 4816, 97th Cong., 1st Sess. § 183(a)(1) (1981).

122. Targeting involves citing specific categories of sources and imposing upon them standards designed to achieve greater emissions reductions.

123. H.R. 4816, 97th Cong., 1st Sess. § 183(a) (1981).

124. *Id.* § 184 (1981). *See* notes 144-45 *infra* for a discussion of "bubbling."

125. H.R. 5555, 97th Cong., 2d Sess. (1982). For a detailed analysis of H.R. 5555 see *Comparison of Current Clean Air Act With HR 5555, Prepared By the House Energy and Commerce Committee Staff*, Mar. 1, 1982, *reprinted* in 12 ENV'T REP. (BNA) 1410-16 (Mar. 5, 1982).

rates the Moffett-Gregg bill[126] and mandates a ten million ton reduction in sulfur dioxide emissions over a ten year period[127] in the thirty-one state region east of the Mississippi.[128] Furthermore, it modifies section 126 to permit "any person"[129] to petition for a finding by the Administrator that a source in another state is in violation of the Act.[130] In addition H.R. 5555 would reduce the applicable standard to permit a petitioner to seek action against collective sources which "interfere" rather than prevent ambient air quality attainment. Finally, the Administrator would be authorized to make a finding of interference without a showing that a particular source was solely responsible for the violation.[131]

In July 1982, the Senate Environment and Public Works Committee approved a Clean Air Act amendment which represented a compromise based on S. 1706.[132] The Senate committee amendment creates a thirty-one state region which would be required to reduce emissions by eight million tons by 1994. The governors of those thirty-one states must, within eighteen months, agree on an allocation plan to meet the required regional reduction.[133] If agreement is not reached, the EPA Administrator will calculate each state's emission reduction.[134]

These proposed amendments reflect the widely diverging viewpoints toward acid rain—its causes, effects, and proper solution. In addition, the highly political nature of the problem makes formula-

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126. The Moffett-Gregg proposed bill is H.R. 4829, 97th Cong., 1st Sess. (1981). Essentially, H.R. 4829 resembles S. 1706 and recommends the establishment of a 31-state regional bubble and emission trading within smaller regions. *See Moffett To Offer Acid Rain Legislation; Bennet Industry Say Controls Premature*, 12 ENV'T REP. (BNA) 793 (Oct. 23, 1981); *id.* at 837.

127. H.R. 5555, 97th Cong., 2d Sess. § 183(a)(1982).

128. *Id.* § 181. *See Summary of H.R. 5555, Bill to Amend The Clean Air Act Prepared By Staff of House Subcomm. on Health and the Environment, reprinted in* 12 ENV'T REP. (BNA) 1382, 1382-84 (Feb. 26, 1982); *Waxman Introduces Bill As Vehicle For Air Act Mark Up, Alternative to H.R. 5252*, 12 ENV'T REP. (BNA) 1355 (Feb. 26, 1982).

129. H.R. 5555, 97th Cong., 2d Sess. § 105(b)(1982). This represents a significant extension of the present limitation which is "any State or political subdivision." Clean Air Act § 126(b), 42 U.S.C. § 7426(b) (Supp. IV 1980).

130. *See* Clean Air Act § 110(a)(2)(E)(i), 42 U.S.C. § 7410(a)(2)(E)(i) (Supp. IV 1980).

131. *Id.*

132. *See Senate Panel Approves Air Act Amendment to Control Acid Rain Through Emissions Cut*, 13 ENV'T REP. (BNA) 419 (July 30, 1982). See notes 98-109 *supra* and accompanying text for a discussion of S. 1706.

133. *Senate Panel Approves Air Act Amendment to Control Acid Rain Through Emissions Cut*, 13 ENV'T REP. (BNA) 419 (July 30, 1982).

134. *Id.*

tion of an acid rain regulatory program extremely difficult. Implementation of the reduction requirements is expensive.[135] One study indicated that to reduce SO_2 emissions by eight million tons by 1995 would cost $3 billion annually in 1982 dollars.[136] The costs would decrease over the decades so that by the year 2000 the annual cost would be $1.8 billion.[137] However, the economic losses caused by the destruction of natural resources may well exceed the costs of preventive measures.[138]

Unfortunately, political, economic and scientific considerations thwarted congressional efforts to enact acid rain legislation before the ninety-seventh congressional session ended.[139] At the end of 1982, no affirmative action had been taken. In the following section proposals are offered for an effective, yet politically acceptable approach to solving the acid rain problem.

IV. EPA Bubble Policy

The Bubble,[140] or Alternative Emissions Reduction Option, is a relatively new approach toward air quality regulation designed by the

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135. Various states have conducted studies estimating the in-state impacts of acid rain. These give only a partial indication of the costs involved. One study focused on the costs required for the state of Ohio to prevent health problems linked to acid rain's effect on the drinking supply. The suggested cost of replacing drinking water supply systems was $84 million. *Economic Impacts of Acid Rain, Hearings Before the Senate Select Comm. on Small Business and Comm. on Environment & Public Works*, 96th Cong., 2d Sess. 170 (1980). A New York study estimated that the loss of annual fisheries to licensed anglers may be $6.4 million annually. Evidence Summary, *supra* note 64, at 9. Additionally, it has been suggested that the United States suffers $250 million in damages to the aquatic ecosystem each year. E. OLSON, THE ECONOMICS OF AIR POLLUTION AND ACID RAIN 6 (National Wildlife Fact Sheet) (July 1981).

On the other hand, the Clean Air Act amendment to control acid rain, approved by the Senate Environment & Public Works Committee, was estimated to cost between $3.5 billion in 1982 and $1.9 billion in 1983. See note 132 *supra* and accompanying text for an examination of the amendment supported by the Senate committee. Although the benefits of any acid rain regulatory program cannot be guaranteed, the environmental costs may be irreversible. Thus the costs of inaction must be weighed against the costs of implementing controls.

136. *Senate Acid Rain Bill Costs Estimated At $5 Billion in 1995, Report To EPA Says*, 13 ENV'T REP. (BNA) 627, 627-28 (Sept. 10, 1982).

137. *Id.*

138. The costs incurred through environmental destruction may well outweigh the costs of controlling acid precipitation. *See* note 135 *supra*.

139. *See Little Hope Seen For Act Amendments Or Even "Short" Extension Bill This Year*, 13 ENV'T REP. (BNA) 684, 684-85 (Sept. 17, 1982).

140. "The EPA's bubble policy lets *existing* plants (or groups of plants) decrease or be excused from pollution controls at one or more emissions sources in exchange for compensating increases in control at other emission sources." 47 Fed. Reg. 15,076

EPA. This policy combines considerations of economic growth and environmental quality through a regulatory scheme that allows certain sources[141] to adopt the most economically efficient set of emission

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(Apr. 7, 1982). *See* 44 Fed. Reg. 71,780 (Dec. 11, 1979) (to be codified at 40 C.F.R. pt. 52). *See generally* Note, *An Overview of the Bubble Concept*, 8 COLUM. J. ENVTL. L. 137 (1982) (describes and analyzes the bubble).

141. In series of cases, the definition of "source" in relation to the application of the bubble concept has come under close scrutiny. The EPA's definition of "source" has varied according to the specific regulatory program at issue. While in certain contexts source has been defined as a single emissions point, at other times it has been construed to mean an entire plant including several emissions points.

In ASARCO, Inc. v. EPA, 578 F.2d 319 (D.C. Cir. 1978), the court rejected the EPA's narrow construction of "source" to include only an entire plant in the context of Section 111 New Source Performance Standards. The EPA's policy was challenged because it permitted a plant owner to avoid the strict NSPS by modifying only one facility within the plant. The court noted that the challenged EPA regulation treated "source" as an entire plant, while facilities were defined as "identifiable pieces of process equipment or individual components which when taken together would comprise a source." *Id.* at 324 n.18. The court determined that Congress intended the NSPS program to enhance air quality and therefore, in keeping with the underlying intent of the program, "source" should be defined to include a component part of the plant. *Id.* at 327. Thus in this context the bubble was deemed inappropriate.

In Alabama Power Co. v. Costle, 636 F.2d 323 (D.C. Cir. 1979), *modifying* 606 F.2d 1068 (D.C. Cir. 1979), the court examined the EPA's application of the term source in the context of the Prevention of Serious Deterioration program. The EPA had construed source as a "structure, building, facility, equipment, installation or operation . . . . " *Id.* at 395. Specifically the inclusion of "equipment or operation" was challenged as overly expansive. The court concluded that the "EPA has latitude to adopt definitions of the component terms of 'source' that are different in scope from those that may be employed for NSPS and other clean air programs, due to differences in the purpose and structure of the two programs." *Id.* at 397-98. Thus the court accepted a broad definition of "source" under the PSD regulations because such an expansive application would further the goals of the program. The bubble, therefore, was deemed appropriate to maintain air quality as intended by the PSD regulations. *Id.* at 402.

Recently in Natural Resources Defense Council, Inc. v. Gorsuch, 685 F.2d 718 (D.C. Cir. 1982), in the context of nonattainment areas, the court determined that emissions trading could not be used to exempt major modification of facilities in nonattainment areas from the new source review requirements. Therefore, in this category, a narrow definition of source was held to impede the implementation of new source review.

The court reviewed this line of cases and noted that the definition of source and the applicability of the bubble would depend upon the purpose of the program in issue. Where the regulation is intended to enhance air quality the bubble will not be upheld; but, where the goal of the regulation is to maintain air quality the bubble is a proper tool. *Id.* at 727.

Consequently, it is important for Congress, when promulgating a regional bubble regulatory framework, to delineate carefully a definition of source. Moreover, Congress must set forth the relation of the term source with the overall purpose of the amendments. *See* Comment, *NRDC v. Gorsuch: D.C. Circuit Bursts EPA's Nonattainment Area Bubble*, 12 ENVTL. L. REP. (ENVTL. L. INST.) 10089, 10089-92 (1982).

controls for pollution control.[142] In essence it consists of placing an "imaginary bubble with a single vent"[143] over an industrial plant allowing only one opening for emissions. Rather than regulating each specific emissions point, air quality regulation would focus upon a plant's total emission. The plant's operator would be allowed to select which emission points to control and use the most economically efficient technology for each point source, within the "bubble." Therefore, specific emissions may be increased at one point as long as the increases are offset by reduced emissions of the same pollutant at another point.

The development of the bubble concept has led to the expansion of trading and banking of emissions reductions.[144] Trading and banking permit sources to exchange "units" of pollution among themselves. The EPA's Bubble Policy has undergone revisions over the past few years.[145]

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142. *See* Note, *supra* note 140, at 160. *See also* del Calvo y Gonzalez, *supra* note 76, at 403-04.

The EPA bubble policy is applicable only to existing sources. The Clean Air Act defines an "existing" source as "any stationary source other than a new source." Clean Air Act § 111(a)(6), 42 U.S.C. § 7411(a)(6) (Supp. IV 1980).

143. *See Economic Efficiency in Pollution Control: EPA Issues "Bubble" Policy For Existing Sources Under Clean Air Act*, 10 ENVTL. L. REP. (ENVTL. L. INST.) 10014 (1980) [hereinafter cited as *Economic Efficiency*].

144. Two interrelated regulatory concepts—the "bubble" and "banking"—are outgrowths of the original offset policy. The bubble policy permits a single industrial plant to utilize the most economically efficient mix of emission controls, so long as the source's emissions will not affect the state's compliance with federal NAAQS and PSD regulations. *See* note 145 *infra* and accompanying text.

Banking describes a regulatory program which creates "markets in air." del Calvo y Gonzalez, *supra* note 76, at 377 (describes the controlled trading of emissions reduction credits). Reductions in a plant's emissions may be saved ("banked") or sold, for use in future offsets and bubbles. *See EPA Proposed Policy, Technical Issues on Creation, Banking, Use of Emission Reduction Credits*, 12 ENV'T REP. (BNA) 1622, 1622-27 (Apr. 9, 1982); *but see NRDC v. Gorsuch: D.C. Circuit Bursts EPA's Nonattainment Area Bubble*, 12 ENVTL. L. REP. (ENVTL. L. INST.) 10089, 10095 (1982) (discusses effects of Natural Resources Defense Council, Inc. v. Gorsuch, 685 F.2d 718 (D.C. Cir. 1982), on bubbles, and the general offset policy).

145. The original formulation of the Bubble Policy by the EPA, adopted in 1976, emphasized that alternative emissions reduction strategies must not create a net increase in the emissions of any pollutant. 41 Fed. Reg. 55,524 (1976). Therefore, its use was limited to situations where the state had proven compliance with its SIP requirements. The EPA expanded its Bubble Policy significantly in 1979. 44 Fed. Reg. 71,779 (1979). The 1979 policy was conditioned in part on the ability of the source to demonstrate that the alternative emission reduction option, or bubble, will not affect the state's attainment and maintenance of its NAAQS and PSD programs. *See Economic Efficiency*, *supra* note 143, at 10017-18; *Environmental Protection Agency, Air Pollution Control: Recommendation For Alternative Emission Reduction Options Within State Implementation Plans*, 10 ENVTL. L. REP. (ENVTL. L. INST.) 30001 (1980); *EPA To Propose Changes to "Bubble" Aimed At Making Policy*

Current proposals for amending the Clean Air Act to address the problems of acid rain include suggestions to expand the EPA's Bubble Policy into a regional air quality regulation.[146] Despite shortcomings in the application of a Bubble theory,[147] the advantages of such a flexible approach have been widely recognized. The principles of the Bubble Policy, once adapted and incorporated into the Clean Air Act, will combat the long range transport of acid rain precursors.[148]

V. Recommended Amendments: The Regional Bubble

Expanding the EPA's Bubble Policy to achieve a regional air quality regulation involves placing an imaginary bubble over a multi-state region.[149] The entire region would be required to meet a set reduction in its sulfur dioxide emissions.[150] The states within the region would be permitted to decide the means to achieve the emissions reduction. Various forms of set-offs would be permitted. In fact, the regional bubble is essentially a regional offset regulation.[151]

The benefits of a regional bubble are numerous. First, it represents an approach to air quality which allows the regulators to focus upon the larger geographic areas associated with long-range transport and

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Easier To Use, 12 ENV'T REP. (BNA) 948 (Dec. 4, 1981). This current policy set forth a less stringent standard of "no net adverse effect on air quality." *Economic Efficiency, supra* note 143, at 10017. This change is particularly significant from the standpoint of regulating long range transport and acid rain. Under the 1979 EPA policy an allowance is made for a possible increase in SO_2 emissions. The standard of "no net adverse effect on air quality" does not take into account dispersion resulting from tall stacks. Nor does it take into account the subsequent long range transport of emissions. Thus the focus is on local ambient air. Since a source need only demonstrate that the alternative emissions rate, or bubble, will not affect the state's attainment or maintenance of NAAQS and PSD program, the policy may be used to justify increases in overall SO_2 emissions.

In 1982 the EPA further expanded its bubble policy. 47 Fed. Reg. 15076 (1982). The 1982 policy extended the use of a bubble to sources which have not yet proved attainment of NAAQS and which are required to use RACT. *See EPA Proposed Policy, Technical Issues on Creation, Banking, Use of Emission Reduction Credits*, 12 ENV'T REP. (BNA) 1623 (Apr. 9, 1982).

146. *See* notes 97 & 126 *supra* and accompanying text.

147. Difficulties in implementing a regional bubble include administrative delays in processing applications for bubble use, setting standards, and enforcing associated requirements. *See* Note, *supra* note 140, at 156-58.

148. *Id.* at 160; Lutz, *Transboundary Management of Air Quality in the United States*, 11 ENV'T L. 321 (1981).

149. For a detailed study of nine regulatory options for controlling long-range transport pollutions see WETSTONE & REED, FINAL REPORT: INSTITUTIONAL ASPECTS OF TRANSPORTED POLLUTANTS (1981) (prepared for the Environmental Law Institute).

150. *Cf.* S. 1706, 97th Cong., 1st Sess. (1981). Under S. 1706 a 31-state region would have been required to reduce emissions by 10 million tons.

151. *See* note 123 *supra*.

acid rain. Moreover, emissions are regulated by placing limits on the total regional loadings permitted. The regional bubble thus solves the inherent problems of the current policy, which are rooted in intrastate considerations. Furthermore, it represents a flexible, cost-effective regulatory approach.[152]

Significantly, the regional bubble may represent a better regulatory proposal from the standpoint of its political acceptability.[153] By apportioning the goal of a regional sulfur dioxide emissions reduction among all who share the costs and benefits of the program, the approach allows aggregate emissions reduction by interstate cooperation.[154]

A. Supplementary Amendments

While the regional bubble represents, in theory, a more equitable means of reducing interstate air pollution, its application on a regional scale also presents some problems which require further study.[155] From a practical standpoint, a regional bubble may be more difficult to administer and enforce. Nevertheless it can be done within

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152. *See* L. PARKER, COMPARISON OF COST ESTIMATES FOR 10 MILLION TON REDUCTION IN SO_2 EMISSIONS 3 (1982) (interstate trading of emission reductions or regional bubbling was determined to significantly reduce the costs of achieving a 10 million ton reduction).

153. Regional bubbling may be politically advantageous because it does not pinpoint specific utilities. In contrast, an alternative approach—targeted retrofit—would single out specific classifications of plants subject to retrofit requirements. For instance, existing electric utility steam generating units in a given area, emitting x amount of SO_2 annually would be targeted. Zeroing in on the Midwestern utilities with the highest annual SO_2 emissions, while efficient, would raise a substantial political and economic outcry from the affected utilities.

154. See Note, *Interstate Air Pollution: Unresolved Issues*, 3 HARV. ENVTL. L. REV. 291, 295 (1979) for a discussion of intergovernmental cooperation. The success of regional acid rain regulation would naturally depend, in part, upon the willingness of the states to cooperate in achieving a regional emissions reduction. Interstate cooperation would be particularly important in the allocation of emission reductions. For example, one state would not be permitted to consume an excess of the regional emission limit. *See, e.g., Governors Draft Acid Rain Position, Call for 5 Million Ton SO_2 Reduction*, Inside EPA, Nov. 27, 1981, at 1 (weekly report). (The National Governors Association (NGA) draft acid rain proposal is similar to that proposed by the Stafford-Mitchell bill, S. 1706, discussed at note 93 *supra* and accompanying text, except that it would require a 5 million ton reduction in a 23-state region).

155. A regional approach has been suggested frequently. *See* Hassett, *Enforcement Problems in the Air Quality Field: Some Intergovernmental Structural Aspects*, 4 ECOLOGY L.Q. 63, 67 (1974) (recommends a "single-function special district operating across state lines"); Lieber, *Controlling Metropolitan Pollution Through Regional Air Sheds: Administrative Requirements and Political Problems*, 18 J. AIR POLLUTION CONTROL A. 86 (1968) (regional "airsheds"); Lutz, *supra* note 148, at 321.

the general framework of the Clean Air Act utilizing the existing procedures for the SIP approval and implementation process to administer and enforce regional regulation to control acid rain.

B. Monitoring

The enactment of a regional bubble amendment also requires development of an improved air quality monitoring network. The effectiveness of the regional bubble depends in part upon careful interstate monitoring of utility emissions, as well as rigorous enforcement of self-reporting data requirements. Strict enforcement of regulatory requirements would be necessary to prevent "paper bubbles,"[156] i.e., the existence of documentation of regional emissions reduction, without a corresponding reduction of actual emissions.

C. One Result: Reduced Emissions

The bubble concept may be used to achieve a reduction in sulfur dioxide emission in areas affected by acid rain. Congress, not the EPA, could achieve emissions reduction by defining a regional emissions reduction target in an amendment to the Clean Air Act. It has been argued that Congress is the appropriate institution to grapple with the difficult political and value judgments which necessarily underlie the setting of air pollution standards.[157]

D. Northeast United States as an Initial Control Region

Once the total regional emission reduction for sulfur dioxide is established by Congress, the amount of reduction that each state within a region will be required to achieve must be determined. The state share could be established pursuant to a congressionally defined formula, set forth in new acid rain amendments. Then, once the state

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156. *See* R. LIROFF, AIR POLLUTION OFFSETS: TRADING, SELLING, BANKING 28 (1980) (study prepared for the Conservation Foundation) (describes "paper bubbles").

157. New York State recognized:

> Practically every important decision of an environmental agency involves an exercise of judgment on incomplete or uncertain data. The Agency would always be able to ignore mandatory duties under the law by vaguely claiming some degree of scientific uncertainty. The judgment whether the public interest demands regulatory action, however, is not for the EPA to make. That judgment was made when Congress enacted the interstate pollution provisions in the form of prerequisites for approval of a State Implementation Plan.

Reply Brief for Petitioner at 16-17, New York v. Gorsuch, No. 82-1717 (7th Cir. 1982).

shares are determined, the states should be given a deadline by which they are to allocate their share of the total regional emissions reduction to their own sources,[158] as in the State Implementation Plan process. If a state fails to act within this time limit, there could be an automatic default figure which would assign to each major utility within the state a certain percent reduction in emissions[159] apportioned across the state to meet that state's total required emissions reduction.

In addition to establishing the total required regional emissions reduction, and the process by which the states are to meet their required share of that target, it is necessary to define the applicable region. Most of the current acid precipitation studies in the United States and most of the political pressures for acid rain amendments focus upon the Northeast.[160] The Act should designate initially the Northeast as the acid precipitation control region,[161] but leave open the possibility of designating later control regions as more evidence concerning the effects of acid precipitation in other states becomes available and more states become interested in participating in an acid precipitation control program.[162]

E. Enhancing the Bubble

In addition to the implementation of a regional bubble policy, the Clean Air Act should be amended to strengthen the control of regional emission loadings. For example, one step toward eliminating the acid rain problem and enhancing the effectiveness of a regional bubble

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158. See H.R. 5555, 97th Cong., 2d Sess. § 184(a) (1982) for a similarly worded proposal for a program to reduce SO_2 emissions.

159. See the proposed legislation discussed at note 95 *supra* and accompanying text for an alternative proposal for an emission reduction goal.

160. *See, e.g.*, J. BRIDGE & F. FAIRCHILD, NORTHEAST DAMAGE REPORT OF THE LONG RANGE TRANSPORT & DEPOSITION OF AIR POLLUTANTS (Apr. 1981), *reprinted in Field Hearings, supra* note 2, at 529-31 (the eastern United States is especially susceptible to long range transport and deposition of pollutants).

In addition, acid rain in Canada, resulting from the long range transport of air pollution from the United States, has been the focus of much political controversy between the two countries. *See* United States-Canada Memorandum of Intent on Transboundary Air Pollution (Interim Report Feb. 1981), *partially reprinted in Field Hearings, supra* note 2, at 824-49; *Field Hearings, supra* note 2, at 776 (remarks of Dr. Gregg Van Volkenburgh, Director of Air Services Branch, Ontario Ministry of the Environment (July 1, 1981)).

161. *See* note 97 *supra* and accompanying text.

162. The widespread nature of the acid rain problem should result in increased awareness and participation from states throughout the country. *See* Boyle, *An American Tragedy*, SPORTS ILLUS., Sept. 21, 1981, at 68, 78-79 (surveys the acidity of specific areas within 25 states in the northeast).

would be an amendment tightening the secondary NAAQS for sulfur dioxide.[163] Furthermore, improved monitoring and petitioning procedures are needed. Also, the construction of industrial stacks must be controlled to safeguard ambient air quality.

F. Section 110: Monitoring

New monitoring requirements are essential to the regulation of long range transport pollutants and to the control of acid rain in the northeastern United States.[164] Increased monitoring is necessary to: (1) obtain more information to fully document the extent of the problem, (2) indicate any regional air pollution trends and (3) reveal whether future regulation successfully reduces acidity in precipitation.

G. Adopting Acid Precipitation Act Programs

Congress has recently recognized the need for new and expanded monitoring within the context of the Acid Precipitation Act of 1980.[165] The Acid Precipitation Act established an Interagency Task Force to devise a comprehensive plan for identifying the causes and effects of acid rain and to study methods of curbing its effects.[166] The Acid Precipitation Act does not authorize the regulation of acid rain.[167] However, the Act does set forth new programs designed to identify the

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163. *See* note 86 *supra* and accompanying text. With the increasing amount of information available on the effects of acidic precipitation upon the food chain and water supply, regulation of these air quality impacts should fall within the definition of protecting public welfare. Provisions within the Clean Air Act support such a change. *See* Clean Air Act § 101(b)(1), 42 U.S.C. § 7401(b)(1) (Supp. IV 1980); *id.* § 109(b)(2), 42 U.S.C. § 7409(b)(2); *see also* Environmental Protection Agency Review, and Possible Revision of the National Ambient Air Quality Standards for Sulfur Dioxide, 46 Fed. Reg. 34,049 (1981) (includes discussion of sulfur dioxide and acid deposition).

164. *See generally* United States-Canada Memorandum of Intent on Transboundary Air Pollution (1981) (Working Group Report Atmospheric Modelling—Conclusions, Recommendations and Phase II Works), *partially reprinted in Field Hearings, supra* note 2, at 824, 848 (the Canadian and United States governments agreed to develop a coordinated monitoring network to check the accuracy of long-range transport models).

165. Acid Precipitation Act of 1980 § 701, 42 U.S.C. §§ 8901-8909 (Supp. IV 1980). *See* note 23 *supra*. *See also Conference Agreement on Title X of S. 932 on Acid Precipitation, Carbon Dioxide Studies*, 11 ENV'T REP. (BNA) 180-84 (May 30, 1980).

166. Acid Precipitation Act § 705(a), 42 U.S.C. § 8903 (Supp. IV 1980).

167. *Id.* § 705(b), 42 U.S.C. § 8904(b) reads: "Nothing in this subchapter shall be deemed to grant any new regulatory authority or to limit, expand, or otherwise modify any regulatory authority under existing law, or to establish any new criteria, standards, or requirements for regulation under existing law." *Id.*

sources of emissions which contribute to acid rain, establish and operate a nationwide, long-term monitoring network to detect and measure acid rain, and develop models of the long-range transport of pollutants.[168]

The new requirements are necessary and should be integrated into the Clean Air Act.[169] Section 110(a)(2)(C) of the Clean Air Act, which requires states to monitor pollution under the SIP, should also be amended to provide for monitoring and analysis of regional air quality and acid deposition. States could also be required to monitor health and environmental effects associated with acid deposition.[170] The EPA could be required to form a nationwide acid precipitation monitoring program in coordination with other federal and state agencies.[171]

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168. The Act provides in pertinent part:

> The comprehensive plan shall include programs for—
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> (1) identifying the sources of atmospheric emissions contributing to acid precipitation;
>
> (2) establishing and operating a nationwide long-term monitoring network to detect and measure levels of acid precipitation;
>
> (3) research in atmospheric physics and chemistry to facilitate understanding of the processes by which atmospheric emissions are transformed into acid precipitation;
>
> (4) development and application of atmospheric transport models to enable prediction of long-range transport of substances causing acid precipitation;
>
> (5) defining geographic areas of impact through deposition monitoring, identification of sensitive areas, and identification of areas at risk . . .

Id. § 705(b), 42 U.S.C. § 8903.

169. *See* Clean Air Act, § 110(a)(2)(C), 42 U.S.C. § 7410(a)(2)(C) (Supp. IV 1980). This section requires "provision for establishment and operation of appropriate devices, methods, systems, and procedures necessary to (i) monitor, compile, and analyze data on ambient air quality and, (ii) upon request, make such data available to the Administrator." *Id.*

170. Section 110(a)(2)(C) could be amended to provide:

> for establishment and operation of appropriate devices, methods, systems, and procedures necessary to (i) monitor, compile, and analyze data on ambient air quality; (ii) monitor, compile, and analyze data to detect and measure levels of acid deposition. In addition, such monitoring shall include factors such as the buffering capacity of affected waters, the effects of acid precipitation upon the quality of the drinking water supply, and the interaction between acidic precipitation and the release of heavy metals into the environment; (iii) upon request, such data shall be made available to the Administrator, and to the public.

171. Alternatively, separate regional monitoring networks could be established.

Another means of amending the Clean Air Act would be to provide for increased monitoring for acid rain control in § 319. Clean Air Act § 319, 42 U.S.C. § 7619 (Supp. IV 1980). This section provides for a national air quality monitoring system. Administratively, however, it would be more feasible to follow the framework of existing § 110 process and to require increased monitoring for acid rain as part of the State Implementation Plan.

Currently, each state must implement, maintain and enforce the NAAQS within specific regions within the states. Section 110 should be amended to add *regional* air quality as a factor in each state's air quality planning. Specific guidelines to meet regional air quality standards should be enumerated.[172] The regulatory scheme could follow the framework of the existing SIP process. A state may be required, after notice and public hearings, to submit to the EPA Administrator a plan for the implementation, maintenance, and enforcement of the regional sulfur dioxide emission reduction set for that state. If the state failed to submit its plan on schedule, it would be required to achieve a more stringent reduction in its sulfur dioxide emissions in a manner proscribed by the Administrator.[173] Furthermore, where a state fails to act, provision should be made for a federal take-over of the task.

H. Burden of Proof for Showing a Violation

A significant obstacle to overcome to effectuate these amendments is the argument that scientific knowledge is insufficient to support the burden a state must bear in proving that another state's emissions prevent either the attainment of ambient air quality standards or compliance with its PSD program. Under section 110(a)(2)(E), the standard of proof[174] is virtually impossible to meet, given the constraints of science.[175] This section requires an aggrieved state to show that the emissions of a single source in another state prevents its maintenance or attainment of NAAQS. Therefore, the proof required should be made less demanding and more realistic. To ease the burden, the focus should be shifted to the *cumulative* interstate impact of all sources in an area.[176] Thus specific changes should be made in

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172. See Note, *supra* note 20, at 292-93 for an evaluation of interstate equities.

173. Compare similar provisions in the proposed bills discussed at note 95 *supra*.

174. Presently the Clean Air Act requires that an aggrieved state show that emissions from another state will "prevent attainment or maintenance" of NAAQS. *See* note 112 *supra* and accompanying text.

175. *See* note 157 *supra*. *See also* Bazelon, *Science and Uncertainty: A Jurist's View*, 5 HARV. ENVTL. L. REV. 209, 212-13 (1981).

> Is it rational for an agency to act as if a tentative suspicion were a known risk? To answer that question, it is important to distinguish the task of a regulator from that of the scientist whose information underlies the decision. Scientists do not generally commit themselves to unproved hypotheses. And yet it would be ironic if agencies had to show that a scientific consensus existed before they could act against suspected health and safety hazards.

Id.

176. *Cf.* S. 1718, 97th Cong., 1st Sess. (1981) introduced by Sens. Dodd and Durenberger, discussed at notes 110-14 *supra*. This bill would broaden the language

section 110(a)(2)(E). First Congress should add a provision requiring a SIP to prohibit a stationary source or *group of sources* from emitting pollution which affects another state's air quality. Second, a more lenient standard of approval of a SIP is in order. At present, the EPA must disapprove a SIP if it does not adequately prohibit emissions which will "prevent" the attainment and maintenance of NAAQS in another state.[177] A better standard is one that prohibits a stationary source or group of sources which "interferes" with the attainment and maintenance of another state's NAAQS.

I. Section 126: Petition Procedures

Section 126 could be amended in a similar fashion. The burden of proof required to establish a grievance at a petition hearing should be reduced to a realistic standard.[178] Furthermore, at present the petition may only seek a finding that a major source emits any air pollutant in violation of section 110. This should be amended by changing "any major [single] source" to "any major source or groups of source" to allow for a finding of interstate pollution from the cumulative impact of groups of stationary sources.[179] In addition the section 126 requirement to hold a public hearing could be strengthened by inserting a clear deadline to ensure swifter administrative action by the EPA.[180]

J. Section 123: Tall Stacks

Section 123,[181] which regulates the height of stacks, has important implications for the long range transport of acid rain precursors. Tall

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of § 110(a)(2)(E) and § 126 to encompass the cumulative interstate impact from multiple sources. *See* note 112 *supra*.

177. *See* note 112 *supra*.

178. At present, the operable standard is emissions in an amount which prevents attainment or maintenance of NAAQS. Clean Air Act § 110(a)(2)(E)(i), 42 U.S.C. § 7410(a)(2)(E)(i) (Supp. IV 1980). It would be more realistic to replace "prevent" with "interferes." This lenient standard would reduce the burden of proof commensurate to the state of scientific capabilities.

179. *See* notes 111-12 *supra* and accompanying text.

180. For example, the provision could be amended to read: "Within sixty days after receipt of any petition under this subsection, the Administrator shall hold a public hearing. The Administrator shall make such a finding or deny the petition within sixty days after the public hearing." *See* note 113 *supra* and accompanying text.

181. Section 123(a) of the Act states, in relevant part:

> (a) The degree of emission limitation required for control of any air pollutant under an applicable implementation plan under this subchapter shall not be affected in any manner by (1) so much of the stack height of any source as exceeds good engineering practice . . . , or (2) any other dispersion technique.

42 U.S.C. § 7423(a) (Supp. IV 1980).

stacks tend to help local air quality because pollutants are dispersed higher into the atmosphere; however, this adds to the problem of long range transport of pollutants and acid rain.[182] The Eleventh Annual Report of the Council on Environmental Quality reveals that section 123 has not been implemented successfully.[183] The report indicates that over four hundred stacks taller than two hundred feet have been built since 1970; over half of these were built by electric utilities.[184] The Council observed that the taller the stack, the higher into the atmosphere pollutants could be emitted and dispersed. As the evidence increasingly points out, however, the tall stack "out of sight, out of mind' approach to environmental regulation does not address the health and environmental consequences for the people downwind. Therefore, section 123 must be amended to strictly limit the use of tall stacks.[185]

The 1977 Amendments to the Act directed the Administrator to promulgate regulations defining "good engineering practice," a requirement for the construction of tall stacks.[186] Final regulations were not issued by the Administration until 1982.[187] Congress could mandate an absolute moratorium on the construction of tall stacks, although such a stringent amendment is unlikely.[188] A more moderate amendment could also be effective. Thus, it is suggested that where a section 126 finding of a violation is made, tall stacks would be prohibited.[189] The provision as amended could state: "The Administrator

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182. BREATHE CLEAN AIR, *supra* note 13, at 3.9-12.

183. Section 123 provides that after 1970 any stack contructed taller than is required by good engineering practice will not receive air quality credit. Furthermore, § 123 prohibits setting emission limitations based upon an anticipated increase in stack height, beyond the requirements of good engineering practice or dispersion techniques. *See* note 181 *supra*.

For a legislative history on the origin and purpose of § 123 *see* H.R. REP. No. 294, 95th Cong., 1st Sess. 81, 91-92 (1977). *See also* Kennecott Copper Corp. v. Train, 526 F.2d 1149 (9th Cir. 1975), *cert. denied*, 425 U.S. 935 (1976).

184. 11 UNITED STATES COUNCIL ON ENVIRONMENTAL QUALITY, ANNUAL REPORT, ENVIRONMENTAL QUALITY—1980, at 175.

185. For an analysis of the EPA's tall stack policy and acid rain *see Rain and Snow*, *supra* note 6, at 50010.

186. 42 U.S.C. § 7423(a)(1) (Supp. IV 1980).

187. Environmental Protection Agency, Final Stack Height Regulations, 47 Fed. Reg. 5864 (1982). *See EPA Announces Final Regulations on Stack Height Engineering Practices*, 12 ENV'T REP. (BNA) 1304 (Feb. 12, 1982). Final setting of the stack requirements was precipitated by a suit instituted by the Sierra Club. *See* Sierra Club v. Costle, 657 F.2d 298 (D.C. Cir. 1981).

188. *See* R. Trumbule, Acid Precipitation: A Serious and Growing Environmental Problem 5 (Jan. 5, 1982) (Issue Brief) (Congressional Research Service).

189. In contrast, § 123 now reads; "In no event may the Administrator prohibit any increase in any stack height or restrict in any manner the stack height of any source." 42 U.S.C. § 7423(c) (Supp. IV 1980).

may not prohibit any increase in stack height or restrict in any manner the stack height of any source, except upon a finding of violation of Section 126(b)." In any event, the five year delay in issuance of final regulation highlights the need for Congress to assume a greater role in regulating acid rain.

VI. Conclusion

The control of acid precipitation is often presented as a classic dichotomy in environmental law: scientific uncertainty is weighed against the evidence which points toward the need for greater regulation. There is an ever growing amount of information on the effects of acidic precipitation and criticisms of the current interstate pollution provisions of the Clean Air Act are increasing. One special problem with proposing regulatory controls for acid rain, however, is the invisible nature of the degradation. Acid rainfall does not look menacing. In fact, acidified lakes are an attractive, crystal clear blue—due to the absence of life below the surface. The invisible nature of the damage makes it more difficult to raise the public's concern for controlling the problem. Thus there is a crucial need to make the issue more visible.

Moreover, because the Clean Air Act does not provide the necessary mechanisms to reduce or eliminate acid rain, a new regulatory approach is needed. To alleviate the acid rain problem, Congress must address the phenomenon of long range transport of sulfur dioxide. Of the numerous proposals to amend the Act, the regional bubble represents the most efficacious and politically acceptable solution. Initially, Congress should amend the Clean Air Act to establish a control bubble over the Northeast and to require a fixed reduction of total emissions within the region. Through the use of offsets and trading within the bubble, industry will be provided the greatest flexibility and discretion to meet the new emissions limitation.

To augment the regional bubble's effectiveness, additional and complementary amendments to the Act are necessary. First, an extensive network must be established to monitor air quality. Second, the operable standards involved in proving a violation during a section 126 petition proceeding must be revised. A state must be permitted to demonstrate that multiple sources in another state are interfering with its maintenance and attainment of NAAQS. Finally, stack heights must be limited to curtail the phenomenon of long range transport. Congress must amend the Clean Air Act to conform with the harsh realities of the acid rain problem or face the destruction of valuable natural resources.