

# Interboundary Stationary Source Pollution—Clean Air Act Section 126 and Beyond

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## I. INTRODUCTION\*\*

Air pollution holds no respect for political boundaries.<sup>1</sup> This phenomenon has been extensively observed in the case of automobile emissions<sup>2</sup> and, during the last few years, has become a matter of equal concern with regard to pollution from stationary sources, in particular power plants and other generators of sulfur dioxide (SO<sub>2</sub>) and particulate matter.<sup>3</sup>

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\*\* All documents cited in this article which are not in the public domain or easy to obtain may be found at the offices of the *Columbia Journal of Environmental Law*.

1. "Air pollutants, by their nature, do not respect political boundaries. . . ." *Natural Resources Defense Council, Inc. v. EPA*, 478 F.2d 875, 880 (1st Cir. 1973).

2. Section 107 of the 1977 Amendments to the Clean Air Act, 42 U.S.C. § 7407 (Supp. I 1977), directed the EPA to identify areas in each state that have achieved acceptable air quality with respect to six pollutants ("attainment areas"), are violating these standards ("nonattainment areas"), or are unclassifiable. Originally, the EPA contemplated classifying all areas east of the Mississippi as nonattainment for photochemical oxidants, a pollutant from automobile emissions. *New Jersey v. EPA*, 626 F.2d 1038, 1046 (1980) (quoting Memorandum from David Hawkins, Asst. Administrator, U.S. Env'tl Protection Agency, to Regional Administrators, U.S. Env'tl Protection Agency (Sept. 23, 1977)). The Agency later revised this approach to a presumption that only cities with populations in excess of 180,000 would be classified as nonattainment for such automotive-related pollutants, thereby prompting New Jersey's lawsuit. The court remanded on procedural grounds.

3. This article focuses on interboundary SO<sub>2</sub> and particulate matter pollution in the Ohio River valley and the Northeast which is attributable to coal-burning power plants, a principle source of SO<sub>2</sub>. See text accompanying notes 15-18 *infra*. See generally Lee, *Interstate Sulfate Pollution: Proposed Amendments to the Clean Air Act*, 5 HARV. ENV'T'L L. REV. 71 (1981) [hereinafter cited as Lee]; Lutz, *Managing a Boundless Resource: U.S. Approaches to Transboundary Air Quality Control*, 11 ENV'T'L L. 321 (1980); Silverstein, *Interstate Air Pollution: Unresolved Issues*, 3 HARV. ENV'T'L L. REV. 291 (1979). See also Ackerman & Hassler, *Beyond the New Deal: Coal and the Clean Air Act*, 89 YALE L.J. 1466, 1515-21 (1980).

Until May, 1981, the issue of interstate SO<sub>2</sub> and particulate matter pollution had been addressed on a case-by-case basis under the Clean Air Act,<sup>4</sup> which, although allowing for serious dialogue, had

4. 42 U.S.C. §§ 7401-7642 (Supp. I 1977 & Supp. II 1978). Four provisions of the 1977 Amendments to the Clean Air Act, Pub. L. No. 95-95, 91 Stat. 685, address the issue of interboundary pollution: § 110(a)(2)(E), 42 U.S.C. § 7410(a)(2)(E) (Supp. I 1977); § 115, 42 U.S.C. § 7415 (Supp. I 1977), *see* note 302 *infra*; § 126, 42 U.S.C. § 7426 (Supp. I 1977); § 160(4), 42 U.S.C. § 7470(4) (Supp. I 1977), *see* note 213 *infra*. The two primary provisions affecting interstate pollution are sections 110(a)(2)(E) and 126.

Section 110(a)(2)(E) specifies that a state implementation plan ("SIP"), which must achieve acceptable ambient air quality with respect to pollutants designated under section 108, 42 U.S.C. § 7408 (Supp. I 1977), shall contain:

adequate provisions (i) prohibiting any stationary source within the State 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 standard, 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, and (ii) insuring compliance with the requirements of section 126, relating to interstate pollution abatement.

Several parties have brought suit against the EPA under this section, asserting that air pollution from one state interferes with the attainment of acceptable air quality in a neighboring state. *Connecticut v. EPA*, 656 F.2d 902 (2d Cir. 1981) (petition for review of EPA approval of New York SIP revision denied); *Pennsylvania v. EPA*, No. 79-1025 (3d Cir., filed Sept. 22, 1981). *New England Legal Foundation v. Costle*, 475 F. Supp. 425, 435-36 (D. Conn. 1979) (challenge to New York SIP revision held premature because provisions satisfying section 110(a)(2)(E)(i) were due at a later date).

Section 126 specifies, in part, that:

(b) 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 110(a)(2)(E)(i). 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.

(c) Notwithstanding any permit which may have been granted by the State in which the source is located (or intends to locate), it shall be a violation of the applicable implementation plan in such State . . . (2) for any major existing source to operate more than three months after such finding has been made with respect to it.

The Administrator may permit the continued operation of a source referred to in paragraph (2) beyond the expiration of such three-month period if such source complies with such emission limitations and compliance schedules (containing increments of progress) as may be provided by the Administrator to bring about compliance with the requirements contained in section 110(a)(2)(E)(i) as expeditiously as practicable, but in no case later than three years after the date of such finding.

Four states filed petitions under this section prior to the petitions, *see* text accompanying notes 6-7 *infra*, which are the focus of this article: West Virginia (Sammis, Ohio, power plant) (settled without hearing); Kentucky (Clifty Creek, Indiana, power plant), 44 Fed. Reg. 29,495 (1979) (hearing held on June 20, 1979); Kentucky (Gallagher, Indiana, power plant), 45 Fed. Reg. 17,048 (1980) (hearing held on Apr.

neither provided an effective response to the problem nor obligated the Environmental Protection Agency ("EPA") to address the issues comprehensively. However, on May 1, 1981, the EPA published a notice<sup>5</sup> that it would hold a hearing to consider in tandem petitions by New York<sup>6</sup> and Pennsylvania<sup>7</sup> which assert that the attainment and maintenance of acceptable air quality in their respective states is impeded by SO<sub>2</sub> pollution from sources located in Indiana, Illinois, Michigan, Kentucky, Ohio, West Virginia and Tennessee.<sup>8</sup> The Canadian province of Ontario joined in the two states' section 126 proceeding for the limited purpose of presenting relevant information.<sup>9</sup> By virtue of the magnitude of the issues presented and the number and quality of the presentations made, this two-day hearing<sup>10</sup> on June 18 and 19, 1981 ("section 126 hearings" or "section 126 proceedings"), confronted the EPA for the first time with the task of addressing the interstate problem on a multi-

17, 1980), 46 Fed. Reg. 38,937 (1981) (denial of petition proposed on July 30, 1981); New Jersey and Connecticut (Arthur Kill and Ravenswood, New York, power plants), 45 Fed. Reg. 72,702 (1980) (hearing held on Dec. 3, 1980); Connecticut (Northport and Port Jefferson, New York, power plants), 45 Fed. Reg. 72,702 (1980) (hearing held on Dec. 3, 1980).

5. 46 Fed. Reg. 24,602 (1981).

6. Petition to the Administrator to Make Findings Under Section 126 of the Clean Air Act [hereinafter cited as Pennsylvania Petition]. Pennsylvania supplemented its petition shortly before the hearing. Letter from Clifford L. Jones to Administrator Gorsuch (June 4, 1981) [hereinafter cited as Pennsylvania Petition Supplement]. The state requested that its petition be broadened to encompass emissions from sources in Indiana, Illinois and Kentucky. However, the supplement did not name specific sources. Pennsylvania further supplemented its petition after the ensuing hearings. Department of Environmental Resources, State of Pennsylvania, Technical Submission of Additional Information Pursuant to Pennsylvania's Section 126 Petition [hereinafter cited as Pennsylvania Post-hearing Supplement].

7. Typical of New York's nine petitions is the petition which it filed with respect to a proposed revision of the SO<sub>2</sub> emission limit in the Ohio SIP for the Toledo Edison Bayshore power plant. Petition of the State of New York for the Disapproval of Proposed Implementation Plan and Comments [hereinafter cited as Bayshore Petition]. New York submitted a single consolidated supplement on October 7, 1981 [hereinafter cited as New York Supplement].

8. The names of the twenty-eight utilities appear in the EPA notice.

9. See notes 234-37 and accompanying text *infra*. Citing the Act generally, Ontario also lodged a separate claim which sought relief from pollution emanating from the same sources addressed in the New York and Pennsylvania petitions. Ministry of the Environment, Province of Ontario, A Submission to the United States Environmental Protection Agency Opposing Relaxation of SO<sub>2</sub> Emission Limits in State Implementation Plans and Urging Enforcement (March 12, 1981) [hereinafter cited as Ontario Submission].

10. Representatives of the petitioning states, sources, source states, coal suppliers, Massachusetts, Connecticut and the Province of Ontario testified.

regional scale.<sup>11</sup> The State of Maine has since been granted petitioner status to bring similar claims in the proceeding.<sup>12</sup>

This article describes the legal and environmental setting of the problems presented, identifies various areas of the law and EPA regulatory policy that govern the problem, and discusses the technical and legal problems associated with measuring interboundary pollution.<sup>13</sup> It next considers the claims made by the petitioning states and Ontario and the issues raised thereby. Finally, it identifies possible solutions to the issues at hand and recommends the course which the EPA and, where appropriate, Congress should take in answering the issues raised by the petitions.

## II. BACKGROUND: CONTROLLING AIR POLLUTION FROM COAL

### A. *Controlling SO<sub>2</sub> in the Midwest*

During the 1970s, the Midwest's coal-fired electric generators emitted the polluting by-product SO<sub>2</sub> in quantities which dwarfed

11. The Agency had recently addressed the problem of interstate SO<sub>2</sub> pollution from the area encompassing the states named in the petitions in a report to Congress. U.S. ENV'T'L PROTECTION AGENCY, OHIO RIVER BASIN ENERGY STUDY (1981) [hereinafter cited as ORBES REPORT]. See text accompanying notes 85-95 *infra*. However, the section 126 proceedings will represent the first resolution of the issues that is subject to judicial review. See 42 U.S.C. § 7607 (Supp. I 1977) (final agency actions under the Clean Air Act, such as a disposition under section 126, are directly appealable to a United States court of appeals).

12. On September 28, 1981, the State of Maine notified the EPA that it intended to file a section 126 petition asserting that SO<sub>2</sub> emissions from the sources identified in the New York and Pennsylvania petitions contributed to visibility impairment in Acadia National Park in Maine. Letter from James E. Tierney, Maine State Attorney General, to Anne M. Gorsuch, Administrator, U.S. Env't'l Protection Agency (Sept. 28, 1981). The state suggested that, given the identity of the sources, its petition should be consolidated with those of New York and Pennsylvania. It agreed to waive the public hearing provided for under section 126.

The formal petition was filed on October 7, 1981. Petition of the State of Maine Concerning Interstate Pollution Abatement Under § 126 of the Clean Air Act, for Consideration with Pending Petitions of the Commonwealth of Pennsylvania and the State of New York [hereinafter cited as Maine Petition]. Maine reasserted its request that the petition be consolidated with those filed by New York and Pennsylvania. In addition to visibility impairment, the petition also complained that adverse air quality in Maine resulted from SO<sub>2</sub> emitted from the sources enumerated in the New York and Pennsylvania petitions.

The EPA approved Maine's petition on November 10, 1981. 46 Fed. Reg. 55,551 (1981). It was consolidated with those of New York and Pennsylvania; the waiver of a hearing was accepted.

13. For the purposes of this article, the term "interboundary pollution" includes both interstate and international pollution.

the emissions levels from other regions of the United States.<sup>14</sup> In 1975, SO<sub>2</sub> emissions from the 423 counties within the states of Illinois, Indiana, Kentucky, Ohio, (western) Pennsylvania and West

14. In generating electricity from coal, coal is burned to heat water to the boiling point. The steam released drives turbines which have coiled wire mounted inside a stationary magnetic field. The revolutions of the turbines produces an electric current in the wire, which the utility sells to its customers.

During combustion, oxidation of the sulfur present in coal leaves as its major by-product the gaseous compound sulfur dioxide (SO<sub>2</sub>), which is emitted into the atmosphere. Once in the atmosphere SO<sub>2</sub> may undergo complex chemical reactions which further oxidize the SO<sub>2</sub> into particulate compounds having SO<sub>4</sub> as a constituent. These are known as sulfates.

The chemical pathways by which sulfates are formed are not fully understood. However, satisfactory definition exists for several factors affecting the rate of transformation from SO<sub>2</sub> into sulfates. In general, the rate of transformation depends upon the temperature, moisture and pollution content of the air mass into which SO<sub>2</sub> is released. Statement of Lowell Smith, Office of Research and Development, U.S. Env'tl Protection Agency, before the Senate Committee on Environment and Public Works 9-10 (June 30, 1981). The length of time during which SO<sub>2</sub> remains in the air also contributes to the rate of sulfate formation. Office of Research and Development, U.S. Env'tl Protection Agency, Sulfates in the Atmosphere: A Progress Report on Project MISTT (Mar., 1977) [hereinafter cited as Project MISTT Progress Report].

The release of SO<sub>2</sub> through tall smoke stacks may contribute to sulfate formation since the tall stack enables the gas to penetrate the atmospheric mixing layer above the surface of the earth, thereby increasing the amount of time the gas remains in the atmosphere. NATIONAL RESEARCH COUNCIL, SULFUR OXIDES 5, 12 (1978) [hereinafter cited as SULFUR OXIDES]; Office of Air and Waste Management, U.S. Env'tl Protection Agency, Position Paper on Regulation of Atmospheric Sulfates, at xi (Sept., 1975) [hereinafter cited as Position Paper on Sulfates]; Project MISTT Progress Report, *supra*, at iii, 25. See also National Commission on Air Quality, To Breathe Clean Air 2.1-73 (Mar., 1981) [hereinafter cited as To Breathe Clean Air].

The highest sulfate concentrations occur under summertime conditions when a high pressure system stalls for a day or two over a region with high SO<sub>2</sub> concentration, such as the Ohio River basin. The high temperature, moisture and sunlight levels in these conditions tend to increase the chemical reactivity of the atmosphere. Subsequently, cold fronts approaching the high pressure centers can create a pressure gradient that sweeps much of the polluted air along the line of the front for hundreds of kilometers. L. Smith, The Acidity Problem—Its Nature, Causes, and Possible Solutions 139-40 (June, 1980) (paper presented at the Symposium on Effects of Air Pollutants on Mediterranean and Temperate Forest Ecosystems, Riverside, Cal.).

While in the air, sulfates may react with moisture and form a solution of sulfuric acid. ORBES REPORT, *supra* note 11, at 5; Office of Research and Development, U.S. Env'tl Protection Agency, Acid Rain 5 (July, 1980). Any resulting rainwater is referred to as "acid rain." See text accompanying notes 70-75 *infra*. However, unlike sulfate particulates, which are subject to the ambient standard for particulate matter, see ORBES REPORT, *supra* note 11, at 73 n.9; To Breathe Clean Air, *supra* at 2.1-70, acid rain is not currently regulated by the EPA. See 46 Fed. Reg. 24,602, 24,603 (1981) (notice of section 126 proceedings).

After SO<sub>2</sub> has been converted to sulfates, removal from the atmosphere through dry deposition or precipitation is very slow. Consequently, sulfates can travel very long distances. Position Paper on Sulfates, *supra*, at 27.

Virginia accounted for 32% of national SO<sub>2</sub> emissions.<sup>15</sup> Coal-fired utilities accounted for 80% of these emissions.<sup>16</sup> Although accounting for only 36% of national coal-fired generating capacity,<sup>17</sup> these utilities emitted 52% of the 18.6 million tons of SO<sub>2</sub> released by all utilities in the United States in 1975.<sup>18</sup>

Excluding western Pennsylvania, SO<sub>2</sub> emissions from the five other midwest states amounted to approximately 9,889,000 tons in 1975.<sup>19</sup> By 1978, SO<sub>2</sub> emissions for these states had decreased to 9,090,000 tons.<sup>20</sup> During the same two periods, SO<sub>2</sub> emissions in New York and Pennsylvania decreased from 1,079 to 1,041, and from 2,130 to 1,900 tons per year, respectively.<sup>21</sup> Though it improved in the midwestern states as well as in New York and Pennsylvania, the SO<sub>2</sub> problem in the eastern United States is substantial.

The Clean Air Act supplies the principle statutory tools for controlling both SO<sub>2</sub> and particulate emissions. The key provisions are the National Ambient Air Quality Standards ("NAAQS"),<sup>22</sup>

15. ORBES REPORT, *supra* note 11, at 6.

16. *Id.* See *Cleveland Elec. Illuminating Co. v. EPA*, 572 F.2d 1150, 1161 (6th Cir.), *cert. denied*, 439 U.S. 910 (1978) (SO<sub>2</sub> emissions in Ohio). However, ORBES area utilities contributed only 22% of regional particulate matter. ORBES REPORT, *supra* note 11, at 6.

17. ORBES REPORT, *supra* note 11, at 6.

18. *Id.*

19. Atmospheric Modelling Work Group, Atmospheric Modelling Interim Report, at addendum to app. 6 (historical and current emissions by state and county) (Feb., 1981) [hereinafter cited as Atmospheric Modelling Interim Report]. The work group was established by the Memorandum of Intent Concerning Transboundary Air Pollution, Aug. 5, 1980, United States-Canada, T.I.A.S. No. 9856 [hereinafter cited as Memorandum of Intent], reprinted in [1980] 3 INT'L ENVIR. REP. (BNA) 391. It was charged with describing the transport of air pollutants from their source to final deposition. The interim report represents the first phase of the group's work.

20. Atmospheric Modeling Interim Report, *supra* note 19, at addendum to app. 6.

21. *Id.*

22. Ambient air quality standards, mandated in 42 U.S.C. § 7409(b) (Supp. I 1977), specify acceptable levels of pollution concentrations. Primary standards represent the air quality necessary to protect the public health, and secondary standards the air quality necessary to protect the public welfare. *Id.* The EPA has promulgated 3-hour, 24-hour, or annual average geometric mean maximum concentrations, or, in some cases, all three, for seven pollutants, including SO<sub>2</sub> and particulate matter. 40 C.F.R. § 50 (1981). The standards for particulate matter (in µg/m<sup>3</sup>) are as follows: 3-hour maximum secondary standard (one violation per year permitted), 260; 24-hour maximum primary standard (one violation per year permitted), 150; annual average primary standard, 75.

Typically, compliance is determined by monitoring emissions or mathematically predicting where concentrations are likely to take place and then determining

State Implementation Plans ("SIPs") that implement the NAAQS,<sup>23</sup> and New Source Performance Standards ("NSPS")<sup>24</sup> which apply to specified new sources of SO<sub>2</sub> and particulate matter irrespective of ambient air quality.<sup>25</sup> Most observers regard the SO<sub>2</sub>/particulate transport problem, particularly as it applies to long-range transport across political boundaries, as an existing source problem, rather than one addressed by the NSPS.<sup>26</sup>

Developing and defending SIPs is not easy, sometimes taking as long as a decade from proposal to final implementation.<sup>27</sup> The history of SIPs for Ohio, Indiana and Illinois, three of the major mid-west producers of SO<sub>2</sub>, illustrates this problem.<sup>28</sup> The Ohio SIP perhaps most poignantly highlights the difficulties associated with developing emission limitations for SO<sub>2</sub> sources.<sup>29</sup> Though the EPA approved Ohio's plan in May, 1971,<sup>30</sup> in 1973 the United States Court of Appeals for the Sixth Circuit vacated the EPA's action<sup>31</sup> on grounds later rejected by the Supreme Court.<sup>32</sup> However, Ohio withdrew the SO<sub>2</sub> regulations during the remand period, requiring the EPA to take remedial action.<sup>33</sup> The EPA promulgated new reg-

whether the predictions exceed the permitted levels. The rationale for these predictive techniques, frequently referred to as dispersion or mathematical modeling, and the reception that modeling has received in the courts, is discussed *infra*. See text accompanying notes 96-124 *infra*.

23. 42 U.S.C. § 7410 (Supp. I 1977) (specifies requirements for plan designed to achieve NAAQS within a state by specific dates).

24. 42 U.S.C. § 7411 (Supp. I 1977 & Supp. II 1978).

25. See 40 C.F.R. § 60 (1981).

26. See, e.g., *Acid Rain: Hearings Before the Subcomm. on Oversight and Investigations of the House Comm. on Interstate and Foreign Commerce*, 96th Cong., 2d Sess. 325 (1981) [hereinafter cited as *Acid Rain Hearings*] (statement of Douglas M. Costle). This does not, however, diminish the importance of NSPS for SO<sub>2</sub> emissions from utilities. The EPA has estimated that, absent NSPS standards for power plants, SO<sub>2</sub> emissions in 1995 could be between 3.3 and 4.4 million tons. See *Sierra Club v. EPA*, 15 E.R.C. 2137, 2231-32 (D.C. Cir. Apr. 29, 1981) (figures 9, 10, 11).

27. *Acid Rain Hearings*, *supra* note 26, at 322, 324.

28. See Bleicher, *Economic and Technical Feasibility in Clean Air Act Enforcement Against Stationary Sources*, 89 HARV. L. REV. 316 (1975) (discussing litigation arising from early EPA approval of SIPs for Ohio, Michigan and West Virginia).

29. See *Acid Rain Hearings*, *supra* note 26, at 324.

30. 37 Fed. Reg. 10,842 (1972).

31. *Buckeye Power Co. v. EPA*, 481 F.2d 162 (6th Cir. 1973).

32. *Union Elec. Co. v. EPA*, 427 U.S. 246 (1976). In *Buckeye Power Co. v. EPA*, 481 F.2d 162 (6th Cir. 1973), the Sixth Circuit held that economic and technological feasibility were relevant to EPA's review of an SIP and, as EPA had not considered these factors when it approved the Ohio SIP, the approval would be vacated. In *Union Electric*, the Supreme Court upheld EPA's assertion that economic and technological feasibility were irrelevant to its review of SIPs.

33. 41 Fed. Reg. 36,324 (1976).

ulations on August 27, 1976.<sup>34</sup> Unlike the heavily criticized regulations originally submitted by Ohio in which pollution concentrations measured at a few points served as the basis for county-wide emission limitations, the new regulations attempted to relate specific pollution sources to specific problems.<sup>35</sup> This was done through computer modeling which mathematically gauged source emissions and plotted the impact on ambient air quality.<sup>36</sup>

Thirty-two sources of SO<sub>2</sub> in Ohio challenged the regulations. In 1978 the Sixth Circuit upheld the modeling employed by the EPA in urban areas<sup>37</sup> and remanded for further analysis of the modeling employed by the EPA in rural areas.<sup>38</sup> Schedules for the rural sources had to await EPA reassessment of its rural model, which was published on June 19, 1980.<sup>39</sup> The EPA responded to requests for reconsideration,<sup>40</sup> and then promulgated schedules of compliance for the four power plants affected by the rural modeling reassessment.<sup>41</sup> Suits challenging the reassessment have since been filed.<sup>42</sup>

Though less celebrated, the histories of the Indiana and Illinois SIPs reflect the same difficulty in SIP development. The EPA approved Indiana's SIP for SO<sub>2</sub> emissions in May, 1972.<sup>43</sup> However, a challenge from a source in the county which had the state's highest ambient SO<sub>2</sub> concentration,<sup>44</sup> Marion County, upset this plan. On November 10, 1975, major parts of the SIP were found invalid by the Marion County Circuit Court<sup>45</sup> in a suit in which

34. *Id.*

35. *Id.* at 36,325-26. See also *Cleveland Elec. Illuminating Co. v. EPA*, 572 F.2d 1150, 1160-61 (6th Cir.), *cert. denied*, 439 U.S. 910 (1978).

36. *Cleveland Elec. Illuminating Co. v. EPA*, 572 F.2d 1150, 1160-61 (6th Cir.), *cert. denied*, 439 U.S. 910 (1978).

37. *Cleveland Elec. Illuminating Co. v. EPA*, 572 F.2d 1150 (6th Cir.), *cert. denied*, 439 U.S. 910 (1978).

38. *Cincinnati Gas & Elec. Co. v. EPA*, 578 F.2d 660 (6th Cir.), *cert. denied*, 439 U.S. 1114 (1978).

39. 45 Fed. Reg. 41,501 (1980).

40. 45 Fed. Reg. 74,041 (1980).

41. 45 Fed. Reg. 73,927 (1980).

42. See, e.g., *Cincinnati Gas & Elec. Co. v. EPA*, No. 76-2090 (6th Cir., filed Feb. 2, 1981).

43. 37 Fed. Reg. 10,842, 10,863 (1972).

44. Air and Hazardous Materials Division, Region V, U.S. Env'tl Protection Agency, Profile of Air Quality in Region V, at 16 (July, 1980) [hereinafter cited as Region V Profile].

45. *Indiana-Kentucky Elec. Corp. v. Indiana Env'tl Management Bd.*, No. C73-675 (filed Nov. 10, 1975), *aff'd*, 393 N.E.2d 213 (Ct. App. 1979). In particular, the court found that the Board failed to make a finding of economic reasonableness as required by IND. CODE ANN. § 13-7-7-2(b) (Burns 1981).



virtually all of the large utilities in the state joined with the named petitioner.<sup>46</sup> For a period of time, state enforcement of the regulations was enjoined. The state defendants appealed to the Indiana Court of Appeals which, on August 20, 1979, upheld the lower court.<sup>47</sup> During the five-year pendency of the litigation, the EPA deferred to the state courts and stayed enforcement of the applicable SO<sub>2</sub> provisions.<sup>48</sup>

In the case of Illinois, procedural challenges have beclouded the enforceability of that state's SIP for seven years. Several corporations attacked Illinois's SO<sub>2</sub> regulations in state court, on grounds that the Illinois Pollution Control Board failed to follow appropriate administrative procedures regarding the economic reasonableness of the regulations.<sup>49</sup> In 1974, the Illinois Court of Appeals upheld the challenges.<sup>50</sup> The Illinois Supreme Court upheld the court of appeals and remanded the regulations to the Board for further deliberation.<sup>51</sup> The Board promulgated new regulations and once again the regulations were held invalid for failure to satisfy the same procedural requirements.<sup>52</sup>

After both rounds of litigation at the state level, the EPA published notices of deficiency requesting Illinois to revise its SIP to make it enforceable in state court.<sup>53</sup> As an alternative to taking

46. Those utilities joining in the suit were: Indiana & Michigan Elec. Co.; Indiana Statewide Rural Elec. Coop.; Indianapolis Power & Light Co.; Northern Indiana Pub. Serv. Co.; Pub. Serv. Co. of Indiana.

47. *Indiana Env'tl Management Bd. v. Indiana-Kentucky Elec. Corp.*, 393 N.E.2d 213.

48. Stipulation for Voluntary Dismissal, *IMC Chem. Group, Inc. v. EPA*, No. 77-1445 (7th Cir., filed Dec. 4, 1979). An explanation of EPA's action may be found in *Indiana & Michigan Elec. Co. v. EPA*, 509 F.2d 839, 847 (7th Cir. 1975): "as respondent [EPA] concedes, if 'part of a state implementation plan is held invalid by a state court, the state would have to revise that part. Should the state fail to do so, the Administrator must propose and promulgate a revision. . . .' (Respondent's brief, No. 72-1498)." However, the Agency has apparently since changed its position. See Letter from Douglas M. Costle, Administrator, U.S. Env'tl Protection Agency, to James D. Dummelle, Chairman, Illinois Pollution Control Board (Nov. 26, 1980).

49. The plan was also challenged in federal court, which upheld the EPA's approval. *Indiana & Michigan Elec. Co. v. EPA*, 509 F.2d 839 (7th Cir. 1975).

50. *Commonwealth Edison Co. v. Pollution Control Bd.*, 25 Ill. App. 3d 271, 323 N.E.2d 84 (1974).

51. *Commonwealth Edison Co. v. Pollution Control Bd.*, 62 Ill. 2d 494, 343 N.E.2d 459 (1976).

52. *Illinois State Chamber of Commerce v. Pollution Control Bd.*, 67 Ill. App. 3d 839, 384 N.E.2d 922 (1978); *Ashland Chem. Co. v. Pollution Control Bd.*, 64 Ill. App. 3d 169, 381 N.E.2d 156 (1978).

53. 44 Fed. Reg. 40,723 (1979); 41 Fed. Reg. 32,302 (1976).

such action,<sup>54</sup> the state has attempted to enforce the overturned regulations, as originally approved by the EPA, in federal district court, asserting that an adverse state court decision is insufficient to overturn a federally approved plan constituting federal law. In *Illinois v. Celotex Corp.*,<sup>55</sup> the United States District Court for the Central District of Illinois dismissed the state's petition on the ground that due process required that the state court's determination be given full force and effect.<sup>56</sup> However, in *Illinois v. Commonwealth Edison Co.*,<sup>57</sup> the United States District Court for the Northern District of Illinois upheld the state's claim that the SIP was enforceable, notwithstanding earlier adverse state court action.<sup>58</sup> The EPA was not a party to either suit.

Notwithstanding the mercurial SIP litigation experience of these three states,<sup>59</sup> the NAAQS attainment status of counties located in these states is mixed. Most counties in Indiana and Illinois have attained the NAAQS for SO<sub>2</sub>.<sup>60</sup> By contrast, over twenty-five percent of Ohio's ninety-one counties have not attained the SO<sub>2</sub> standard

54. Illinois did submit revised regulations generally relaxing the previously overturned provisions to the EPA in September, 1979. 44 Fed. Reg. 76,308 (1979). However, the EPA approved the revisions only insofar as they preserved or tightened the original provisions. 45 Fed. Reg. 62,804 (1980).

55. 516 F. Supp. 716 (1981).

56. See *Indiana & Michigan Elec. Co. v. EPA*, 509 F.2d 839, 847 (7th Cir. 1975) (EPA asserted that failure to consider petitioners' procedural claims relating to economic and technological infeasibility at the federal level would not prejudice petitioners' due process rights as such claims could be raised at the state court level).

57. 490 F. Supp. 1145 (1980).

58. The court construed 42 U.S.C. § 7410 (Supp. I 1977), which provides for EPA approval of SIP revisions, as the only mechanism permitted for such purposes.

59. Litigation has not been confined to these three states. For example, the Sixth Circuit in *Buckeye Power, Inc. v. EPA*, 481 F.2d 162 (6th Cir. 1973), invalidated Kentucky's SIP for SO<sub>2</sub> emissions. West Virginia's SIP for SO<sub>2</sub> emissions did not receive final judicial approval until 1978, six years after it submitted the plan to EPA. See *Appalachian Power Co. v. EPA*, 579 F.2d 846 (4th Cir. 1978); *Appalachian Power Co. v. EPA*, 477 F.2d 495 (4th Cir. 1973). See also *Union Elec. Co. v. EPA*, 427 U.S. 246, 254 (1976).

60. As of July 1, 1980, only five counties out of 92 in Indiana were classified as nonattainment for the primary SO<sub>2</sub> standard, and one was classified nonattainment for the secondary standard. Region V Profile, *supra* note 44, at 16-17. Seven Indiana counties were classified as violating the primary standard for particulate matter and an additional four were violating the secondary standard. *Id.* at 18.

In Illinois, as of July 1, 1980, two counties out of 102 were violating the primary and secondary standards for SO<sub>2</sub>. *Id.* at 6-7. Twelve Illinois counties exceeded the primary standard for particulate matter and 33 exceeded the secondary standard. *Id.* at 7-8.

and close to one half have not attained the particulate matter standard.<sup>61</sup>

Proposed SIP revisions, affecting the Ohio, Illinois and Indiana power plants designated in the section 126 proceedings, have the potential for raising SIP emission limitations for these facilities from the pre-existing level of 2,980,400 tons to 4,234,100 tons per year, a net increase of 1,253,700 tons per year.<sup>62</sup> Some of these facilities are actually burning fuel of a higher sulfur content than permitted by applicable pre-existing provisions, but such use would be acceptable under the proposed revisions. Accordingly, the EPA calculates that the real effect of the revisions would amount to 802,200 additional tons of SO<sub>2</sub> per year.<sup>63</sup>

In summary, lawsuits have stymied EPA and state enforcement of pollution controls, and the Agency's proposals to approve relaxations of SIP controls could build in permanent increases in the law's tolerance of SO<sub>2</sub> and sulfate pollution.

## B. Sulfates

Much of the New York petition addresses the claimed hazards associated with sulfates.<sup>64</sup> The effects of sulfates have caused con-

61. As of July 1, 1980, 22 out of 88 Ohio counties exceeded the SO<sub>2</sub> primary standard, and three exceeded the secondary standard. *Id.* at 43. Twenty-one counties exceeded the primary standard for particulate matter, and twenty the secondary standard. *Id.* at 45-48.

Attainment status is, of course, a function of the standards' rigor, and SO<sub>2</sub> emission limitations from sources within these states vary, depending upon measured or modeled conditions. See text accompanying notes 96-124 *infra* for discussion of modeling. For the 23 Ohio, Illinois and Indiana utilities named in the New York and Pennsylvania petitions, emission limitations then in effect ranged from 1.2 pounds of SO<sub>2</sub> per million British thermal units ("Btus") of heat input (all eight of the Indiana utilities and one of the Ohio utilities) to 9.5 pounds per million Btus (one of the Ohio plants). U.S. Env't'l Protection Agency, Briefing Materials Prepared for Section 126 Proceedings Hearing Panel, at "SO<sub>2</sub> Emission Limitations" (June, 1981) [hereinafter cited as Briefing Materials].

A Btu is the amount of heat required to raise the temperature of one pound of water one degree Fahrenheit. A typical 500 megawatt coal-fired power plant can burn about 5,000 million Btus per hour. Pounds per million Btus is thus the ratio of the weight of emissions to the heat content of the coal. *Sierra Club v. Costle*, 15 E.R.C. 2137, 2141 n.6 (D.C. Cir. Apr. 29, 1981).

62. Briefing Materials, *supra* note 61, at "SO<sub>2</sub> Emission Limitations." See notes 204, 206 and accompanying text *infra*.

63. Briefing Materials, *supra* note 61, at "SO<sub>2</sub> Emission Limitations." For the six named utilities located in Michigan, Tennessee and West Virginia, the EPA calculates that the "real" effect of revision would be an increase of 320,900 tons of SO<sub>2</sub> per year.

64. See Bayshore Petition, *supra* note 7, at 10-16.

cern both within<sup>65</sup> and without<sup>66</sup> the EPA for a number of years. In contrast to SO<sub>2</sub>, which is thought to be a mild respiratory irritant because very little SO<sub>2</sub> normally penetrates into the lung, sulfates are regarded as a more substantial irritant because they are deposited deeper into the respiratory tract than gaseous SO<sub>2</sub>.<sup>67</sup> Further, preliminary studies indicate that human respiratory disease is more closely associated with relatively low levels of sulfates than SO<sub>2</sub>.<sup>68</sup> Finally, while no direct causal relationship has been proven, "[s]everal recent epidemiological studies have established statistically significant associations between concentrations of sulfates and regional mortality rates."<sup>69</sup>

Other effects of sulfates,<sup>70</sup> both as suspended particulates and in the form of wet depositions or acid rain, have been well documented.<sup>71</sup> Hundreds of lakes in North America and Scandinavia are now so acidic, as a result of acid rain, that they can no longer support fish life.<sup>72</sup> Acid rain can also adversely affect soil by suppressing the decay of organic matter and the formation of nitrogen-

65. Position Paper on Sulfates, *supra* note 14; Office of Environmental Engineering and Technology, U.S. Env't'l Protection Agency, A Sulfate Episode: 1976 (undated) [hereinafter cited as Sulfate Episode].

66. See H.R. REP. NO. 294, 95th Cong., 1st Sess. 122-25 (1977) [hereinafter cited as H.R. REP. NO. 294], reprinted in [1977] U.S. CODE CONG. & AD. NEWS 1077, 1201-04.

67. Position Paper on Sulfates, *supra* note 14, at 4.

68. *Id.* at 8-9.

69. Ackerman & Hassler, *Beyond the New Deal: Coal and the Clean Air Act*, 89 YALE L.J. 1466, 1517 (1980).

70. The Clean Air Act is concerned with the public health and the public welfare. 42 U.S.C. § 7401(b)(1) (Supp. I 1977). Secondary NAAQS are set at levels necessary to protect "the public welfare." *Id.* § 7409(b)(2). Effects on welfare include: effects on soil, water, crops, vegetation, man-made materials, animals, wildlife, weather, visibility and personal comfort; damage to property; and hazards to transportation. *Id.* § 7602(h).

71. See generally SULFUR OXIDES, *supra* note 14, at 63-130.

72. Office of Research and Development, U.S. Env't'l Protection Agency, Research Summary: Acid Rain 1 (Oct., 1979), reprinted in *Acid Rain Hearings*, *supra* note 26, at 207. See also International Joint Commission, Seventh Annual Report, Great Lakes Water Quality (Oct., 1980) [hereinafter cited as IJC Report].

Virtually all of eastern Canada and portions of the northeastern United States experience rains with acidity equal to or exceeding that which can adversely affect susceptible ecosystems. All parts of the Great Lakes watershed are now receiving precipitation 5 to 40 times more acid than would occur in the absence of atmospheric emissions. Many inland lake ecosystems in the most susceptible parts of the Basin may be irreversibly harmed within 10-15 years.

*Id.* at 50.

fixing products, and by breaking the bonds which bind valuable nutrients to the soil.<sup>73</sup> While some plants thrive in an acidic environment, acid rain can adversely affect young plant tissues and the process of photosynthesis.<sup>74</sup> Moreover, acid rain accelerates the weathering and erosion of buildings and statues.<sup>75</sup>

Sulfates also affect visibility: particulates the size of sulfates scatter light very efficiently.<sup>76</sup> In the Northeast, particularly in the summer when air stagnation and sulfate formation are most likely, visibility can be reduced dramatically.<sup>77</sup> The EPA has taken action to protect visibility in international parks, national parks, national memorial parks and national wilderness areas,<sup>78</sup> but most of these areas lie outside the area affected by pollution from the Midwest.<sup>79</sup> In addition, rather than focusing on the issue of visibility impairment due to regional haze, a problem aggravated by the long-range transport of sulfates, the EPA focuses more on visibility impairment attributable to the emission plume of a facility as it leaves the source.<sup>80</sup>

Despite the severity of these hazards, present monitoring of sulfate accumulation is inadequate. To the extent that they may be detected on monitors for particulate matter, sulfates are treated as particulate matter for purposes of the relevant primary and secondary NAAQS.<sup>81</sup> However, there is no separate standard for the fine

73. *Acid Rain Hearings*, *supra* note 26, at 19.

74. *Id.* at 20.

75. *Id.* at 22.

76. Office of Air Quality Planning and Standards, U.S. Env'tl Protection Agency, *Protecting Visibility: An EPA Report to Congress*, at 4-1, 4-10, 4-11 (Oct., 1979) [hereinafter cited as *Protecting Visibility*].

77. *Id.* at 4-17, 4-18; Sulfate Episode, *supra* note 65, at 3.

78. Section 169A of the Clean Air Act, 42 U.S.C. § 7491 (Supp. I 1977), requires the EPA to identify mandatory Class I PSD areas meriting action to protect visibility, and also requires the Agency to take such action. These areas are set forth in 42 U.S.C. § 7472(a) (Supp. I 1977), and generally include the areas identified in the text accompanying this note. The EPA has promulgated regulations pursuant to the statute. 40 C.F.R. § 51.300-307 (1981).

79. See 44 Fed. Reg. 69,116 (1979) (list of mandatory Class I areas for which visibility is an important value).

80. Telephonic interview with Jeffrey Smith, Office of General Counsel, U.S. Env'tl Protection Agency (June, 1981). See also 45 Fed. Reg. 80,084, 80,085 (1980). By contrast, studies made during a 1969 copper strike (when effect of a diminution in sulfates attributable to the smelting of sulfur-bearing copper on regional visibility could be assessed) showed a high correlation between reduction in sulfates and visibility improvement in a large regional area surrounding the smelters. *Protecting Visibility*, *supra* note 76, at 4-24.

81. See notes 14 *supra*, 211 *infra*.

end of the total suspended particulate range that is represented by sulfates.<sup>82</sup> While work progresses within the EPA toward the development of a fine or respirable particulate standard that would encompass sulfates,<sup>83</sup> the Agency's statements regarding its ability to effect such a revision in the near future have been cautious.<sup>84</sup>

Nevertheless, to the extent that sulfates originating in the Midwest interfere with the ability of the petitioning states to satisfy applicable particulate requirements, no statutory obstacle prevents the EPA from granting redress for violations of those requirements.

### C. *The ORBES Report*

The EPA has looked into the role played by the industrial Midwest as a whole in sending pollutants into the skies. The findings, contained in the EPA's Ohio River Basin Energy Study ("ORBES Report"),<sup>85</sup> were striking and controversial.

The ORBES Report addressed the issue of long-range transport of sulfates and concluded that "sulfur dioxide emissions in the lower ORBES region contributed significantly (between 50 and 90 percent) to the upper region [*e.g.*, western Pennsylvania]."<sup>86</sup> The report projected the environmental, energy and cost effects associated with five scenarios, all of which assumed that coal would be the predominant source of energy in the ORBES region through the year 2000.<sup>87</sup> Using four previously monitored regional sulfate episodes as a meteorological base,<sup>88</sup> the report projected various effects that could be associated with similar situations that might be expected to occur in the future. In one such episode,<sup>89</sup> which the study indicates might be expected to occur at least ten times per year, extremely persistent winds had carried highly stagnant air up the Ohio River valley toward southwestern Pennsylvania. Using

82. See note 211 *infra*. See also 46 Fed. Reg. 24,602, 24,603 (1981).

83. See Office of Air Quality Planning and Standards, U.S. Env't'l Protection Agency, Review of National Ambient Air Quality Standards for Particulate Matter: Draft Staff Paper 95-96, 115-17 (June 13, 1981).

84. *Acid Rain Hearings*, *supra* note 26, at 322.

85. ORBES REPORT, *supra* note 11.

86. ORBES REPORT, *supra* note 11, at 7.

87. *Id.* at 8-9. In the study, an environmental regulatory program comparable to the current EPA regulatory program served as the base case scenario. The four other cases assumed loosening or tightening of environmental regulations and various changes in energy demand. Future references to the study apply to the base case projections.

88. *Id.* at 75.

89. *Id.* at 75. This was the "August 27, 1974, episode."

modeling, the study concluded that "[i]ndexing this episode, sulfur dioxide emissions in the lower ORBES region contributed about 75 percent of peak sulfate concentrations in the upper region. Nearly 100 percent of the contribution from the lower region came from utility emissions."<sup>90</sup>

The model episode had occurred on August 27, 1974. The report noted that the three other episodes "had meteorological patterns different from the August 27 episode and from each other,"<sup>91</sup> but, employing the same modeling, the study went on to state:

[d]uring these three episodes, as in the August 27 episode, sulfur dioxide emissions from all sources in the lower region contributed significantly (as much as 80 percent) to the sulfate concentrations in the upper region. Similarly, utility sulfur dioxide emissions in the lower region alone contributed at least half (and in one episode almost all) of the sulfate concentrations in the upper region.<sup>92</sup>

These modeling analyses focused on short-term or episodic effects. Employing a different model,<sup>93</sup> the study also concluded that utilities in lower ORBES region states contribute substantially to annual average SO<sub>2</sub> and sulfate concentrations in the upper region:

[o]ne of the model's predictions is that utility sulfur dioxide emissions in the ORBES region contribute about 75 percent of the annual regional sulfur dioxide and sulfate concentrations. Another prediction is that the long-range transport of utility sulfur dioxide emissions contributes about 30 percent of the observed annual sulfur dioxide concentrations in the industrialized areas of the upper ORBES region.<sup>94</sup>

Based on the modeling performed, the ORBES Report arrived at the following conclusion:

[i]n Pennsylvania . . . long-range transport of sulfur dioxide emissions can contribute significantly (between 25 and 50 percent) to widespread violations of the Pennsylvania sulfate standard and to violations of the federal 24-hour TSP [total suspended particulate] secondary standard in that state.<sup>95</sup>

90. *Id.* at 76. The study continued: "utility sulfur dioxide emissions from the ORBES states of Illinois, Indiana, and Kentucky produced peak sulfate concentrations of about 8, 14, and 25 micrograms per cubic meter, respectively, at locations in the upper ORBES region." *Id.*

91. *Id.*

92. *Id.*

93. This was the TRI/FAY model. *Id.* at 78. The Prahm model was used to evaluate short-term episodes. *Id.* at 76.

94. *Id.* at 78.

95. *Id.* at 74.

The ORBES Report provides what is to date the most comprehensive attempt to link the Midwest's SO<sub>2</sub> emissions and the Northeast's pollution problems. But as will be seen, the crucial role which theoretical models play in that linkage has been the seed of controversy.

#### D. Modeling

The record of the section 126 hearings provides ample support<sup>96</sup> for the studies cited by New York and Pennsylvania in support of their respective petitions. To be sure, the hearings also highlight grounds for criticism.<sup>97</sup> The critics particularly focused on the ORBES Report and the modeling employed. They touched primarily on the model's mechanics, *i.e.*, the premises built into it,<sup>98</sup> although parties also criticized the report for conclusions which, they asserted, were not supported by facts.<sup>99</sup>

96. Based on the location and magnitude of the emissions from the Ohio River Basin and the potential for long residence times for the emitted aerosol it is logical to expect the Ohio River Basin and regions downwind to have, on certain days, concentrations of total suspended particulates (TSP) due to upwind sources which will exacerbate concentrations from local emissions above the secondary ... [NAAQS] ...

[In addition s]ulfur dioxide ... can undergo gas-to-particle conversion to form sulfuric acid ... Here again, plume trajectories which experience little precipitation have the potential to contribute to the "background" concentration of TSP in the source region and downwind.

Dr. Perry J. Samson, *The Transport of Suspended Particulates into New York State 2-5* (June, 1981) (prepared statement). (emphasis original).

97. The information cited in the New York and Pennsylvania petitions does not support the contention that SO<sub>2</sub> emissions from the named sources in the range of long-distance transport significantly influence ambient sulfate of TSP [total suspended particulates] levels in those States. ... [Recent studies indicate] that the relationship between SO<sub>2</sub> emissions, their transformation into sulfates, and, after long-range transport, the concentration and deposition of those sulfates at distant sites is exceedingly complex and predominantly influenced by meteorological and photochemical factors ... [T]hese variables are more important than SO<sub>2</sub> emission levels in explaining distant sulfate concentrations.

George M. Hidy, *Statement Before the U.S. Environmental Protection Agency 3*, 18 (June, 1981) [hereinafter cited as Hidy].

98. The report was criticized for inadequate data screening measures, inadequate meteorological data and lack of wind data at the appropriate elevations, *see* Smith, Martin & Kramer, *Review of Ohio River Basin Energy Study (ORBES) Main Report: Long-range Transport and Diffusion Sections 6-8* (Jan. 30, 1981) (prepared for Utility Air Regulatory Group) [hereinafter cited as UARG Study], and lack of wind data from sufficient locations. Hidy, *supra* note 97, at 13. The report was also criticized for inadequately assessing chemical conversion rates in the atmosphere, UARG Study, *supra*, at 9, and for limiting the number of cases that were used to develop projections. UARG Study, *supra*, at 21; Hidy, *supra* note 97, at 14.

99. The conclusions that a strong association exists between wind persistence



An appreciation of the criticism directed at the conclusions of the ORBES Report requires an awareness of the limitations and problems associated with atmospheric modeling as a means of predicting air pollution concentrations. "A model is essentially a description of physical or chemical processes in the language of mathematics. Relationships between the variables of the system being modeled are replaced by logical connections or equations in the mathematical model."<sup>100</sup> Although a relatively new field, atmospheric modeling has established its place in both the workings of the EPA<sup>101</sup> and judicial decisions.<sup>102</sup> Modeling is often the preferred mechanism for assessing changes in ambient air concentration attributable to pollutants emitted by a source, because setting enough monitors to measure a source's impact in all directions is usually not feasible.<sup>103</sup> In the most extensive use of modeling to date, the EPA employed computerized models to establish SO<sub>2</sub> emission limitations for the entire state of Ohio.<sup>104</sup>

The widespread employment of modeling notwithstanding, its use is subject to uncertainties.<sup>105</sup> Considerable care must be employed in developing the assumptions that are applied, and, even

from the southwest and high regional SO<sub>2</sub> concentrations, and that sulfates are a major contributor to total suspended particulate levels in the ORBES region, were subjected to special scrutiny. UARG Study, *supra* note 98, at 12-20.

100. Atmospheric Modelling Interim Report, *supra* note 19, at 2-1 to 2-2.

101. Pursuant to 42 U.S.C. § 7475(e)(3)(D) (Supp. I 1977), the EPA adopted a Guideline on Air Quality Modeling in April, 1978, which was incorporated by reference in the Agency's PSD regulations. 40 C.F.R. §§ 51.24(m), 52.21(n) (1981). The methods described by the EPA are to be used in determining whether substituted models are comparable to those set forth in the guidelines. *Alabama Power Co. v. Costle*, 636 F.2d 323, 383 (D.C. Cir. 1979).

102. In general, courts have been receptive to the use of models as a means of establishing air pollution emission limitations. See, e.g., *Cleveland Elec. Illuminating Co. v. EPA*, 572 F.2d 1150, 1164 (6th Cir.), *cert. denied*, 439 U.S. 910 (1978); *Mision Indus., Inc. v. EPA*, 547 F.2d 123 (1st Cir. 1976); *Sierra Club v. EPA*, 540 F.2d 1114, 1136 (D.C. Cir. 1976), *vacated on other grounds sub nom. Montana Power Co. v. EPA*, 434 U.S. 809 (1977). But cf. *Cincinnati Gas & Elec. Co. v. EPA*, 578 F.2d 660 (6th Cir.), *cert. denied*, 439 U.S. 1114 (1978) (upholding in part and rejecting in part model used by the EPA to predict pollution effects from sources of sulfur dioxide in rural Ohio; see also text accompanying note 38 *supra*).

103. See J. Ostrov, *The Case for Predictive Models in Controlling Air Pollution* 1 (Mar., 1979) (written for Mar., 1979, meeting of the Air Pollution Control Association).

104. See *Cincinnati Gas & Elec. Co. v. EPA*, 578 F.2d 660 (6th Cir.), *cert. denied*, 439 U.S. 910 (1978); *Cleveland Elec. Illuminating Co. v. EPA*, 572 F.2d 1150, 1160-61 (6th Cir.), *cert. denied*, 439 U.S. 910 (1978).

105. While Congress mandated that the EPA develop modeling guidelines, certain members expressed considerable reservation. See *Alabama Power Co. v. Costle*, 636 F.2d 323, 382 n.63 (D.C. Cir. 1979).

so, modelers and meteorologists will not always agree on what assumptions should be used.<sup>106</sup> An analysis of some of the parameters that must be handled in the development of short distance models for power plant emissions illustrates the fertile area available to those who may wish to challenge an SO<sub>2</sub> model, as well as the difficult task assigned to those who must construct the model.

A power plant releases gaseous and particulate emissions through stacks. The route and short-term chemical fate of these by-products will depend on the height of the stack, the temperature of the exhaust gases, and the mixing height<sup>107</sup> of the atmospheric layer into which the emission plume is released; that is, the plume will be either rapidly dispersed or held aloft for hundreds of kilometers<sup>108</sup> before it disperses and falls to the ground as SO<sub>2</sub> and other pollutants, or transformation products such as sulfates. In addition, wind direction and wind speed will determine the direction the plume takes, and how fast its constituents reach a given distance.<sup>109</sup>

The problem is that the precise values of these parameters are often unknown. The temperature and, therefore, velocity of exhaust gases may vary from time to time. One may have a general idea of wind speed and direction based on measurements made at nearby airports or weather stations, but one may not have a precise fix on the wind speed or direction at the point where the plume interacts with the atmosphere.<sup>110</sup> Further, information on the mixing height in the vicinity of the plume may be difficult to gauge at regular intervals.<sup>111</sup>

Long-range transport compounds the uncertainty. In addition to the parameters already discussed, the modeler must assess wind trajectories over long periods of time,<sup>112</sup> and, in the case of partic-

106. See notes 96, 97 *supra*. Thirty-two companies challenged the modeling employed by the EPA to develop the Ohio SIP. *Cleveland Elec. Illuminating Co. v. EPA*, 572 F.2d 1150 (6th Cir.), *cert. denied*, 439 U.S. 910 (1978).

107. Mixing height is defined as "[t]he height above the earth's surface of a boundary layer inversion which is usually the upper limit of turbulent mixing activity, and which inhibits upward flux of pollutant [sic]." Atmospheric Modelling Interim Report, *supra* note 19, at app. A.3-3.

108. M. Smith, Statement Before the United States Environmental Protection Agency 23-26 (June, 1981).

109. *Id.* at 28.

110. *Id.*

111. *Id.* at 27.

112. See *id.* at 37-38.

ulate sulfates, the rate of chemical transformation from  $\text{SO}_2$ ,<sup>113</sup> as well as the rate at which such resultant pollutants are "scavenged" out of the air through wet deposition such as rain.<sup>114</sup> Because of these difficulties, there is considerable disagreement on the current utility of long-range transport models. Although the EPA has proposed three models for inclusion in its modeling guidelines,<sup>115</sup> a statement made by former EPA Administrator Douglas Costle evidences the Agency's unease regarding such models: "I am not optimistic at all about the prospect of developing the kinds of regional models that are really legally and scientifically adequate to trace impacts of individual stacks 500, 600, 800 miles away. There are too many variables that intervene, such as terrain, climate, and a whole range of things."<sup>116</sup> Mr. Costle's concerns were echoed by agency action on January 27, 1981, in which the EPA advised that none of its models were approved for tracking long-range transport.<sup>117</sup>

However, the availability of long-range models and their feasibility is not a dead letter. An interim report of the United States-Canadian Working Group on Atmospheric Modeling<sup>118</sup> lists five long-range transport models which "are currently available for predicting sulfur deposition and for developing source-receptor relationships."<sup>119</sup> While cautioning that the model results reached by the group must be regarded as preliminary,<sup>120</sup> the report concludes that relationships described between pollution source areas and sensitive receptor areas ("transfer matrices"<sup>121</sup>) are relatively uniform among the five models,<sup>122</sup> and that the results from

113. See *id.* at 30.

114. *Id.* at 33.

115. 45 Fed. Reg. 20,157, 20,158 (1980).

116. *Acid Rain Hearings*, *supra* note 26, at 324, 325.

117. 46 Fed. Reg. 8,481, 8,488 (1981). This view apparently carried into the Reagan Administration. See Statement of Walter Barber, Acting Administrator, U.S. Env't Protection Agency, before the House Subcomm. on Health and the Environment 15 (May 1, 1981) ("At present, the quality of our models and our limited understanding of the nature of long-range transport and atmospheric pollution transformation have not permitted us to make the causal connections necessary to take action on long-range pollution under either section [115 or 126].").

118. Atmospheric Modelling Interim Report, *supra* note 19.

119. *Id.* at 5-1.

120. *Id.* at 5-9.

121. Transfer matrices are convenient formats "in which to display changes in concentration or deposition patterns, corresponding to various emission reduction scenarios." *Id.* at 2-4.

122. *Id.* at 5-8.

the models can serve "for the initial development of pollution control strategies."<sup>123</sup> Thus, while one analyst writes that "[i]t is not far amiss to describe model sensitivity testing of regional scale and long-range transport models as anarchic—many groups are repeating much the same kind of experiment, but no consistent uniform protocols exist by which to compare and evaluate the respective performance of different models,"<sup>124</sup> the work being performed by the United States-Canadian Working Group appears to provide some measure of uniformity as well as progress. In summary, while the issues associated with long-range modeling are complex, much progress is being made, particularly in the assessment of region-to-region impacts.

### E. *Tall Stacks*

A challenge to an SIP based on faulty modeling or other alleged flaws is one method by which utilities have sought relief from the rigors of the Clean Air Act and the approved SIP plans. Another method is the erection of "tall stacks," by which a plant might project gaseous and particulate emissions into a powerful windstream and beyond its surrounding area. However, this technique is limited by statute and regulation.

123. *Id.* at 7-2. In two subsequent "Working Reports," the group demonstrated additional analysis of the five original models plus two newer ones. Phase II Working Report (July 10, 1981) (Rep. No. 2-15) [hereinafter cited as Phase II Working Report]; Modeling Subgroup Report (July 10, 1981) (Rep. No. 2-13) [hereinafter cited as Modeling Subgroup Report]. Though one report notes variation among the models in the absolute or normalized amounts of sulfur products predicted for the source-receptor transfer matrices, the report states that the models were generally more consistent in predicting the percentage of sulfur products contributed by the source regions to the various receptor areas. Phase II Working Report, *supra*, at 10-11.

Although the same report cautions that "it is premature to draw any general conclusions at this time," *id.* at 11, its findings on percentage contributions certainly imply further support for the use of models as predictors of regional impacts. In this regard, the group has taken the mean region-to-region percentage contributions predicted by each of the seven models and developed a composite table showing the predicted effects. Modeling Subgroup Report, *supra*, at app. B-7. Significantly, the composite figures indicate that more than 90% of the sulfates present in New York's Adirondack region originated out-of-state (10.46% attributable to Pennsylvania), and that more than 84% of the sulfates present in western Pennsylvania originated out-of-state (3.39% attributable to New York and New England). *Id.*

124. V. Mohnen, Statement Before the United States Environmental Protection Agency 33 (June 19, 1981) (prepared statement) (quoting A. Bass, Modeling Long-range Transport and Diffusion 207 (1980) (paper presented at Second Joint Conference on Applications of Air Pollution Meteorology and Industrial Meteorology)).

In 1977, Congress added sections 123<sup>125</sup> and 302(k)<sup>126</sup> to the Clean Air Act. Together these provisions were designed to "reaffirm the mandate of the 1970 amendments that atmospheric loading through dispersion technology [such as tall stacks] is not an acceptable means of meeting State Implementation Plan emission limitations."<sup>127</sup> The congressional action followed a series of judicial decisions<sup>128</sup> which disapproved of the use of tall stacks, as well as an increasing awareness that "[d]ispersion enhancement techniques operate by keeping pollutants out of areas of high pollutant concentrations, and dispersing them to lower concentration areas. . . . Inevitably, however, the pollutants emitted into the atmosphere must end up somewhere; and the atmosphere at their destination, whatever [sic] that may be, will be degraded."<sup>129</sup> Pertinent to the section 126 proceedings before the EPA, Congress, when adopting section 123, also relied on studies concluding that: "[t]he application of tall stacks and/or intermittent control systems will not reduce total emissions of sulfur oxides to any significant degree; thus

125. 42 U.S.C. § 7423 (Supp. I 1977). Section 123 provides that:

(a) The degree of emission limitation required for control of any air pollutant under an applicable implementation plan under this title shall not be affected in any manner by—(1) so much of the stack height of any source as exceeds good engineering practice (as determined under regulations promulgated by the Administrator), . . . . (c) . . . For purposes of this section, good engineering practice means, with respect to stack heights, 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, nearby structures or nearby terrain obstacles (as determined by the Administrator). For purposes of this section such height shall not exceed two and a half times the height of such source unless the owner or operator of the source demonstrates, after notice and opportunity for public hearing, to the satisfaction of the Administrator, that a greater height is necessary as provided under the preceding sentence. In no event may the Administrator prohibit any increase in any stack height or restrict in any manner the stack height of any source.

126. 42 U.S.C. § 7602(k) (Supp. I 1977). Section 302(k) defines the term "emission limitation" as one which "limits the quantity, rate, or concentration of emissions of air pollutants on a continuous basis." This prevents satisfaction of the limits by pollution controls which vary, as a function of atmospheric conditions, on a day-by-day or intermittent basis.

127. H.R. REP. NO. 564, 95th Cong., 1st Sess. 144 (1977).

128. *Alabama Power Co. v. EPA*, 636 F.2d 323, 389-90 (D.C. Cir. 1979) (discussing cases); *Dow Chem. Co. v. EPA*, 635 F.2d 559, 561 (6th Cir. 1980) (discussing cases); 41 Fed. Reg. 7,450 (1976) (citing cases).

129. H.R. REP. NO. 294, *supra* note 66, at 87 (quoting *Natural Resources Defense Council, Inc. v. EPA*, 489 F.2d 390, 408-09 (5th Cir. 1974)).

this strategy does not decrease the total amount of sulfate in the regional atmosphere."<sup>130</sup>

Section 123 permits reliance on tall stacks to meet the requirements of the Clean Air Act in only two circumstances: where stacks were in place at the time of enactment of the Clean Air Act Amendments of 1970,<sup>131</sup> and where needed to offset excessive concentrations of any air pollutant in the immediate vicinity of the source as a result of downwash of pollutants caused by atmospheric disturbances at the point of emission release.<sup>132</sup> With respect to the latter situation, the EPA has developed its present position by stages. The Agency first took the position that a stack height-to-building height ratio of 2.5-1 was permissible for resolving aerodynamic downwash problems.<sup>133</sup> The EPA proposed<sup>134</sup> this rule of thumb, normally referred to as "good engineering practice" ("GEP"), as a formula for evaluating most, but not all,<sup>135</sup> stack height issues. However, the Agency indicated that it might require source-by-source field studies or fluid modeling for sources seeking to raise stack heights in order to qualify for less restrictive SIP requirements.<sup>136</sup>

The EPA has revised its stack height policy on three occasions. First, while reviewing SO<sub>2</sub> emissions revisions for Cleveland Electric Illuminating's ("CEI's") Avon Lake facility, the Agency announced on June 24, 1980, that:

EPA has concluded that an existing source increasing its stack height should not automatically receive credit for the increase on

130. *Id.* at 83. The report also noted that "the same report expressed concern that 'there is some evidence that local control of SO<sub>2</sub> (by higher stacks, and so forth) is leading to a wider dissemination of particulate sulfates.'" *Id.* at 84.

131. 42 U.S.C. § 7423(a) (Supp. I 1977). By comparison, draft amendments prepared by the EPA in June, 1981, would have established August 7, 1977, as the grandfather date, creating a safeharbor for many of the sources involved in litigation cited by Congress when it enacted section 123. [1981] POLLUTION CONTROL GUIDE NEWSLETTER (CCH) 286. The Agency subsequently withdrew the amendments.

132. 42 U.S.C. § 7423(b) (Supp. I 1977).

133. *See* 41 Fed. Reg. 7,450 (1976).

134. 44 Fed. Reg. 2,609 (1979). Application of the formula can result in a stack-to-building ratio of less than 2.5-1, because the formula uses the height of the downwash-influencing structure, multiplied by a factor of one, plus the height or width of the structure, whichever is less, multiplied by a factor of one and one half.

135. An exception would be a situation in which atmospheric downwash is influenced by nearby terrain rather than structures associated with the source. *Id.*

136. *Id.* A precise assessment of how many sources have been evaluated on the basis of the formula as opposed to a case-by-case analysis may not be possible, but it appears that the general practice at the time of the proposal was to use the GEP formula. *Acid Rain Hearings, supra* note 26, at 424.

the basis of the GEP formula. In the future, any source seeking to raise its stack above the de minimus level defined in EPA guidance will be required to conduct a fluid modeling study to demonstrate the GEP height necessary to avoid excessive concentrations due to downwash, wakes and eddies. EPA believes that the potential severity of the acid rain problem requires the Agency to conduct the additional analyses. . . .<sup>137</sup>

On May 28, 1981,<sup>138</sup> although acknowledging its concern for the relationship between tall stacks and acid rain, the EPA reversed the June, 1980, restatement on procedural grounds.<sup>139</sup> On October 7, 1981, the Agency proposed a new set of regulations which embodied this policy change and reaffirmed the availability of the GEP formula for all sources, without the need to conduct fluid modeling or field tests.<sup>140</sup>

In light of expressed congressional skepticism as to the accepta-

137. 45 Fed. Reg. 42,279, 42,282 (1980). The above construction is consistent with the legislative history underlying section 123. In describing the conference committee bill to the House of Representatives, Congressman Rogers, the floor manager of the bill, characterized the downwash provisions of section 123 as follows:

[t]he Conference Committee accepted the House bill's provision relating to the height of smokestacks, which provides that the emission limitations that apply to sources of pollution shall be calculated on the basis of smokestack heights sufficient to avoid "atmospheric downwash, eddies and wakes" . . . so long as this does not exceed two and one-half times the facility's height. It was our intent that . . . if it should be determined that downwash, eddies and wakes can be prevented by stacks of less than two and one-half times facility height, the Administrator's rule should give "credit" only for the height needed to avoid these conditions.

123 CONG. REC. 27,071 (1977).

138. 46 Fed. Reg. 28,650 (1981).

139. The May 28, 1981, restatement was made in the context of the same CEI power plant proceeding that had prompted EPA's earlier June 24, 1980, restatement.

140. 46 Fed. Reg. 49,814 (1981). In addition, the proposal relaxed the criteria for employing stack height in the following manner. (1) Rather than limiting the "grandfather" provisions of section 123 to stacks "in being" on December 31, 1970, as did the Agency's July, 1979, proposal, the proposal extends the grandfather clause to stacks for which commitments to construct existed on December 31, 1970. (2) Rather than defining "excessive concentrations" attributable to downwash as concentrations exceeding the NAAQS or a PSD increment, as did the July, 1979, proposal, the proposal deletes all references to the NAAQS and PSD increments. (3) Rather than limiting the reach of section 123 to pollution concentrations engendered by downwash, as did the July, 1979, proposal, the proposal extends the scope of the section by allowing tall stack credit to avoid "plume impaction" where the facility is located in complex terrain. (4) Unlike the July, 1979, proposal which, for sources located near terrain features, limited application of section 123 to such features no more than 0.8 kilometer from the source, the proposal places no limit on downwash attributable to terrain features provided that fluid modeling or field tests demonstrate excess concentrations due to such terrain. See 47 Fed. Reg. 5,864 (1982) (proposal retained).

bility of tall stacks, the EPA's current posture on this issue is, at a minimum, open to question.<sup>141</sup>

### F. Coal Conversion

The Pennsylvania and New York petitions both address the issue of increased use of coal in the Ohio River basin, in particular the likelihood that facilities now burning oil will convert to coal.<sup>142</sup> This issue is tangled,<sup>143</sup> but it figures prominently in any discussion of SO<sub>2</sub> emissions in the Ohio River valley and the Northeast.

Oil-burning utilities may switch from oil to coal either voluntarily or mandatorily.<sup>144</sup> However, under the Clean Air Act different

141. As the EPA has recognized, the issue holds great significance for regional SO<sub>2</sub> pollution:

[o]ver the past year, EPA has become increasingly concerned that current atmospheric loading of SO<sub>2</sub> and other pollutants are [sic] resulting in significant regional air pollution problems, particularly acid rain. . . . EPA is concerned that allowing sources automatic credit for GEP formula height is improperly encouraging emission limit relaxations and SO<sub>2</sub> emission increases that aggravate the acid rain problem. . . . EPA believes that the potential severity of the acid rain problem requires the Agency to conduct the additional analyses associated with case-by-case review of proposed stack height increases.

45 Fed. Reg. 42,279, 42,281-82 (1980). Specifically, the EPA realizes that elimination of the requirement that the need for increased stack height be subject to rigorous determination would result in numerous requests for SIP revisions from industrial sources in the Midwest. Memorandum from Robert L. Duprey, Director of Air Programs, Region V, U.S. Env't'l Protection Agency, to David G. Hawkins, Asst. Administrator for Air, Noise and Radiation, U.S. Env't'l Protection Agency (Aug. 25, 1978), quoted in *Acid Rain Hearings*, *supra* note 26, at 425.

142. Pennsylvania Petition, *supra* note 6, at 20; Bayshore Petition, *supra* note 7, at 3.

143. See Dady, *Reconciling Coal Conversion Policy and Nonsignificant Deterioration of Air Quality*, 15 TULSA L.J. 532 (1980) (general discussion of coal conversion under the Clean Air Act).

144. Sections 2(a) and 2(b) of the Energy Supply and Environmental Coordination Act of 1974 ("ESECA"), 15 U.S.C. §§ 791-798 (1976 & Supp. I 1977 & Supp. II 1978), empowered the Federal Energy Administration (later, the Department of Energy ("DOE")) to issue orders to utilities and large industrial boilers prohibiting such sources from using oil as a fuel and ordering them to convert to coal. 15 U.S.C. §§ 792(a), 792(b) (1976 & Supp. I 1977). In 1978, part of ESECA was replaced by the Power Plant and Industrial Fuel Use Act of 1978 ("FUA"), Pub. L. No. 95-620, 92 Stat. 3289 (codified in scattered sections of 15, 19, 42, 45, 49 U.S.C.). Like ESECA, FUA was designed to promote energy self-sufficiency through greater use of coal and other alternatives to oil. See Economic Regulatory Administration, U.S. Dep't of Energy, Powerplant and Industrial Fuel Use Act Annual Report 5 (March 1, 1980). FUA also empowers the DOE to order existing oil-burning sources to switch from oil to coal or other alternative fuels. 42 U.S.C. §§ 8341(a), 8342(b) (Supp. II 1978).

Under both ESECA and FUA, sources can be required to switch fuels only if applicable air pollution requirements are satisfied. 15 U.S.C. § 792(b)(2)(B) (1976); 42 U.S.C. § 8471(a) (Supp. II 1978).



consequences obtain. If a source switches voluntarily and is of sufficient size,<sup>145</sup> section 111(a)(2)<sup>146</sup> specifies that NSPS apply. In effect, the facility is treated as a newly constructed facility and, as such, is subject to the stringent requirements that apply to such facilities.<sup>147</sup> In addition, if the facility is located in an area designated "attainment" or "unclassified" under sections 107(d)(1)(D)<sup>148</sup> and 107(d)(1)(E),<sup>149</sup> the facility is subject to the permit, control technology and air quality requirements of the Prevention of Significant Deterioration ("PSD") provisions of the Act.<sup>150</sup>

By comparison, if the Department of Energy ("DOE") has issued a coal conversion or prohibition order to a utility pursuant to the Energy Supply and Environmental Coordination Act of 1974 ("ESECA")<sup>151</sup> or the Power Plant and Industrial Fuel Use Act of 1978 ("FUA"),<sup>152</sup> it is exempt from both NSPS and PSD provisions.<sup>153</sup> In addition, sources receiving orders under ESECA or FUA are eligible for delayed compliance orders ("DCOs") under section 113(d)(5)<sup>154</sup> of the Clean Air Act. DCOs allow a source to defer until December 31, 1985,<sup>155</sup> compliance with SIP air quality requirements, provided that primary ambient air quality standards are observed.<sup>156</sup> In contrast, many sources of SO<sub>2</sub> and particulate

145. Generally, utility boilers capable of generating 250 million Btus of heat output per hour. 40 C.F.R. §§ 60.40(a)(1), 60.40(a)(2) (1980). See 40 C.F.R. §§ 60.40-49 (1980) (NSPS for power plant).

146. 42 U.S.C. § 7411(a)(2) (Supp. I 1977).

147. 40 C.F.R. §§ 60.40-49 (1980). The EPA has effectively diluted the distinction between treatment of voluntary and involuntary conversion by exempting voluntary conversions from coverage under the 1979 NSPS for power plants. See 40 C.F.R. § 60.40a(d) (1981). However, such conversions remain subject to the more lenient pre-existing 1971 NSPS. 40 C.F.R. §§ 60.40-46 (1981).

148. 42 U.S.C. § 7407(d)(1)(D) (Supp. I 1977).

149. 42 U.S.C. § 7407(d)(1)(E) (Supp. I 1977).

150. 42 U.S.C. § 7479 (Supp. I 1977). See generally *Alabama Power Co. v. EPA*, 636 F.2d 323, 399-403 (D.C. Cir. 1979). However, unlike NSPS, which apply only to boiler modifications capable of producing more than 250 million Btus per hour (roughly, emitting 300 pounds of SO<sub>2</sub> per hour, see *Sierra Club v. Costle*, 15 E.R.C. 2137, 2141 n.6 (D.C. Cir. Apr. 29, 1981)), PSD applies to all non-de minimus modifications, *Alabama Power*, *supra*, at 393-403, which the EPA has defined as modifications capable of producing 40 tons of SO<sub>2</sub> per year (approximately 250 pounds per day, assuming full capacity operation). 45 Fed. Reg. 52,676, 52,698 (1980).

151. 15 U.S.C. §§ 791-798 (1976 & Supp. I 1977 & Supp. II 1978).

152. Pub. L. No. 95-620, 92 Stat. 3289 (codified in scattered sections of 15, 19, 42, 45, 49 U.S.C.).

153. 42 U.S.C. §§ 7411(a)(8) (Supp. I 1977). This section applies to both PSD provisions and NSPS. 42 U.S.C. § 7479(2)(C) (Supp. I 1977).

154. 42 U.S.C. § 7413(d)(5) (Supp. I 1977).

155. 42 U.S.C. § 7413(d)(5)(A)(ii) (Supp. I 1977).

156. 42 U.S.C. § 7413(d)(5)(B) (Supp. I 1977).

matter are now subject to compliance dates of July 31, 1975,<sup>157</sup> although some received extensions to July 31, 1979.<sup>158</sup>

As of December 11, 1980, the EPA had issued section 113(d)(5) orders for fifteen boilers.<sup>159</sup> The EPA has taken the position that it may issue DCOs even where ESECA or FUA orders have not been made final.<sup>160</sup> However, as of the above date, the EPA has indicated that it will follow this policy only where the DOE has issued a notice of intent to proceed on FUA orders that have been proposed for issuance.<sup>161</sup>

Legislative changes in a similar vein, contemplated by the DOE in 1980, provide some indication of the magnitude of additional SO<sub>2</sub> emissions that might be experienced were the DOE to follow through on the conversion orders it has proposed thus far, and/or were the EPA to issue the related DCOs.<sup>162</sup> The legislative initiative, known as the "Oil Backout Bill," would have made it easier for the DOE to require oil-burning utilities to switch to coal by authorizing it to fund much of the capital cost of meeting the tougher air pollution requirements associated with the burning of

157. Under 42 U.S.C. § 7410(a)(2)(A) (Supp. I 1977), primary NAAQS were to have been achieved prior to July 31, 1975. Under 42 U.S.C. § 7410(a)(2)(B) (Supp. I 1977), compliance dates for sources whose emissions would have to be cut back to meet the NAAQS could be extended to the attainment date. Section 172(a)(1) of the Clean Air Act, 42 U.S.C. § 7502(a)(1) (Supp. I 1977), added in 1977, appears to provide for an extension of the attainment dates for SO<sub>2</sub> and particulate matter to December 31, 1982, for areas designated as nonattainment, thereby implying the potential for extending compliance dates for sources to such dates. However, both the legislative history and EPA interpretation of the section indicate that, as applied to sources of SO<sub>2</sub> and particulate matter, section 172 was intended to apply only to new, additional control requirements and not to those present in SIPs before July 31, 1975. See 45 Fed. Reg. 2,319, 2,321 (1980) (quoting legislative history). Since facilities switching from oil to coal will usually experience SIP relaxations rather than be subject to additional controls, see note 163 *infra*, the provisions of section 172 would normally be inapposite to coal conversions.

158. 42 U.S.C. § 7413(d)(1)(D) (Supp. I 1977).

159. Memorandum from Jeffrey G. Miller, Acting Assistant Administrator for Enforcement, U.S. Env't'l Protection Agency, to Regional Administrators, U.S. Env't'l Protection Agency 2 (Dec. 11, 1980).

160. *Id.*

161. *Id.*

162. The Agency's action is presumably based on the very few units that have received or are about to receive final ESECA or FUA orders from the DOE. As of March 1, 1981, the DOE had proposed coal conversion orders under ESECA or prohibition orders under FUA for 14 and 25 utilities, respectively, accounting for 85 boilers. Economic Regulatory Administration, U.S. Dep't of Energy, Powerplant and Industrial Fuel Use Act Annual Report 34-39 (Mar. 1, 1981). (Power companies may have as many as five boilers at a given utility site.) However, only one final order (under ESECA) had been issued. *Id.* at 3.

coal.<sup>163</sup> Although the proposal never became law, it did receive close scrutiny during the subsequent congressional hearings on acid rain.<sup>164</sup> During these hearings the DOE and the EPA offered estimates regarding the increased SO<sub>2</sub> emissions that would accompany coal conversion at the fifty candidate facilities<sup>165</sup> under the proposed legislation.<sup>166</sup> The EPA estimated 385,000 additional tons per year,<sup>167</sup> most of it in the East;<sup>168</sup> the DOE estimated 210,000 additional tons per year.<sup>169</sup> The difference between the two estimates resulted from the DOE's assumption that converting facilities would operate only up to eighty percent of the levels permitted by the SIPs, an assumption which the EPA disputed.<sup>170</sup>

These estimates are instructive, because the facilities on which the DOE focused were, on the basis of age and other characteristics, the most likely candidates for coal conversion.<sup>171</sup> Some, if not many, of these facilities could be expected to voluntarily switch to coal were they immune from NSPS and PSD requirements. Two bills recently introduced in Congress would grant such immunity.<sup>172</sup> Accordingly, the projections offer an indication of the increases in SO<sub>2</sub> emissions that could be experienced if the most likely candidates for conversion switched to coal without any overriding NSPS or PSD requirements. The probability that, by one course or another, coal conversion will significantly increase

163. Memorandum from Lynn R. Coleman, General Counsel, U.S. Dep't of Energy, to James T. McIntyre, Jr., Director, U.S. Office of Management and Budget (Jan. 22, 1980) (summarizing the DOE proposal), *reprinted in Acid Rain Hearings*, *supra* note 26, at 242, 244. Because coal has a higher sulfur content than oil, SIP limits that were tailored to the burning of oil would have to be relaxed, to the extent permitted by the NAAQS, to allow for the burning of coal. However, even with relaxations, many utilities would have to install expensive controls to meet the NAAQS. The capital funding provided by the DOE initiative was designed to meet a significant share of these expenses. *Acid Rain Hearings*, *supra* note 26, at 245.

164. *Acid Rain Hearings*, *supra* note 26.

165. The candidates included 39 facilities for which orders had been proposed pursuant to ESECA or FUA, *id.* at 245, as well as those that had voluntarily switched to coal.

166. *Id.* at 274 (testimony of Lynn R. Coleman, General Counsel, U.S. Dep't of Energy, and David Hawkins, Asst. Administrator for Air, Noise and Radiation, U.S. Env'tl Protection Agency).

167. *Id.*

168. *Id.* at 318. The DOE also recognized that "major SO<sub>2</sub> increases would occur in Regions I and II [New York, New Jersey and New England], where the acid rain problem is worst." *Id.* at 286.

169. *Id.* at 274.

170. *Id.* at 274, 276.

171. *Id.* at 245.

172. S. 540, 97th Cong., 1st Sess. (1981); H.R. 2618, 97th Cong., 1st Sess. (1981).

pollutant emissions makes all the more critical the resolution of the enforcement problems relevant to interboundary pollution.

### G. *Enforcement and Source Monitoring*

Litigation and source reluctance notwithstanding,<sup>173</sup> the EPA has succeeded in bringing close to eighty-five percent of the nation's coal-fired utilities into compliance with applicable statutory provisions.<sup>174</sup> However, compliance with anti-pollution regulations can be difficult to enforce. For example, compliance with fuel content rules, such as the sulfur-in-coal requirements that frequently apply to utilities,<sup>175</sup> can be shattered by a non-conforming coal shipment. Alternatively, where compliance depends on delicate pollution control equipment, poor maintenance can significantly affect the operation of the equipment and, consequently, source compliance.

An EPA budget memo illustrates the severity of the problem:

[a] recent joint EPA-CEQ study showed that the continuous compliance problem is significant. Of 180 stationary sources studied, excess emissions from the worst 20 averaged over 80 percent above allowed emissions on an annual basis. It is believed that excess emissions account for six percent of the SO<sub>2</sub> emissions nationwide.<sup>176</sup>

In response to these circumstances, the EPA is shifting its enforcement focus from initial source compliance to compliance monitoring.<sup>177</sup> One issue related to this shift bears significantly on the section 126 proceedings.<sup>178</sup> Specifically, how should the EPA eval-

173. See *Dow Chem. Co. v. EPA*, 635 F.2d 559, 560 (6th Cir. 1980).

174. Memorandum from Howard Wright, Compliance Analysis Section, U.S. Env'tl Protection Agency, to John Rasnic, Compliance Monitoring Branch, U.S. Env'tl Protection Agency (Sept. 3, 1981).

175. See, e.g., 45 Fed. Reg. 12,266, 12,270 (1980).

176. Bayshore Petition, *supra* note 7, at app. B. See also [1980] 11 ENVIR. REP. (BNA) 328. Other studies reach similar conclusions:

[t]he failure of sources that have achieved initial compliance to meet emissions limits on a continuous basis is an air quality problem of growing concern. One major study for EPA states that 71 percent of the 180 sources reported as complying with standards had documented incidents of excess emissions resulting in a cumulative annual excess of 25 percent over the allowed emissions level.

To *Breath Clean Air*, *supra* note 14, at 2.1-65 to 2.1-66.

177. Memorandum from David Tunderman, Office of Planning and Evaluation, U.S. Env'tl Protection Agency, to Roy N. Gamse, Richard D. Wilson and Edward F. Tuerk, U.S. Env'tl Protection Agency, at Draft Policy Statement 1 (Apr. 23, 1981).

178. See Memorandum on Coal-fired Power Plants from Walter C. Barber, Director, Office of Air Quality Planning and Standards, U.S. Env'tl Protection Agency, to Barbara Blum, Deputy Administrator, U.S. Env'tl Protection Agency 1 (Dec. 7, 1979) [hereinafter cited as *Power Plant Memo*], cited in *Acid Rain Hearings*, *supra* note 26, at 427-28.

uate compliance with sulfur-in-coal requirements designed to ensure attainment of short-term, viz., three-hour and twenty-four-hour, SO<sub>2</sub> emissions limits.<sup>179</sup>

As noted above,<sup>180</sup> the sulfur content of coal may vary from shipment to shipment.<sup>181</sup> In addition, an on-the-scene daily assay of sulfur content is impractical. Accordingly, some states have monitored sulfur in coal by using averaging periods as long as thirty days.<sup>182</sup> Such an approach, however, may mask specific shipments which exceed the average enough to endanger the short-term SO<sub>2</sub> ambient air quality standards.

To counter the possibility of short-term violations attributable to use of multi-day averaging, the EPA has been investigating a probabilistic emissions measure known as the "expected exceedance" or "ex-ex" approach.<sup>183</sup> Under ex-ex, the predictable sulfur content of the coal being burned is arrayed randomly with a corresponding emission quotient; the range and frequency of sulfur content variations is based on collected data or estimates.<sup>184</sup> Through the use of a model, the predicted emissions pattern is compared with past meteorological conditions for each area under study. If the comparison demonstrates possible threats to the short-term standard at a given site more than once a year, a violation will be imputed to the source.<sup>185</sup>

In contrast to traditional measurement methods which assume that the highest sulfur content fuel will be burned consistently,<sup>186</sup> the ex-ex method of evaluating source compliance assumes some random variation in sulfur content. If pursued, this model could lay the logical basis for SIP relaxations and an attendant increase in atmospheric loading:

[i]t is difficult to be precise but it is most likely that the 24-hour limits developed under the current assumptions of constant, maximum emissions will become monthly averages under the

179. See 45 Fed. Reg. 9,994, 9,996 (1980).

180. See text accompanying note 175 *supra*.

181. 45 Fed. Reg. 9,994, 9,996 (1980).

182. See, e.g., 44 Fed. Reg. 27,991 (1979) (approval of 30-day averaging for SO<sub>2</sub> source in Massachusetts, provided that limit was placed on a single day's emissions). See also 46 Fed. Reg. 19,936 (1981) (EPA enforcement policy regarding Ohio, incorporating 30-day averaging as a screening device); 45 Fed. Reg. 9,101 (1980).

183. See M. Hillyer & C. Burton, *The Ex-Ex Method: Incorporating Variability in Sulfur Dioxide Emissions into Power Plant Impact Assessment* (July 23, 1980) (prepared for Office of Regional Programs, U.S. Env't'l Protection Agency).

184. *Id.* at 4.

185. *Id.*

186. See 45 Fed. Reg. 9,994, 9,996 (1980).

Ex-Ex analysis. Naturally, less restrictive limits will result in corresponding increased atmospheric loading of SO<sub>2</sub>.<sup>187</sup>

In other words, a prediction of lower average sulfur content would make it possible for the EPA to relax twenty-four-hour limitations on SO<sub>2</sub> emissions. For this reason, environmental groups have severely criticized the ex-ex method.<sup>188</sup> More to the point, this change in the analytic method would have a direct impact on inter-boundary pollution. This adds to the importance of a full resolution of issues in the section 126 proceedings.

### III. THE PETITIONS

#### A. *Pennsylvania*

Some of Pennsylvania's populous western counties front on the headwaters of the Ohio River. Pennsylvania's petition reflects concern over pollution from its sister states downstream. Citing thirty-eight sources of SO<sub>2</sub> located in Ohio and West Virginia, Pennsylvania's primary claim was that SO<sub>2</sub> emissions from the Midwest travel up the Ohio River valley where the emissions ultimately interfere with the attainment and maintenance of the ambient standards<sup>189</sup> for both SO<sub>2</sub> and particulate matter.<sup>190</sup> In support of its assertion, the state pointed to model calculations conducted under an EPA contract.<sup>191</sup> The calculations indicate that SO<sub>2</sub> from West Virginia and Ohio sources is responsible for varying concentrations of SO<sub>2</sub> at monitors located in Pennsylvania.<sup>192</sup>

The state presented other studies indicating that high concentrations of SO<sub>2</sub> measured at Pennsylvania monitors reflected the ad-

187. Power Plant Memo, *supra* note 178, at 1.

188. Acid Rain Hearings, *supra* note 26, at 427.

189. See note 22 *supra*.

190. Pennsylvania Petition, *supra* note 6.

191. H.E. Cramer Co., Calculations from Compliance Emissions of Long- and Short-term SO<sub>2</sub> Concentrations in the Southeast Pennsylvania Air Quality Control Region (1981).

192. For example, the study determined that: 1) emissions from all eastern Ohio and West Virginia sources account for 35 and 39% of the maximum annual average SO<sub>2</sub> concentrations and 60% of the maximum 3- and 24-hour concentrations, in two of the southwestern Pennsylvania areas examined; 2) Ohio and West Virginia sources account for about 35 and 53%, respectively, of the average annual SO<sub>2</sub> concentrations calculated for a narrow strip on the Pennsylvania border where the annual SO<sub>2</sub> standard has been violated; 3) sources in West Virginia account for 83% of the 24-hour and 100% of the 3-hour maximum SO<sub>2</sub> concentrations in an area four kilometers east of the Pennsylvania-West Virginia border and ten kilometers southeast of Weirton, West Virginia. *Id.*, cited in Pennsylvania Petition, *supra* note 6, at 4-7.

vection of SO<sub>2</sub> emissions from across the border.<sup>193</sup> However, only a minimal attempt was made to correlate ambient conditions registered or modeled in Pennsylvania with specific out-of-state sources of SO<sub>2</sub>. Instead, the state relied on the inferences suggested by these and other studies<sup>194</sup> which generally supported the principle of pollution transport from the Ohio River valley. The principal study in the latter category is the ORBES Report.<sup>195</sup>

The petition continued by describing the disparity between SO<sub>2</sub> emission limitations for specified sources in Pennsylvania and West Virginia.<sup>196</sup> It noted the expected heavy reliance on coal by mid-west utilities<sup>197</sup> and pointed to emission variances that have been granted to West Virginia SO<sub>2</sub> sources in the recent past.<sup>198</sup> The petition criticized the EPA's method of approving state-proposed relaxations of state implementation plan ("SIP") emission controls on a case-by-case basis. It argued that even where the easing of site-specific restrictions does not result in violations in Pennsylvania, collectively such lenient actions toward other states could prevent Pennsylvania from preserving a margin of growth for its own sources.<sup>199</sup> The petition concluded by requesting that the EPA find that emissions from the named Ohio and West Virginia sources prevent attainment and maintenance of the SO<sub>2</sub> and particulate

193. "SO<sub>2</sub> amounting to as much as half the 24-hour standard was advected into Pennsylvania on January 6 [1977—a day on which the 24-hour SO<sub>2</sub> standard was exceeded at certain Pennsylvania monitors] from the combination of power plants and industrial sources located to the west and southwest of the state." A. Mahan, B. Niemann & B. Phillips, *Characteristics and Origins of Sulfur Dioxides, Total Suspended Particulates, and Sulfates in Western Pennsylvania* 56 (June, 1980) [hereinafter cited as *Teknekron Study*].

194. In the Pennsylvania Post-hearing Supplement, *supra* note 6, at 16, Pennsylvania stated that in the twelve-month period ending May 31, 1981, the 150 µg/m<sup>3</sup> 24-hour primary NAAQS for particulate matter was violated at 27 monitoring sites located away from in-state sources of particulate matter. Citing the *Teknekron Study*, *supra* note 193, the state asserted that during this time period the average concentration attributable to sulfates was 13.3 µg/m<sup>3</sup>, and that the sulfate levels were "due predominately to out-of-state sources." Pennsylvania Post-hearing Supplement, *supra* note 6, at 16. The state concluded that 56% of the violations would have been avoided had the sulfate concentrations not been present. *Id.*

195. ORBES REPORT, *supra* note 11.

196. Pennsylvania Petition, *supra* note 6, at 22.

197. *Id.* at 20.

198. *Id.* at 20-21.

199. *Id.* at 24. Section 110 of the Clean Air Act, 42 U.S.C. § 7410 (Supp. I 1977), specifies that implementation plans must not only achieve, but also establish mechanisms for maintaining, ambient air quality standards, e.g., through provisions preserving margins for growth.

matter standards in Pennsylvania,<sup>200</sup> that the EPA enlarge established air quality control regions,<sup>201</sup> and that it require all the offending sources to control emissions up to an unspecified but reasonably available level of control technology ("RACT").<sup>202</sup>

### B. New York

Rather than prepare a single petition, New York submitted a series of nine petitions<sup>203</sup> that focused on seventeen power plants in Ohio, West Virginia, Indiana, Illinois, Tennessee and Michigan for which the EPA had proposed to relax emission standards as of the time of the petitions.<sup>204</sup> By New York's calculations, the change in standards, if approved, would annually add 1,445,900 tons of SO<sub>2</sub> to the Ohio River valley.<sup>205</sup> New York asserted that approval of such relaxations would exacerbate an already alarming situation in which, during the preceding two years, the EPA had approved emission relaxations which permitted nine Ohio River valley power plants to release an extra 818,000 tons per year.<sup>206</sup> New York further asserted that these relaxations have taken place in a climate of lax enforcement, making the problem more grave.<sup>207</sup>

200. Pennsylvania Petition, *supra* note 6, at 25. By the terms of Pennsylvania's supplemental filing, the relief requested presumably extends to unnamed sources in Illinois, Kentucky and Indiana. See Pennsylvania Petition Supplement, *supra* note 6.

201. See section 107 of the Clean Air Act, 42 U.S.C. § 7407 (Supp. I 1977) (establishing air quality control regions ("AQCRs") within which ambient standards must be satisfied). A state may encompass two or more AQCRs. *Id.* § 107(b)(2). Though AQCRs may encompass interstate areas, *id.* § 107(c), normally AQCRs fall wholly within given states.

Presumably, Pennsylvania wants the impact of local pollution to be evaluated over a greater area than permitted by existing AQCRs to take into account long-range transport and transformation of SO<sub>2</sub> emissions. Lee, *supra* note 3, at 83-88, advocates a similar approach in which the larger areas would be complemented by regional emission limitations.

202. 42 U.S.C. § 7502(b)(3) (Supp. I 1977) specifies that sources located in areas where ambient air quality standards have not been achieved must employ, as a minimum, RACT.

203. See note 7 *supra*.

204. See Bayshore Petition, *supra* note 7, attachment A (table B); New York Supplement, *supra* note 7, attachment G.

205. Bayshore Petition, *supra* note 7, attachment A at 1. Total allowed emissions for the 28 power plant sources named in the New York and Pennsylvania petitions were 3,678,900 tons per year at the time of the hearing. Briefing Materials, *supra* note 61, at table 1.

206. See Bayshore Petition, *supra* note 7, at 7. Under section 110 of the Clean Air Act, 42 U.S.C. § 7410 (Supp. I 1977), states may propose revisions to SIPs. However, such revisions do not become operative as a matter of federal law until approved by the EPA. See *Kennecott Copper Corp. v. Costle*, 572 F.2d 1349 (9th Cir. 1978).

207. Bayshore Petition, *supra* note 7, at 7.



Like Pennsylvania, New York pointed to various studies suggesting that SO<sub>2</sub>-laden air is being advected from the Ohio River valley into New York.<sup>208</sup> However, unlike Pennsylvania, New York focused primarily on the sulfate conversion product of out-of-state SO<sub>2</sub> emissions.<sup>209</sup> The state pointed to an EPA-funded study which concludes that seventy-five per cent of all sulfates present in New York enter the state west of Buffalo.<sup>210</sup> Building on this premise, the state drew attention to many situations in which violations of the particulate matter standard in New York were attributable, to a significant degree, to sulfates.<sup>211</sup> It further stated that if sulfate levels had not been influenced by out-of-state emissions, most such particulate matter violations would not have been registered.<sup>212</sup>

The state also asserted that, in addition to contributing to violations of the particulate standard, sulfates originating from out-of-

208. *Id.* at 30, 31 (citing the ORBES REPORT, *supra* note 11). The state also relied heavily on the finding of the United States-Canadian Atmospheric Modelling Work Group, *see* notes 19, 123 *supra*, particularly the composite region-to-region table developed by the group which indicates that over 90% of the sulfates present in New York originate out-of-state. New York Supplement, *supra* note 7, at 24-26.

209. Bayshore Petition, *supra* note 7, at 3.

210. *Id.* at 32 (citing U.S. Env'tl Protection Agency, Particulate Source Contribution in the Niagara Frontier 9 (Dec., 1979). The Kolak Study also concludes that occurrences are consistent with the long-range transport into New York from predominantly southwesterly winds. *See also* New York Supplement, *supra* note 7, at 23, 24 (summarizing recent studies that support the Kolak Study), attachment D.

211. Bayshore Petition, *supra* note 7, at 14, 47-49. Sulfates, usually 0.1 to 1.0 microgram in size, constitute the finer or smaller end of the spectrum of particulate matter. Position Paper on Sulfates, *supra* note 14, at 25. By using dichotomous samplers, a type of monitoring instrument, technicians can perform sulfate fraction analysis which distinguishes sulfates from larger particulates.

212. The state cited the following examples. At one monitoring site in the Buffalo area, where the annual particulate matter standard was violated in 1978 and the primary 24-hour standard was violated in 1979, sulfate levels accounted for 15% of the measured annual particulate matter levels. Bayshore Petition, *supra* note 7, at 48, attachment F, at 2. Had sulfate levels been reduced by one-third, violations would not have occurred. *Id.* at attachment F, at 2. At this same site in 1980, sulfate levels ranged from 10 to 17% of the primary standard when four violations of the 24-hour primary standard occurred. New York Supplement, *supra* note 7, at 50.

A second Buffalo site registered violations of annual standards in 1978 and 1979: 83 and 86  $\mu\text{g}/\text{m}^3$ , respectively. Fraction analysis was not performed. However, assuming that 15% of the measured levels were sulfates (from the data collected at the first monitoring site), it was concluded that if the out-of-state component of the assumed sulfate levels (75%) were eliminated, no violations would have taken place. Bayshore Petition, *supra* note 7, at attachment F, at 3.

Monitors in Albany recorded violations of the primary 24-hour and annual standards in 1979, and violations of the 24-hour secondary standard in 1979 and 1980. Nearby monitors measured sulfate levels at 21 to 23% of the 1979 annual particulate standard. *Id.* at attachment F, at 5; New York Supplement, *supra* note 7, at 53.

state SO<sub>2</sub> emissions interfere with the state's Prevention of Significant Deterioration ("PSD") program. Specifically, it claimed that up to fifty percent of particulate matter in rural PSD areas is attributable to sulfates and that these levels result in an elevation of the PSD baseline,<sup>213</sup> consume air quality increments once the PSD baseline is set,<sup>214</sup> and interfere with the ability of the state to establish ambient standards more stringent than those required by federal regulation.<sup>215</sup>

Noting, as did Pennsylvania, that greater reliance will be placed on midwest coal in the future,<sup>216</sup> the state concluded that the burden is on the EPA and the originating states to show that SIP emission relaxations associated with such increased use of coal will not interfere with attaining and maintaining NAAQS in downwind states.<sup>217</sup> With respect to the utilities named in New York's collective petitions, the state asserted that the EPA must either disapprove the proposed SIP revisions or assess the cumulative impact of the proposed revisions for these sources on New York.<sup>218</sup>

213. Under the PSD provisions of the Clean Air Act, 42 U.S.C. §§ 7470-7491 (Supp. I 1977), sources of SO<sub>2</sub> and particulate matter seeking to locate in areas designated as attainment or unclassifiable, *see* note 2 *supra*, must demonstrate, *inter alia*, that air quality concentrations ("increments") will not exceed certain statutorily specified levels over baseline concentrations. 42 U.S.C. § 7473 (Supp. I 1977). The baseline concentration for any given area is determined as of the date when the first PSD permit application for an area is submitted. 42 U.S.C. § 7479(4) (Supp. I 1977); *Alabama Power Co. v. Costle*, 636 F.2d 323, 374 (D.C. Cir. 1979). Therefore, in an area where no PSD permit applications have been received, pollution from out-of-state sources can add to the baseline pollution level. This may undermine any plans the state may have had for preserving air quality or, if the baseline is pushed too close to the ambient air quality standards, possibly prevent an industry from locating in the area. Section 160(4) of the Act, 42 U.S.C. § 7470(4) (Supp. I 1977), addresses the latter problem: "[t]he purposes of this part are as follows: . . . (4) to assure that emissions from any source in any State will not interfere with any portion of the applicable implementation plan to prevent significant deterioration of air quality for any other State. . . ." Whether a section 160(4) violation occurred was the subject of a PSD permit dispute between Kentucky and Indiana. *See Indianapolis Power & Light Co. v. EPA*, No. 78-2062 (7th Cir., filed May 21, 1979) (order vacating denial of permit application and remanding to the EPA for further consideration).

214. *See* 40 C.F.R. § 52.21(b)(13) (1981).

215. Section 116, 42 U.S.C. § 7416 (Supp. I 1977), permits states to establish air quality standards more stringent than federal requirements. *See Union Elec. Co. v. EPA*, 427 U.S. 246 (1976). In addition, states may protect air quality in PSD areas by placing it in a more stringent PSD classification. 42 U.S.C. § 7474 (Supp. I 1977). *See Nance v. EPA*, 645 F.2d 701 (9th Cir. 1981) (upholding redesignation of PSD classification of Indian reservation, thereby requiring proposed source in neighboring state to achieve more stringent air pollution limitations than originally planned).

216. *Bayshore Petition*, *supra* note 7, at 3, 37.

217. *Id.* at 39.

218. *Id.* at 41.

### C. Maine

Like New York, Maine focused primarily on the sulfate transformation products of emissions from the named midwestern sources.<sup>219</sup> Citing data that associates high sulfate readings in Maine with weather patterns emanating in the Midwest, the state concluded that sulfates are transported into Maine in large pollution-laden air masses under conducive meteorological conditions.<sup>220</sup> In addition to two instances in which it claimed that sulfate levels precipitated violations of the particulate matter standard,<sup>221</sup> Maine argued that such out-of-state source pollution interferes with its PSD program.<sup>222</sup> Finally, drawing upon experiments which correlate visibility impairment with pollutant concentrations in the air, the state also asserted that the high sulfate levels attributable to out-of-state sources are responsible for reduced visibility in Acadia National Park.<sup>223</sup>

Asserting that section 126 requires that a petitioning state do no more than show that out-of-state sources contribute to a prohibited

Compare New York's request for relief with a similar request recently considered in *Connecticut v. EPA*, 656 F.2d 902 (2d Cir. 1981). *Connecticut* involved a petition filed by Connecticut in opposition to the EPA's decision to temporarily relax sulfur-in-fuel requirements for two New York power plants. Connecticut argued that harm would occur were similar relaxations granted to other New York sources; the court held that the EPA need not consider the potential interstate effects of multiple sulfur-in-fuel relaxations until specific SIP revisions permitting such relaxations were approved by the EPA. *Id.* at 909. However, two considerations distinguish that holding from the relief requested by New York in the instant section 126 proceeding. First, the Second Circuit was careful to distinguish between interstate issues presented in the context of a challenge to a section 110 SIP revision and those presented in a section 126 proceeding. Only with respect to the former did the court state that its opinion was applicable. *Id.* at 908, 910. Second, the sulfur-in-fuel limitations considered by the court were prospective in nature and therefore speculative. By contrast, those noted by New York in the section 126 proceedings have already been submitted to the EPA for approval, or, in some cases, approved by the Agency. Accordingly, it would seem that *Connecticut* is not, by itself, a bar to the relief requested by New York.

219. Citing pertinent studies, the state contended that 98% of the background sulfates measured in Maine originate out-of-state and that more than half of this amount comes from the seven midwest states referred to in the New York and Pennsylvania petitions. Maine Petition, *supra* note 12, at 23.

220. *Id.* at 10-18.

221. *Id.* at 48. In general, the state claimed that sulfates "usually account for a quarter and often more than a third of the total suspended particulate matter" measured during high sulfate episodes. *Id.*

222. *Id.* at 25-28. With respect to PSD, Maine's arguments are similar to those made by New York. See notes 213-15 and accompanying text *supra*.

223. Maine Petition, *supra* note 12, at 28-36. For discussion of the protection accorded visibility in national parks, see notes 78-80 and accompanying text *supra*.

effect,<sup>224</sup> Maine concluded that it satisfied its burden under the statute and that the burden of mitigating the asserted problems now resides with the EPA.<sup>225</sup> The state specifically requested the Administrator to focus her attention on those upwind sources which are characterized by high emission rates and tall stacks.<sup>226</sup>

#### D. Ontario

The Pennsylvania, New York and Maine petitions were filed under the interstate provisions of the Clean Air Act.<sup>227</sup> However, long-range transport of SO<sub>2</sub> northeast from the Ohio River valley is not restricted to interstate effects. In particular, there is considerable evidence that fossil fuel emissions from United States sources contribute to acid precipitation ("acid rain") in Canada.<sup>228</sup> It is estimated that half of the sulfur deposited on Canadian soil is emitted from sources in the United States,<sup>229</sup> and that most of that is from Ohio River valley sources.<sup>230</sup>

The Canadian government regards acid deposition as its most critical environmental problem.<sup>231</sup> In a memorandum of intent dated August 5, 1980, the United States and Canada recognized the importance of transboundary air pollution.<sup>232</sup> The memorandum recites the mutual concern of both nations regarding the effects of acid deposition and concludes that the "best means to protect the environment from the effects of transboundary air pollution is through the achievement of necessary reductions in pollution loadings."<sup>233</sup> To accomplish this goal, the memorandum establishes five specialized work groups: Work Group 1 (impact as-

224. Maine Petition, *supra* note 12, at 2 n.1.

225. *Id.* at 41.

226. *Id.* at 44. For discussion of the relationship between tall stacks, sulfates and the long-range transport of SO<sub>2</sub> pollutants, see note 14 *supra*, note 279 *infra*.

227. See note 4 *supra*.

228. See SULFUR OXIDES, *supra* note 14, at 14; United States-Canada Research Consultation Group on the Long-range Transport of Air Pollutants, Second Report 6 (Nov., 1980) [hereinafter cited as United States-Canada Consultation Report]; IJC Report, *supra* note 72, at 48-55.

229. United States-Canada Consultation Report, *supra* note 228, at 6. The report states that, in contrast, the great majority of sulfur deposition in the United States can be attributed to its own sulfur emissions. However, the impact of depositions of sulfur from Canada on the United States, particularly in areas sensitive to sulfur deposition, is unknown. *Id.*

230. *How Many More Lakes Have to Die*, CANADA TODAY, Feb., 1981, at 3.

231. To Breath Clean Air, *supra* note 14, at 2.1-70.

232. Memorandum of Intent, *supra* note 19.

233. *Id.* at 3.

sessment); Work Group 2 (atmospheric modeling); Work Group 3A (strategies development and implementation); Work Group 3B (emissions, costs and engineering assessment); and Work Group 4 (legal and institutional arrangements and drafting).

In light of the interboundary aspects of long-range SO<sub>2</sub> transport, the Province of Ontario requested that the section 126 hearings be extended to consider transboundary impacts.<sup>234</sup> At the hearing, the EPA denied the Province's petition.<sup>235</sup> However, the EPA allowed the Province to make presentations that might be useful to the EPA in responding to the Pennsylvania and New York petitions.<sup>236</sup> While appearing in this capacity, the Province underscored the view that interstate and interboundary SO<sub>2</sub> pollution ought to be handled interdependently since, in the view of the Province, the same sources of pollution were the focal point of both inquiries.<sup>237</sup>

#### IV. RESOLVING THE ISSUES RAISED BY THE PETITIONS

The Pennsylvania, New York and Maine petitions raise many issues. This article addresses six of them, as formulated below. Issues 1, 2 and 3 concern the legitimate scope of section 126 of the Clean Air Act. Issues 4, 5 and 6 concern other rights of action which are or should be made available, through amendment of section 126 or by some other means.

The issues addressed in this article are the following:

1. Does section 126 contemplate a claim that emissions from a neighboring state interfere with the ability of the receiving state to protect growth through plans for maintaining ambient standards, or is the section restricted to claims that the standards are being violated within the receiving state? If the first interpretation is correct, what criteria should be applied?
2. Regardless of whether a claim is directed at attainment or maintenance of the standards, should there be a threshold requirement for establishing the significance of out-of-state pollution? If so, what should that threshold be?

234. Request of the Province of Ontario to Expand the Scope of the Hearings to Consider International Transport of Pollutants.

235. Transcript of Public Hearing on Pennsylvania and New York Section 126 Petitions, at 6 (June 18, 1981) [hereinafter cited as June 18 Transcript].

236. *Id.*

237. Transcript of Public Hearing on Pennsylvania and New York Section 126 Petitions, at 266 (June 19, 1981) [hereinafter cited as June 19 Transcript] (statement of Graham W. S. Scott, Deputy Minister, Ontario Ministry of the Environment).

3. Does section 126 contemplate claims that groups of sources rather than individual sources contribute to air quality problems in the receiving state?
4. Is section 126 an appropriate mechanism for claims associated with the long-range transport of SO<sub>2</sub> and its attendant transformation into sulfate particulates?
5. If section 126 is not adequate to fully address the issue of long-range transport of sulfate particulates, what measures are available to the EPA for mitigating the problem? In those areas where the EPA cannot act, what actions should Congress take?
6. Are the issues of international and interstate SO<sub>2</sub> pollution sufficiently intertwined as to warrant coordinated action? If so, which, if any, of the measures spawned by the issues raised above are appropriate for the purpose?

A. *The Boundaries of Section 126*

1. Protection of Air Quality Maintenance Programs

During the course of the section 126 proceedings, two witnesses faulted New York and Pennsylvania for failing to demonstrate that NAAQS had been violated in areas allegedly affected by out-of-state sources.<sup>238</sup> One of the witnesses asserted that the data and calculations employed by Pennsylvania were old and that during 1980 the monitoring network operated by the state had registered no violations.<sup>239</sup>

Though the post-hearing, supplemental filings of both states assert violations related to out-of-state sources in 1980, a justifiable claim can be made that events occurring in one year may not recur at a later time. In short, the identification of enduring violations that can be associated with out-of-state sources is a difficult task. Accordingly, the question arises: may section 126 be invoked by a petitioning state in the absence of a proven violation but where out-of-state emissions are sufficient to interfere with the state's ability to "maintain" acceptable air quality levels?

The question whether section 126 extends to air quality maintenance as well as attainment has not been addressed by the courts.

238. June 18 Transcript, *supra* note 235, at 201 (statement of Ronald Shipley, Assistant Attorney General, West Virginia); June 19 Transcript, *supra* note 237, at 33 (statement of Roger Strelow, representing several midwest power companies).

239. June 19 Transcript, *supra* note 237, at 21, 33, 34 (statement of Roger Strelow).

Nevertheless, one need go no further than the statute to resolve the issue. Section 110(a)(2)(E)(i),<sup>240</sup> to which section 126(b) directly pertains, speaks in terms of attainment *or* maintenance of the standards.<sup>241</sup> Thus, it appears that Congress intended that section 126 would be applicable even where no violations occurred if out-of-state emissions interfered with a state's plan to maintain its attainment status through more restrictive measures than needed for attainment or through measures designed to preserve margins for growth.

Two other provisions of the Clean Air Act bear out this conclusion. First, section 172(a)(1)<sup>242</sup> contemplates that all states will attain NAAQS for particulate matter and SO<sub>2</sub> by December 31, 1982.<sup>243</sup> It would be anomalous if, after that date, only states whose air quality violated the law could petition the EPA for relief from out-of-state emissions while those states which had sacrificed to achieve the standards could not. Second, the Act specifically provides states with the right to establish emission provisions more stringent than required to meet ambient standards.<sup>244</sup> Section 126 contemplates such a development. As stated by the Senate committee report:<sup>245</sup>

[i]n the absence of interstate abatement procedures, those plants in States with more stringent control requirements are at a distinct economic and competitive disadvantage. This new provision is intended to equalize the positions of the States with respect to interstate pollution by making a source at least as responsible for polluting another state as it would be for polluting its own State.<sup>246</sup>

Again, it would be inconsistent for the drafters of the Clean Air Act to show concern for the impact of out-of-state emissions on strictly

240. 42 U.S.C. § 7410(a)(2)(E)(i) (Supp. I 1977).

241. The disjunctive "or" also appeared in the House and Senate bills which culminated in the 1977 Amendments, *see* H.R. REP. NO. 294, *supra* note 66, at 330; S. REP. NO. 127, 95th Cong., 1st Sess. 42 (1977), *reprinted in* [1977] U.S. CODE CONG. & AD. NEWS; 42 U.S.C. § 1857c-5(a)(E) (1976) (repealed 1977) (the predecessor to section 110(a)(2)(E)(i)).

242. 42 U.S.C. § 7502(a)(1) (Supp. I 1977).

243. With respect to the secondary NAAQS, however, *see* section 113(d)(5)(A), 42 U.S.C. § 7413(d)(5)(A) (Supp. I 1977), providing for the possibility of an extension to December 31, 1985, for air quality control regions affected by coal conversion orders. *See* text accompanying notes 154-58 *supra*.

244. *Union Elec. Co. v. EPA*, 427 U.S. 246 (1976).

245. S. REP. NO. 127, 95th Cong., 1st Sess. (1977).

246. *Id.* at 52.

controlled states yet deny those states access to the remedial provisions of section 126.

## 2. Developing a Standard

In prior proceedings on section 126, the EPA has taken the position that "the degree of protection afforded by the interstate pollution provisions includes not only protection against NAAQS violations, but also against unreasonable interference with a maintenance program or margin for growth in the SIP."<sup>247</sup> However, this policy raises two questions: what threshold impact need be registered by the recipient state in order to benefit from the section 126 mechanism, and what constitutes unreasonable interference?

The question of what quantum of out-of-state emissions constitutes an unreasonable interference is difficult to answer. One can imagine instances in which a small amount of emissions from a poorly controlled source might prevent a large source with effective pollution control from locating in an area. To accommodate such circumstances, the EPA should develop a de minimus rule which, while exempting very small emissions from the purview of section 126, is sufficiently strict to cover this type of situation. The EPA has experience in developing de minimus provisions<sup>248</sup> and should be able to adopt rules which are administratively manageable yet achieve their purpose.

With respect to the second question, the Agency has expressed interest in two approaches. First, it might compare the offending out-of-state source's impact in the recipient state to that from similar sources located in the state.<sup>249</sup> Alternatively, it might compare the emission limitations applicable in the offending source's state to

247. 45 Fed. Reg. 17,048, 17,049 (1980).

248. In *Alabama Power Co. v. Costle*, 636 F.2d 323 (D.C. Cir. 1979), the court construed the PSD permit section of the Clean Air Act, 42 U.S.C. § 7475 (Supp. I 1977), to accommodate an exemption for modifications to major sources which engender de minimus pollution and directed the EPA to develop provisions outlining the limits of such de minimus changes. The Agency promulgated rules on August 7, 1980, after responding to numerous comments to earlier proposed regulations. 45 Fed. Reg. 52,676, 52,705 (1980). The Administrator determined that modifications resulting in pollution equivalent to four percent of the 24-hour primary standard for particulate matter and SO<sub>2</sub> (corresponding to an emission rate of 25 tons per year of particulate matter and 40 tons per year of SO<sub>2</sub>) would be considered significant, or not de minimus. *Id.* at 52,707.

249. 45 Fed. Reg. 17,048, 17,049 (1980).



that governing sources in the recipient state.<sup>250</sup> While the two approaches are appealing, they both pose problems. Principally, a comparison test may be very difficult to devise. For example, how should the EPA assess a situation in which emissions from the out-of-state source directly affect an industrialized and heavily populated area in the recipient state, while the most comparable in-state source is located in a rural area? How should the Agency compare sources that are closely situated but emit into a recurrent downwind pattern where only the out-of-state source significantly influences sensitive regions?

One should not abandon these tests simply because of their apparent difficulty. However, it may be possible to resolve the conflicts generated by the air quality maintenance issues by looking instead at the rationale behind the maintenance and growth provisions in the SIPs of the recipient states. That is, the issue may be approached by looking at the economic use to which the recipient state would put the area in question were it not for out-of-state pollution which already degrades ambient air quality.<sup>251</sup>

Normally, this would involve an assessment of 1) the types of industry that could be expected to locate in the state and be tolerated by the state's air quality conditions, uninfluenced by out-of-state pollution, and 2) the number of jobs, tax dollars or incremental community revenues that might be generated by such facilities. This determination might be reached through negotiations between the involved states, subject to voluntary federal arbitration. An economic value would be assigned to the use of the air reservoir in question, and the offending out-of-state source(s) then would be given the option of matching the lost value of industrial growth to the recipient state through monetary payments or upgrading controls to meet an EPA comparison test, to the extent that one was available. While novel, this scheme of economic offsets is roughly analagous to previous EPA action in which sources seeking to locate in nonattainment areas have been required to achieve environmental offsets, by purchase or otherwise, from existing sources.<sup>252</sup> In both cases an economic value must be as-

250. *Id.*

251. An exception would present itself if the recipient state wished to preserve a portion of the NAAQS for conservation purposes alone. However, in the current section 126 proceedings, no downwind state, including witness states, expressed concern for maintaining the standards solely for conservation purposes.

252. 41 Fed. Reg. 55,524 (1976) (emission offset interpretive ruling), *as amended*

signed to the air quality degradation attributable to the polluting facility.

### 3. Multiple Source Pollution

There remains the important question whether section 126 covers multiple, region-wide sources as well as specific sources. By its terms, section 126(b) is uninformative as to whether Congress contemplated single or multiple sources. The operative language states that "[a]ny 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 110(a)(2)(E)(i)."<sup>253</sup> The question remains whether the word "*any*" contemplates only individual sources or sources grouped by region or location as well.

The EPA has taken the position that section 126 encompasses regional sources:

[t]hat section 126 proceeding [involving the instant Pennsylvania section 126 petition] will be the appropriate forum for evaluating Pennsylvania's claims regarding cumulative out-of-state source impacts. In contrast to the source-specific review required under section 110(a)(2)(E) for individual SIP revisions, such as those challenged here, emissions impacts due to any identified out-of-state sources can be considered in a section 126 proceeding.<sup>254</sup>

by 44 Fed. Reg. 3,274 (1979), and as further amended by 45 Fed. Reg. 31,304, 31,311 (1980) (codified at 40 C.F.R. § 51, app. S (1981)). The original ruling was enacted into law (as it might be later amended) by the 1977 Amendments, Pub. L. No. 95-95, § 129(a), 91 Stat. 746, as amended by Pub. L. No. 95-190, §§ 14(b)(2), 14(b)(3), 91 Stat. 1404, for the period from August 7, 1977 (date of enactment of the amendments), to July 1, 1979 (date by which states were to have submitted nonattainment plans which, pursuant to 42 U.S.C. § 7503(1)(A) (Supp. I 1977), could embrace offset provisions). In certain circumstances, e.g., where nonattainment areas are newly identified and time is required to submit suitable SIP revisions or where interstate pollution is involved, the ruling remains in effect after July 1, 1979. 44 Fed. Reg. 20,372, 20,379 n.36 (1979).

253. 42 U.S.C. § 7410(a)(2)(E)(ii) (Supp. I 1977) (emphasis added).

254. Brief for Respondents at 35, *Pennsylvania v. EPA*, No. 79-1025 (3d Cir., filed Sept. 22, 1981). The part of the Agency's position regarding the applicability of section 126 to cumulative out-of-state impacts seems in keeping with the overall thrust of the statute.

On the other hand, the provisions of sections 110(a)(2)(E)(i), 42 U.S.C. § 7410(a)(2)(E)(i) (Supp. I 1977), and 126 appear sufficiently intertwined to warrant concurrent consideration whenever practicable. As both New York, Bayshore Petition, *supra* note 25, at 2, and the Province of Ontario, Ontario Submission, *supra* note 9, at 16, have pointed out, the cumulative impact of SIP relaxations to a large number of sources, though acceptable on a source-by-source basis, could in the aggregate promote adverse interstate impacts. Accordingly, where timely section 126

The legislative history, while not containing specific support for this construction, evinces Congress's intent to extend the ambit of section 126 in a manner consistent with coverage of multiple sources. By enacting sections 110(a)(2)(E)(i)<sup>255</sup> and 126, Congress attempted to strengthen the interstate pollution provisions of the Clean Air Act.<sup>256</sup> In the view of the House Committee on Interstate and Foreign Commerce, "the existing law (as interpreted by the Administrator) is an inadequate answer to the problem of interstate pollution."<sup>257</sup> The Committee identified two major shortcomings of the previous interstate pollution provisions: "an effective interstate air pollution control program must include not only prevention of interstate air pollution from new sources but also abatement of pollution from existing sources . . . [and] an effective program must also be designed to prevent significant deterioration. . . ."<sup>258</sup>

The committee report indicates that the Committee was aware of the adverse effects that atmospheric loading from multiple sources had on these two goals. With respect to reducing pollution from existing sources, the Committee noted that " '[t]he application of tall stacks and/or intermittent control systems will not reduce total emissions of sulfur oxides to any significant degree; thus this strategy does not decrease the total amount of sulfate in the regional atmosphere.' "<sup>259</sup> And with respect to prevention of significant deterioration of air quality, the Committee stated that:

significant increases in overall atmospheric loadings of emissions causing increased acid rainfall may have serious environmental

petitions have been filed, the Agency ought to consider such petitions in conjunction with pending section 110 SIP revisions. Otherwise, sources acting in reliance on an EPA approval of a section 110 revision may find that they have acted to their detriment (e.g., through contractual undertakings or long-term arrangements for higher sulfur content fuel) should the EPA find it necessary to reverse its approval as a result of later section 126 proceedings. *But cf.* *Connecticut v. EPA*, 656 F.2d 902 (2d Cir. 1981).

255. 42 U.S.C. § 7410(a)(2)(E)(i) (Supp. I 1977).

256. Prior to the 1977 Amendments, section 110(a)(2)(E) read as follows:

(2) The Administrator shall approve such plan . . . if he determines that . . . (E) it contains adequate provisions for intergovernmental cooperation, including measures necessary to insure that emissions of air pollutants from sources located in any air quality control region will not interfere with the attainment or maintenance of such primary or secondary standard in any portion of such region outside of such State or in any other air quality control region.

42 U.S.C. § 1857c-5(e)(2)(E) (1976) (repealed 1977).

257. H.R. REP. NO. 294, *supra* note 66, at 330.

258. *Id.*

259. *Id.* at 83.

and economic consequences. In view of these risks, the committee proposes a policy which will help minimize total increased loadings of emissions into the atmosphere by protecting against significant deterioration of clean air resources.<sup>260</sup>

These statements indicate that Congress was generally aware of the need for continuing vigilance when it enacted section 126.<sup>261</sup> To interpret the provision to apply only to individual sources would frustrate the congressional intention of strengthening the Clean Air Act's interstate provisions.<sup>262</sup>

Examination of former section 110(a)(2)(E), the provision which Congress intended to strengthen, further supports this conclusion. In pertinent part, section 110(a)(2)(E) states that:

[such implementation plan shall include] measures necessary to insure that emissions of air pollutants from *sources* located in any air quality control region will not interfere with the attainment or maintenance of such primary or secondary standard in any portion of such region outside of such state or in any other air quality control region.<sup>263</sup>

The old language evinces an intent to address emissions from multiple as well as individual sources. Given Congress's intention of strengthening the provision in the 1977 Amendments, it is unlikely that it would have enacted a successor provision that could not also reach multiple sources.

In sum, section 126 should apply to multiple sources. The EPA should affirm in the section 126 proceedings what it has already stated in its brief.<sup>264</sup>

### B. *Section 126 and Beyond*

Having concluded that section 126 is applicable to proceedings involving multiple sources such as those initiated by Pennsylvania, New York and Maine, three questions remain. How can the EPA apply section 126 to claims involving long-range transport of SO<sub>2</sub>

260. *Id.* at 132-33.

261. In the main, section 126 originated in the House. See H.R. REP. NO. 594, 95th Cong., 1st Sess. 145-46 (1977), *reprinted in* [1977] U.S. CODE CONG. & AD. NEWS 1525-27.

262. *But see* To Breathe Clean Air, *supra* note 14, at 2.2-19 (by suggesting that section 126 should be changed to permit one state to petition the EPA for relief against any aggregate of sources, the National Commission on Air Quality suggests that such potential does not now exist).

263. 42 U.S.C. § 1857c-5(a)(2)(E) (1976) (repealed 1977). (emphasis added).

264. See text accompanying note 254 *supra*.

and sulfates? If section 126 is not an effective mechanism for addressing these problems, what should Congress do? Finally, should interstate and international SO<sub>2</sub> pollution be attacked in a coordinated manner? That is, should the EPA coordinate the section 126 proceedings with the issues raised in the United States-Canadian memorandum of intent?

### 1. Interstate Questions

The section 126 proceedings place the EPA on the frontiers of scientific knowledge. For the first time, the Agency is being asked to adopt a major regulatory position based on computerized modeling of the wind directions, source emissions, precipitation patterns, atmospheric mixing, and atmospheric transformation phenomena of an entire region. The exercise is awesome and, in truth, there is disagreement within the environmental community as to the utility of such models.<sup>265</sup> Nevertheless, the data collected makes a persuasive case that emissions from the Ohio River valley contribute to SO<sub>2</sub>,<sup>266</sup> acid rain<sup>267</sup> and sulfate<sup>268</sup> problems in the northeastern United States and southeastern Canada.

Confronted with remedial statutes and treading close to scientific frontiers, reviewing courts have deferred to the technical expertise of agencies and have not demanded rigorous step-by-step proof of causal relationships:

[w]here a statute is precautionary in nature, the evidence difficult to come by, uncertain, or conflicting because it is on the frontiers of scientific knowledge, the regulations designed to protect public health, and the decision that of an expert administrator, we will not demand rigorous step-by-step proof of cause and effect. . . . The Administrator may apply his expertise to draw conclusions from suspected, but not completely substantiated, relationships between facts, from trends among facts, from theoretical projections from imperfect data, from probative preliminary data not yet certifiable as "fact," and the like.<sup>269</sup>

Given the progress being made by the United States-Canadian Atmospheric Modeling Working Group<sup>270</sup> and the judicial deference

265. See notes 96, 97, 116, 117, 123, 124 and accompanying text *supra*.

266. See notes 191-93 and accompanying text *supra*.

267. See note 311 *infra*.

268. See text accompanying notes 89-92 *supra*. See also note 212 *supra*.

269. *Ethyl Corp. v. EPA*, 541 F.2d 1, 28 (D.C. Cir.), *cert. denied*, 426 U.S. 941 (1976) (challenge to reductions in lead content of gasoline required pursuant to Clean Air Act).

270. See text accompanying notes 118-24 *supra*.

paid thus far to EPA modeling, a reviewing court reading through the record data on long-range SO<sub>2</sub> transport might well uphold an EPA determination that pollution from the designated sources interferes with attainment or maintenance of ambient air quality standards in New York, Pennsylvania and Maine.

However, the Agency would not easily win the battle; the same sources which have challenged EPA modeling in the past<sup>271</sup> can be counted on to challenge the modeling in the future. Moreover, while a decision on the Agency's model would, by virtue of its national character, be decided by a single court, the United States Court of Appeals for the District of Columbia,<sup>272</sup> inevitable challenges to the application of the model to the designated facilities would likely occur in the four federal courts of appeals<sup>273</sup> whose jurisdictions encompass Ohio, Illinois, Kentucky, Indiana, Michigan, Tennessee and West Virginia.<sup>274</sup> History suggests that the process of developing SIP revisions in the context of such litigation could be delayed for years.<sup>275</sup>

This is not to suggest that the application of long-term modeling is inappropriate to the section 126 proceedings. However, the SIP revisions made necessary by such modeling<sup>276</sup> could easily place the Agency on an arduous and thankless course. As an alternative, I would propose a two-pronged approach consisting of sound administrative responses to the problem of long-range SO<sub>2</sub> transport and responsible legislative changes to the statute.

*Administrative Action.* The EPA is by now well positioned to determine whether emissions from Ohio River valley sources significantly contribute to the particulate sulfate problem in New York, Pennsylvania and Maine. If the Agency so concludes, and if the state of long-term modeling prevents it from establishing causal re-

271. See text accompanying notes 27-59 *supra*.

272. 42 U.S.C. § 7607(b)(1) (Supp. I 1977).

273. These are the Fourth, Fifth, Sixth and Seventh Circuits.

274. 42 U.S.C. § 7607(b)(1) (Supp. I 1977).

275. "The Ohio case is one where we spent 3 or 4 years in court over the development of a Federal plan because the State of Ohio refused to develop an abatement plan of its own. During that time things were pretty much at a stalemate." *Acid Rain Hearings*, *supra* note 26, at 324 (statement of Administrator Costle).

276. Should the EPA uphold the New York and Pennsylvania petitions, the offending sources must curtail emissions within three months, 42 U.S.C. § 7426(c)(2) (Supp. I 1977), unless the Administrator permits the continued operation of such sources, in which case the Administrator must promulgate necessary SIP revisions and attendant compliance schedules to ensure that emissions are adequately curtailed within three years. 42 U.S.C. § 7426(c) (Supp. I 1977).

lationshps between the sources and the problem, it might need to take firm action short of the SIP revisions envisioned by section 126. Such action should include the following steps.

First, the EPA should reconsider its current position on stack heights which permits stack height increases up to the GEP formula height without supporting field studies or fluid modeling.<sup>277</sup> The Agency should maintain its position only if it concludes that the atmospheric loading associated with the strict formula is no greater than it would be if field studies or fluid modeling were employed.

The Agency's current stack height policy also contains a number of other relaxations from its original section 123 proposal.<sup>278</sup> In the aggregate, such relaxations will contribute to atmospheric loading and further aggravate the problem of long-range SO<sub>2</sub> transport. As stated by the Agency itself: "[u]se of dispersion techniques instead of constant emission controls can result in additional atmospheric loadings which may contribute to undesirable environmental effects. The use of tall stacks increases the possibility that pollution will travel long distances before it settles to the ground."<sup>279</sup> EPA rules which make the use of dispersion techniques easier only compound the problem. Thus, the tall stack relaxations should not go forward without a thorough assessment of the impact of the rules on the section 126 proceedings. A reasonable reading of the statute and its legislative history, in particular the relationship recognized between tall stacks and atmospheric loading,<sup>280</sup> suggests that Congress intended nothing less.

277. See note 140 and accompanying text *supra*.

278. See note 140 *supra*.

279. 46 Fed. Reg. 49,814, 49,815 (1981). One of the documents upon which the EPA relied in developing its tall stack regulations, *id.* at 49,814, provides an informative discussion of the relationship between tall stacks and sulfate formation:

[t]he height of release of pollutants—stack height—is not only important in affecting local ground level air pollution but can exacerbate regional air pollution, most notably fine particle sulfate. . . . Tall stacks allow more sulfate formation and less removal than an equivalent release at lower heights by . . . [a]llowing SO<sub>2</sub> to remain in the atmosphere longer before it is deposited at [sic] the ground. The more SO<sub>2</sub> which is not deposited, the more fine particulate sulfate formed . . . . Because an efficient atmospheric mechanism exists to transport pollutants released from tall stacks hundreds of kilometers downwind, the reported increasing trends in regional haze and sulfate can be explained in part by release of emissions from taller stacks.

S. Eigsti, An Assessment of the Potential Effect of Stack Height on Sulfate Formation and Sulfur Deposition 1, 7 (Dec., 1979).

280. See text accompanying notes 127-30, 259 *supra*.

Second, the EPA should begin a new enforcement effort aimed at both compliant sources and those in violation of the law. Increased enforcement could decrease annual SO<sub>2</sub> emissions by as much as 1.3 million tons.<sup>281</sup> Further, the EPA should not lightly abdicate its enforcement responsibilities to the states. While state enforcement is preferable whenever possible, states faced with smaller environmental budgets due to decreased federal funding will likely find it difficult to fulfill traditional enforcement responsibilities, let alone new ones.<sup>282</sup>

Third, before adopting new measurement approaches such as the ex-ex,<sup>283</sup> the EPA should follow formal rulemaking procedures and outline specifically the environmental consequences of employing the technique. If, as feared by the environmental community,<sup>284</sup> ex-ex poses the prospect of wholesale SIP revisions, the EPA should render a final judgment on ex-ex only in light of the long-range SO<sub>2</sub> transport issue.

Fourth, the EPA should reassess its position on coal conversion. The impact of coal conversion on interstate pollution concerned Congress. Thus, the Senate report on the 1977 Amendments,<sup>285</sup> referring to the proposed interstate measures, states that "[t]his provision will be especially important as sources begin to convert to use of coal as a primary fuel. The interstate abatement procedure will assure that converting sources do not degrade the air or endanger the public health of downwind States."<sup>286</sup> Given this concern and the potential for substantial pollution associated with coal conversion, the EPA should refrain from issuing delayed compliance orders ("DCOs")<sup>287</sup> to sources at least until the Department of Energy has completed environmental impact statements for the sources. Though the coal conversion issue can, ultimately, be resolved only by Congress, a moratorium on the EPA's issuance of DCOs until environmental impact statements are completed will

281. To Breathe Clean Air, *supra* note 14, at 2.1-73 to 2.1-74 (citing EPA/DOE studies which conclude that SO<sub>2</sub> emissions in the eastern United States in 1985 could be reduced to 16.2 million tons (from 17.5 million tons) if plants comply with current emission limits).

282. See, e.g., Washington Post, Sept. 30, 1981, at 1, col. 5; Washington Post, Sept. 19, 1981, at 1, col. 6.

283. See text accompanying notes 184-88 *supra*.

284. See text accompanying note 188 *supra*.

285. S. REP. NO. 127, 95th Cong., 1st Sess. (1977).

286. *Id.* at 42.

287. See text accompanying notes 154-56 *supra*.



at least ensure that the issues of long-range SO<sub>2</sub> and sulfate transport will be considered for all such sources before specific sources obtain regulatory relief.

Finally, the EPA should propose and hold public hearings on a moratorium on the easing of certain SIP standards in the Midwest and Northeast, the moratorium to be in effect until resolution of the section 126 proceedings. The SIP relaxations affected would be those which would permit particular sources to exceed a designated emissions threshold. Such action would serve as an interim measure until Congress provides more specific guidance. It would also provide the Agency with additional time to evaluate new modeling results and an ever-increasing flow of data involving long-range transport of SO<sub>2</sub> from the Midwest. Because both midwest and eastern states would be covered by the new limits on incremental pollution, sources in eastern states would not possess an advantage over their midwestern counterparts.

Whatever the merit of the above actions, most are discretionary and, therefore, open to judicial challenge. But more importantly, most are stop-gap remedies and designed to preserve the status quo. What is required is an affirmative response to the problem of long-range transport of sulfur dioxide: revision of the Clean Air Act to authorize the EPA to take decisive action should it make the findings contemplated by section 126.

*Legislative Changes.* Three approaches for amendment of the Clean Air Act have been suggested. The first approach would identify a geographic area and require each major source in the area to employ reasonably available control technology ("RACT").<sup>288</sup> A second approach envisions the establishment by the EPA of a system of limits on total SO<sub>2</sub> emissions in a region, with regional boundaries drawn on the basis of modeling convenience or political boundaries. Once the EPA established the regional limits, states would set individual source emission limits and would have the primary responsibility for enforcing them.<sup>289</sup> A third approach assumes that an accurate emissions inventory will be available for each enforcement region. On the basis of some pre-established target, a fixed percentage emission reduction would be required of every source in the region. Sources could trade off emission limits; e.g., if two sources were the same size and subject to a ten percent

288. See note 202 and accompanying text *supra*.

289. See Lee, *supra* note 3.

emission reduction requirement, one could reduce its emissions by twenty percent and the other maintain its emissions.<sup>290</sup>

Of the three approaches, the first would be the easiest to implement and, therefore, the most likely to succeed. RACT is by now a familiar part of the law,<sup>291</sup> and the EPA has experience with developing RACT guidelines.<sup>292</sup> RACT regulations for coal-burning power plants could be established as a region-wide limitation expressed in terms of pounds of SO<sub>2</sub> per million British thermal units (Btus). Where these limits would result in unacceptable displacements, such as mine closings, Congress might wish to grant exemptions to certain types of sources. Based on proceedings conducted by the EPA under section 125,<sup>293</sup> the Agency should be able to provide Congress with ample data regarding such displacements.<sup>294</sup> However, the ultimate decision should be legislative, based on compassion, equity and a hard-nosed assessment of the long-range SO<sub>2</sub> transport issue. To be fair, the RACT requirement should apply to both recipient and emitting states. Coal washing could also be required, unless specifically exempted by Congress. Flexibility could be injected into the approach by allowing offsets whereby a given source could remain above the RACT emission level if another reduced emissions below it. The affected region would be large, so an offset in any part of the region could be used in conjunction with another source located tens or even hundreds of miles away.

The National Commission on Air Quality has stated that a uniform emission limit of four pounds of SO<sub>2</sub> per million Btus would reduce SO<sub>2</sub> emissions in the eastern United States by 2.5 to 3.3 million tons per year, a reduction of 14.1 to 18.6% from 1980 levels, respectively.<sup>295</sup> Whether Congress should establish such a

290. See *Acid Rain Hearings*, *supra* note 26, at 325 (statement of Administrator Costle).

291. The RACT concept was incorporated into the Clean Air Act in 1977.

292. Guidelines have been published for a variety of ozone sources. See 44 Fed. Reg. 53,761 (1979).

293. 42 U.S.C. § 7425 (Supp. I 1977).

294. Section 125 provides statutory authority under which the President or his designee (EPA) can prohibit a source from using non-local or non-regional coal if the consequence of such use would be significant local or regional economic disruption or unemployment. Pursuant to this section, the EPA conducted proceedings concerning certain Ohio utilities, culminating after two years in two proposed determinations that use of non-local coal by the utilities in question would not result in significant economic disruption or unemployment. See 46 Fed. Reg. 8,106 (1981); 44 Fed. Reg. 52,030 (1979).

295. To Breathe Clean Air, *supra* note 14, at 2.1-75.

limit as the uniform RACT requirement depends on the costs,<sup>296</sup> the resulting utility rate increases,<sup>297</sup> the impact on coal producers and miners,<sup>298</sup> and the health and welfare benefits reasonably attributable to such a reduction in emissions.

In contrast to the relative ease and certainty of the first legislative approach, the second approach, a region-wide emission limitation, raises the same litigation and administrative problems inherent in the development of the midwest SIPs.<sup>299</sup> In addition to establishing the overall permissible regional limits, regulatory authorities would have to limit individual source emissions. Given the fact that the modeling used for such assessments would be focused on the region rather than individual sources, and that the underlying pollution problem would not be as apparent or dramatic as that of meeting locally applicable ambient standards, one can easily see a replay of the midwest SIP experience raised to a new level of frustration. Rather than repeat the process and, in so doing, compound the already complex SIP efforts in the Midwest, Congress should approach the regional bubble approach warily.

296. The National Commission on Air Quality cites an EPA/DOE study which concludes that the cost to the utility industry of meeting such a standard by 1985 would be \$300 million per year by 1985 and \$700 million per year by 1990. *Id.*

297. Average utility rates nationwide are projected to rise by an average of 0.6% by 1990, although rates in Ohio and Indiana may increase by as much as 2.5%. *Id.*

298. All utilities in New York and Pennsylvania are now burning fuel that would comply with a four-pound SO<sub>2</sub>/million Btu standard. However, some of these facilities burn oil rather than coal. At the section 126 proceeding, representatives of the Peabody Coal Company (employing 3,200 miners working in mines which serve a number of the named utilities) and the Consolidated Coal Company (employing 3,000 such miners), indicated that much of the coal they produce would not satisfy more stringent environmental requirements. R. Kerch, Statement Before the U.S. Environmental Protection Agency (June 19, 1981); J. Wootten, Oral Summary of Statement Before the U.S. Environmental Protection Agency (June 19, 1981).

299. See text accompanying notes 27-59 *supra*. The following dialogue between former Administrator Costle and Congressman Douglas Walgren of Pennsylvania is instructive:

Mr. Walgren: Do you not have authority to put a bubble over an entire region? Does not the Federal role of approaching State plans allow you to take into consideration how they would fit in with the regional approach?

Mr. Costle: What you would have to do is to set an ambient standard in effect for a multi-State region. You would have to be able to take all the acid rain problem and trace the source of that problem and set a number, agree on a number, which would represent the allowable ambient concentration. Then you would have to go to the States and they would develop the plans in effect. I think that is an area where we just have a modeling and a degree of technical difficulty in trying to arrive at such a standard.

If we go that route, it could be a long time before we have enough data, as I said earlier, to know how to set that standard.

*Acid Rain Hearings, supra* note 26, at 326.

The problems with a third approach, involving a categorical emission reduction measure, are also substantial. Though easier to implement than regional emission limits, the major failing of a source-by-source emission cutback lies in the difficulty of setting a regional emission limitation goal. Such a goal may not be easy to identify. Furthermore, this approach requires a reliable, up-to-date emission inventory. Although both the EPA and the states keep relatively complete emissions data, predictions from the data are often at variance with actual emissions, particularly during downswings or upswings in a source's manufacturing<sup>300</sup> or generating activities. Thus, unless convincing grounds are offered, this approach should not be adopted either.<sup>301</sup>

## 2. Interboundary Aspects

Section 115<sup>302</sup> of the Clean Air Act provides an action for relief

300. For an example of the difficulty of attributing emission levels to sources during periods of fluctuating economic activity, see *Pennsylvania Post-hearing Supplement*, *supra* note 6, at 15.

301. Congress should also reevaluate coal conversion policy. Specifically, no rational ground would seem to exist for distinguishing the Clean Air Act treatment accorded voluntarily converting as opposed to mandatorily converting sources. Both should be treated the same. In this regard, Congress should evaluate the impact of coal conversion on the long-range sulfur transport issue and determine whether the exemptions that now apply to converting sources are appropriate. See text accompanying notes 153-58 *supra*. Weighing the positive aspects of coal conversion in terms of energy independence against the adverse pollution effects of coal conversion, see text accompanying notes 166-70 *supra*, Congress should determine whether some quantum of control above that required by the governing SIP is appropriate in the case of midwest or eastern coal converting sources.

302. 42 U.S.C. § 7415 (Supp. I 1977). Section 115 specifies:

(a) Whenever the Administrator, upon receipt of reports, surveys or studies from any duly constituted international agency has reason to believe that any air pollutant or pollutants emitted in the United States cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare in a foreign country or whenever the Secretary of State requests him to do so with respect to such pollution which the Secretary of State alleges is of such a nature, the Administrator shall give formal notification thereof to the Governor of the State in which such emissions originate.

(b) The notice of the Administrator shall be deemed to be a finding under section 110(a)(2)(H)(ii) which requires a plan revision with respect to so much of the applicable implementation plan as is inadequate to prevent or eliminate the endangerment referred to in subsection (a). Any foreign country so affected by such emission of pollutant or pollutants shall be invited to appear at any public hearing associated with any revision of the appropriate portion of the applicable implementation plan.

(c) This section shall apply only to a foreign country which the Administrator determines has given the United States essentially the same rights with respect to the prevention or control of air pollution occurring in that country as is given that country by this section.

from pollution that crosses national borders. Two conditions must be satisfied before the provision can be set in motion. First, the Administrator of the EPA must have reason to believe that air pollutants emanating from the United States "may reasonably be anticipated to endanger public health or welfare in a foreign country."<sup>303</sup> Second, the Administrator must find that the aggrieved country offers the United States "essentially the same rights with respect to the prevention or control of air pollution"<sup>304</sup> as is provided by section 115. If these two requirements are satisfied, or if the reciprocity finding has been made and the Secretary of State so instructs the Administrator, the Administrator must formally notify the governor of the state in which such emissions originate that the state's SIP must be revised to eliminate the anticipated threat.<sup>305</sup>

In 1980, two events prompted Administrator Costle to conclude that the above prerequisites had been satisfied. First, in October, the International Joint Commission ("IJC"), an international agency formed by agreement between the United States and Canada in 1972, issued its Seventh Annual Report on Great Lakes Water Quality.<sup>306</sup> The report noted that "virtually all of eastern Canada and portions of the United States experience rains with acidity equal to or exceeding that which can adversely affect susceptible ecosystems,"<sup>307</sup> and recommended that the governments of both countries "undertake to reduce atmospheric emissions of the oxides of sulfur and nitrogen from existing as well as new sources."<sup>308</sup>

Second, shortly after the release of the IJC report, the Canadian House of Commons amended that nation's Clean Air Act.<sup>309</sup> As interpreted by the EPA, the legislation:

provides the Canadian federal government with authority to adopt emission standards for sources which contribute to air pollution related problems in another country. Specifically, Section 21.1(1) of the legislation provides that where the Minister of Environment has reason to believe that an air contaminant emitted by a Canadian source or sources creates or contributes to air pol-

303. *Id.* § 7415(a).

304. *Id.* § 7415(c).

305. *Id.* §§ 7415(a), 7415(b).

306. IJC Report, *supra* note 72.

307. *Id.* at 50.

308. *Id.* at 5.

309. 1980 Can. Stat., c. 45, s. 3. As stated by the Minister of the Environment, John Roberts: "[t]he purpose of the amendments to the Clean Air Act now before the House is to provide the United States with essentially the same legislative protection as that offered Canada under section 115 of the Clean Air Act." House of Commons Debates 5800 (Dec. 16, 1980).

lution that may reasonably be expected to constitute a significant danger to the health, safety, or welfare of persons in another country, the Minister shall recommend to the Governor in Council (the highest federal executive authority) specific emission standards for the source or sources, in relation to the air contaminant, either alone or in combination with one or more other air contaminants, as he considers appropriate to eliminate or significantly reduce the danger.<sup>310</sup>

Responding to these two events, on January 16, 1981, Administrator Costle made the following findings:

I have concluded from the October 1980 *Seventh Annual Report on Great Lakes Water Quality of the International Joint Commission* that acid rain results in significant harm in both the U.S. and Canada, and that sources in both countries contribute to the problem through the long-range transport of air pollution. . . .

I have concluded . . . that the Canadian legislation does provide that country with ample authority to give the U.S. equal rights. This is not a permanently binding determination, however: Under Section 115 EPA must also determine that Canada is *exercising or interpreting* this authority in a manner that gives equal rights to the U.S. This implementation aspect of the determination is necessarily a dynamic one which will continue to be influenced by Canadian action now and in the future.

In summary, my conclusions are adequate to warrant the initiation of Section 115. Under this provision, formal notification is given to a Governor that his State must identify and propose pollution control measures to address the international problem. . . . I have instructed my staff to . . . recommend which States should be notified.<sup>311</sup>

310. Letter from Douglas M. Costle, Administrator, U.S. Env'tl Protection Agency, to Senator George Mitchell 4 (Jan. 13, 1981).

311. U.S. Env'tl Protection Agency, *Environmental News* 1, 3 (Jan. 16, 1981) (press release).

To date, no notification has been made, the unofficial reason being that transboundary issues will be resolved under the August, 1980, Memorandum of Intent ("MOI").

Apparently, to protect its position while the MOI discussions are taking place, on March 27, 1981, the Province of Ontario filed a petition with the EPA requesting that the Agency refrain from approving SIP SO<sub>2</sub> relaxations for twenty specified mid-west power plants. Ontario Submission, *supra* note 9. See Appendix A *infra*. In its petition Ontario asserted that: the named power plants "significantly contribute to acid deposition in Ontario," Ontario Submission, *supra* note 9, at 2; that much of its economy "is dependent upon the province's natural resources," *id.* at 3; that "Ontario is already subject to levels of acidic precipitation which seriously impair the environment and affect the welfare of its residents," *id.* at 38; and, given Administrator Costle's January 16, 1981, findings, "any increased emissions would be inconsistent with the obligations of the Administrator under [Section] 115." *Id.* In contrast to the above, the Province has asserted that it has adopted regulations which

As noted earlier,<sup>312</sup> Ontario was denied petitioner status in the section 126 proceedings, but sought relief through a different administrative channel. In so doing, Ontario has succeeded in pointing out that the issues of concern to it and the petitioning states are interrelated.<sup>313</sup> Indeed, many of the sources identified in the section 126 proceedings are also the subject of Ontario's March, 1981, submission opposing SIP relaxations.<sup>314</sup> Accordingly, one can fairly conclude that remedial action taken with respect to either of the statutory provisions will further the purposes of the other.

The administrative and legislative measures proposed in this article attempt to address both sections. If attention is paid to the activities now taking place under the United States-Canadian memorandum of intent there is no reason not to consider the provisions together. Were the EPA to view them in such a manner, it would be in a position to assert that remedial actions such as those advocated in this article serve as an interim response to both facets of the long-range SO<sub>2</sub> transport problem. It would then be up to the Agency and Congress to determine whether more is necessary adequately to address the interboundary issue.

## V. CONCLUSION

The section 126 proceedings now before the EPA provide a unique opportunity for the Agency and, by extension, the Congress to address environmental issues that have been developing for many years. Many factors converge to make resolution of these is-

will reduce SO<sub>2</sub> emissions from its most prolific polluter—the INCO smelter in Sudbury, Ontario—by seventy percent, to what they were in the late 1960s. June 19 Transcript, *supra* note 237, at 272 (statement of Graham W.S. Scott). It will also require emission reductions of 43% by 1990 from the Ontario Hydro thermal power plant system, the Province's other major SO<sub>2</sub> polluter. *Id.* at 273. Both measures are claimed to respond to the interrelated problem of long-range transport and acid rain. *Id.* On September 24, 1981, the Province of Quebec, asserting many of the same concerns as Ontario and referring to its own plans to reduce sulfur dioxide emissions, submitted a request to the EPA similar to that filed by Ontario. Ministère de l'Environnement, Gouvernement du Québec, A Submission to the United States Environmental Protection Agency Opposing Relaxation of SO<sub>2</sub> Emission Limits in State Implementation Plans and Urging Enforcement (Sept. 11, 1981).

312. See text accompanying note 235 *supra*.

313. June 19 Transcript, *supra* note 237, at 289 (statement of Bruce Terris on behalf of Province of Ontario).

314. Compare Ontario Submission, *supra* note 9, and Appendix A, with those sources listed in the EPA's notice announcing the section 126 proceedings. 46 Fed. Reg. 24,602 (1981).

sues crucial to the continued effectiveness of the nation's controls on air pollution.

At the core is concern by the petitioning northeast states (and the Canadian provinces of Ontario and Quebec) over pollutants emanating from midwest utilities. Specifically, the petitioning states allege that midwest pollution has hindered attainment and maintenance of federally mandated ambient air standards. In this regard, the EPA's first attempt at modeling emissions from coal-fired generators in Illinois, Indiana, Kentucky and Ohio concluded that such emissions are probably being carried on prevailing winds into Pennsylvania so as to hinder that state's maintenance and attainment of federal air quality standards. While controversy exists over the theoretical modeling used in the study, a United States government working group engaged in a transboundary study with Canada has given credence to the transport phenomena described.

At the same time, the EPA has taken several tentative steps which could permit more sulfur dioxide pollution from midwest sources. Despite Congress's expressed skepticism, the EPA has retracted provisions which would have deterred the use of tall stacks more than will be the case under the Agency's latest pronouncement. The Agency has also shown interest in administratively-created procedures which foster conversion by oil-fired utilities to coal and lead to postponements of emission controls. The EPA is exploring a proposal for sulfur-content assessment which has the potential to lead to greater SO<sub>2</sub> emissions by lowering the assumed sulfur content of coal burned by utilities. Finally, the requests by midwest states to relax basic controls in SIPs, and the EPA's responsiveness, are matters of concern.

Against this background, New York and Pennsylvania have sought relief under section 126 of the Act. It appears that section 126 countenances their claims—not only against individual sources but against groups of sources as well—and that the coverage of section 126 extends to both attainment and maintenance of the standards. The EPA should probably construct a *de minimus* rule to ensure that relief is granted only in the case of non-trivial interference with attainment and maintenance.

Though the statutory authority now available to the EPA may not be sufficient to remedy the problem of long-range transport of SO<sub>2</sub> and sulfates, the EPA can take corrective action to mitigate the problem. The EPA should reassess its current attitude toward tall stacks. It should also be more vigilant in monitoring sources

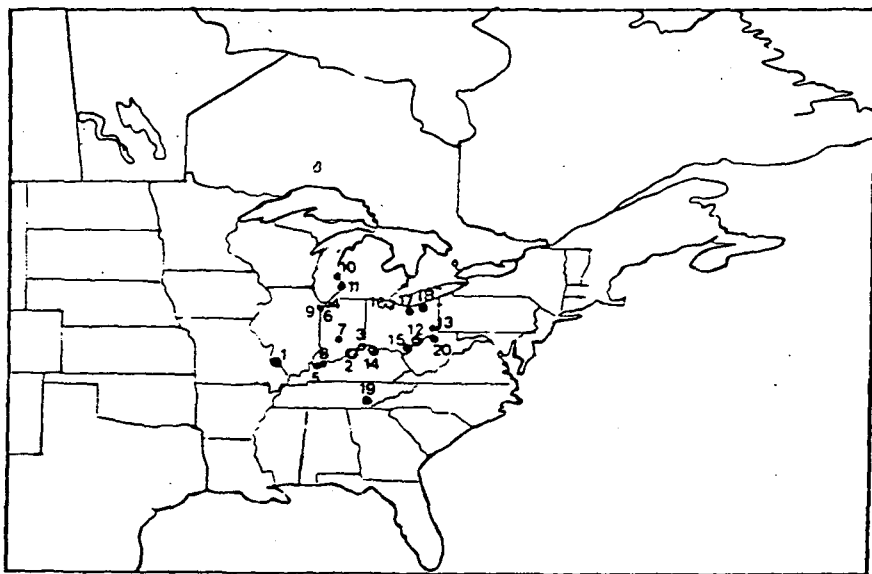


thought to be in compliance, subject the proposed "ex-ex" sulfur-content index to rigorous scrutiny, and reassess its position on coal conversion. Lastly, the EPA should, through public hearings, consider setting interim bounds on any relaxation of SIP controls affecting midwest sources.

Congress has the ultimate role in upholding the nation's commitment to air pollution control. To provide the EPA with the authority it needs to conclusively address the interboundary problem, Congress should amend the Act to require identified major sources in each region to adopt reasonably available control technology. If implemented, such legislation will, over the long-term, help to resolve the types of interstate and interboundary problems that are now before the EPA.

## Appendix A

Location of power plants which are the subject of the Ontario Submission. Ontario Submission, *supra* note 9, at 10. With the exception of the Avon Lake and Eastlake facilities, these are also the power plants designated in the section 126 proceedings. 46 Fed. Reg. 24,602 (1981).



## ILLINOIS

1) Baldwin

## MICHIGAN

10) Cobb  
11) Campbell

## TENNESSEE

19) Kingston

## INDIANA

2) Clifty Creek  
3) Tanners Creek  
4) Michigan City  
5) Cully  
6) Bailly  
7) Stout,  
Elmer W.  
8) Warrick  
9) Mitchell,  
Dean H.

## OHIO

12) Muskingum  
13) Cardinal  
14) Beckjord  
15) Poston  
16) Bayshore  
17) Avon Lake  
18) Eastlake

## WEST VIRGINIA

20) Kammer