Universal Scrubbing: Cleaning the Air

Eugene M. Trisko
West Virginia University College of Law

Follow this and additional works at: https://researchrepository.wvu.edu/wvlr

Part of the Energy and Utilities Law Commons, and the Environmental Law Commons

Recommended Citation
Available at: https://researchrepository.wvu.edu/wvlr/vol84/iss5/3

This Article is brought to you for free and open access by the WVU College of Law at The Research Repository @ WVU. It has been accepted for inclusion in West Virginia Law Review by an authorized editor of The Research Repository @ WVU. For more information, please contact ian.harmon@mail.wvu.edu.
UNIVERSAL SCRUBBING: CLEANING THE AIR
EUGENE M. TRISO*K

I. INTRODUCTION

New source performance standards (NSPS) for coal-fired power plants have generated much controversy since 1979.1 The

* Adjunct Professor of Law, West Virginia University. B.A., New York University, 1972; J.D., Georgetown University Law Center, 1977. Member, District of Columbia Bar. Research funding for this article was provided by Stern Bros., Inc.

1 Commentary on the NSPS provisions added to the Clean Air Act [42 U.S.C. § 7401, et seq. (Supp. III 1979) (“CAA” or “Act”)] by the Clean Air Act Amendments of 1970 [Pub. L. No. 91-604 (1970)] initially focused on the need for minimum federal performance standards in light of unsatisfactory state pollution control efforts under earlier federal and state legislation. See, e.g., Trumbull, Federal Control of Stationary Source Air Pollution, 2 ECOLOGY L.Q. 283, 310, n. 125 (1972): “One is hard pressed to think of a city or state that now has effective air pollution control.” [Citing Hill, The Politics of Air Pollution: Public Interest and Pressure Groups, 10 ARIZ. L. REV. 37 (1968)].


983
Reagan Administration and some business groups are urging Congress to simplify the "alphabet soup" of federal emission control standards for new sources.2 Proposals to eliminate requirements in the Clean Air Act Amendments of 1977 for flue gas "scrubbers" on all new coal-fired power plants top the agenda of difficult environmental policy choices posed by the current reauthorization of the Clean Air Act.

This article demonstrates that Congress correctly decided the electric utility scrubber issue in 1977, and that the Environmental Protection Agency's (EPA) Revised New Source Performance Standards (RNSPS) represent both a fair balance of economic, energy, and environmental considerations, and a close approximation of current technological capabilities. Analysis of universal scrubbing requirements is framed by the opposing views of Acker-
man and Hassler's *Clean Coal/Dirty Air*, and the decision of the United States Court of Appeals for the District of Columbia that its authors sought to influence, *Sierra Club v. Costle.* Additional considerations raised by the Clean Air Act's prevention of significant deterioration (PSD) and visibility protection policies confirm the necessity and reasonableness of best available control technology (BACT) requirements for major new emission sources.

II. BACKGROUND

EPA promulgated the first NSPS for coal-fired power plants in 1971. The 1971 rules allowed new units to meet a maximum sulfur dioxide (SO\(_2\)) emission rate of 1.2 lbs. per million Btu (MMBtu) heat input by the use of low-sulfur coal alone, or by add-on flue gas scrubbers. Virtually any type of United States coal could be burned in compliance with the 1.2 lb. emission ceiling.

Following promulgation of the optional-scrubbing 1971 NSPS, West to East coal shipments increased sharply as eastern utilities

---


6 *Id.*

7 The highest sulfur coals are mined in northern West Virginia, western Kentucky, Ohio, Indiana, and Illinois. Uncontrolled emission rates from these coals typically range from 5 to 9 lbs. SO\(_2\)/MMBtu, implying scrubber removal efficiencies of 76 to 87 percent to meet a 1.2 lb. ceiling. See R. Chapman & M. Wells, *Coal Resources and Sulfur Emission Regulations: A Summary of Eight Eastern and Midwestern States* (EPA-600/7-81-086, May 1981). [hereinafter cited as Chapman & Wells].
contracted for low-sulfur western coal to meet the new source emission standard or to comply with State Implementation Plan (SIP) emission limits at existing plants. In 1977, eastern utilities consumed twenty-six million tons of western coal, up from just one million tons in 1970. The United States Department of Energy predicted in 1977 that West to East coal shipments would increase to 165 million tons by 1990. From 1973 to 1977, states such as Illinois and West Virginia experienced declining coal shipments to their traditional electric utility markets. Only Kentucky managed to increase utility coal sales appreciably during this period, due mainly to demand for low-sulfur eastern Kentucky coals for blending with higher sulfur varieties at existing eastern power plants.

As these changes in domestic coal markets were unfolding, the Sierra Club persuaded a federal court to enjoin EPA from approving any SIP that would permit the "significant deterioration" of air quality in clean air areas. By a four to four tie vote in 1973, the Supreme Court left standing the D.C. Circuit Court of Appeals' affirmance of the lower court decision.

In July 1973, EPA announced four alternative proposals for a prevention of significant deterioration (PSD) policy. The alternatives shared a common denominator: the requirement that major new sources utilize BACT. NSPS would serve as BACT for most sources, but for coal-fired power plants EPA proposed a case-by-case review:

Current NSPS are set at a level which requires use of a control

---

10 U.S. DEPARTMENT OF ENERGY, FED. ENERGY REGULATORY COMMISSION, supra note 8, at xxii.
11 Id.
13 Id.
15 Id. at 18,989.
system on plants burning high sulfur coal. However, in some regions, coal with sulfur content low enough to meet the NSPS is readily available and would be used even in the absence of emission limitations. In these situations, use of the low sulfur regional coal with no additional efforts to control sulfur dioxide emissions would not automatically constitute application of BACT. This use of NSPS as a maximum emission limitation, with the possibility of requiring additional control on a case-by-case basis, is being proposed because the NSPS are designed for uniform application nationwide, whereas significant deterioration is essentially a local or regional issue. Therefore, each of the proposed regulations requires that a case-by-case analysis of fossil-fired electric plants be conducted to determine if emissions can and should be further reduced.16

EPA's recognition that burning low-sulfur coal without scrubbers could conflict with PSD goals closely followed a request for reconsideration of the 1971 NSPS by the Navajo Tribe.17 Concerned about the deterioration of air quality in the Four Corners region from nearby power plants burning low-sulfur coal without scrubbers, the Navajo sought technological relief from EPA. Although unsuccessful in their initial administrative action and subsequent lawsuit, the Navajo elevated their local air quality concerns to national attention.18

EPA promulgated final PSD rules in December 1974,19 just as Congress was preparing for another reauthorization of the Clean Air Act. The final rules eliminated the proposed case-by-case BACT review for new coal-fired power plants due to EPA's concern "that such review might arguably be inconsistent with the congressional intent of requiring national standards of per-

16 Id. (emphasis added).
17 See Oljato Chapter of the Navajo Tribe v. Train, 515 F.2d 654 (D.C. Cir. 1975); CLEAN COAL/DIRTY AIR at 21-23. The Navaho's initial lawsuit was dismissed on procedural grounds by the District Court for the District of Columbia; the court of appeals (D.C. Cir.) ruled the record was insufficient to permit judicial review, and instructed the Navaho to file a formal petition for reconsideration with EPA. 515 F.2d 654, 667. The Navaho and the Sierra Club petitioned EPA in 1976 and urged that the NSPS should require a 90 percent reduction in SO2 emissions. EPA agreed to investigate this claim [42 Fed. Reg. 5121 (1977)], but Congress enacted the CAA Amendments of 1977 before EPA had ruled on the petition.
formance for new sources." The question of BACT reviews for new power plants was left for Congress to decide.

Despite initial opposition from the Ford Administration, congressional PSD supporters spent more than two years developing and refining the concept. It was a highly divisive issue, especially for westerners, who feared that stringent air quality protection for national parks and wilderness areas could paralyze energy and industrial development. A filibuster by Senator Jake Garn (R-Utah) killed any prospect for reauthorization in 1976. In 1977, Senator Edmund Muskie (D-Me.) and Representative Paul Rogers (D-Fla.) led their respective bills into conference. With the support of the Carter Administration, the conference bill (H.R. 6161) was enacted on August 7, 1977.

The PSD provisions of the 1977 Clean Air Act Amendments were substantially more stringent than the earlier EPA rules. Among other things, they established strict increments of allowable deterioration for SO2 and particulate matter at 156 mandatory Class I national parks and wildernesses, a visibility pro-

---

21 On March 22, 1974, EPA transmitted to Congress a proposed amendment to the Clean Air Act which would have restricted the power of the federal government to promulgate air quality regulations more stringent than necessary to protect public health and welfare. S. 3287, 93d Cong., 2d Sess. (1974).
24 CAA §§ 162, 163, 42 U.S.C. §§ 7472, 7473 (Supp. III 1979). EPA's 1974 PSD regulations established PSD increments (measured incremental amounts of pollution allowed above baseline air quality) for SO2 and particulate matter in Class II areas, and provided for optional, state-determined Class I areas with stricter increments, and Class III areas with air quality increments equal to the National Ambient Air Quality Standards. 39 Fed. Reg. 42,510 (1974). PSD increments codified by the 1977 CAA Amendments and corresponding EPA-determined NAAQS are shown below.

Prevention of Significant Deterioration Increments and National Ambient Air Quality Standards for Sulfur Dioxide and Particulate Matter
[In micrograms per cubic meter]

<table>
<thead>
<tr>
<th>Sulfur Dioxide</th>
<th>3-Hour</th>
<th>24-Hour</th>
<th>Annual</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSD Class I</td>
<td>24</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>PSD Class II</td>
<td>512</td>
<td>91</td>
<td>20</td>
</tr>
</tbody>
</table>

https://researchrepository.wvu.edu/wvlr/vol84/iss5/3
tection policy for those areas, and a case-by-case BACT review process for major sources in 28 categories in which applicable NSPS would serve as the minimum level of emission control. PSD had become a de facto scrubbing mandate for virtually all new coal-fired power plants.

III. CLEAN COAL/DIRTY AIR: INSIGHT OR PROPAGANDA?

Ackerman and Hassler's Clean Coal/Dirty Air criticizes every stage in the development of minimum federal emission standards for new sources, from the 1970 congressional decision to impose NSPS, through EPA's 1979 promulgation requiring a 70 to 90 percent SO₂ removal rate for new coal-fired power plants. The factors that contributed to Congress's "agency-forcing" 1970 determination have been widely discussed elsewhere. This section examines Ackerman and Hassler's critique of universal scrubbing requirements. Their analysis of EPA's 1979 NSPS rulemaking is considered later in this article.

Clean Coal/Dirty Air makes three major points about the NSPS revisions enacted in 1977:

1. The House's amendments to section 111 were conceived in a low-visibility atmosphere of "midnight lawmaking" in which the costs and environmental consequences of forced scrubbing were not fully explicated.

<table>
<thead>
<tr>
<th>PSD Class IIIa</th>
<th>3-Hour</th>
<th>24-Hour</th>
<th>Annual</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAAQS</td>
<td>700</td>
<td>182</td>
<td>40</td>
</tr>
<tr>
<td>PSD Class I</td>
<td>1,300b</td>
<td>365c</td>
<td>80c</td>
</tr>
<tr>
<td>PSD Class II</td>
<td>-</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>PSD Class IIIa</td>
<td>-</td>
<td>37</td>
<td>19</td>
</tr>
<tr>
<td>NAAQS</td>
<td>-</td>
<td>75</td>
<td>37</td>
</tr>
<tr>
<td>Particulates</td>
<td>-</td>
<td>150b</td>
<td>60b</td>
</tr>
</tbody>
</table>

a. Optional, state-determined
b. Secondary (welfare-protective) NAAQS
c. Primary (health-protective) NAAQS

28 CLEAN COAL/DIRTY AIR at 26-58.
(2) Forced scrubbing represented a multi-billion dollar bailout of high-sulfur coal producers, which will have the perverse consequence of increasing SO$_2$ emissions in the densely populated, acid rain sensitive East;\textsuperscript{29} and

(3) More cost effective alternative means for achieving SO$_2$ emission reductions were, and remain, available.\textsuperscript{30}

A. "Midnight Lawmaking"

Ackerman and Hassler suggest that forced scrubbing flows largely from an "invisible amendment" to section 111 that eliminated the low-sulfur coal option as a compliance strategy.\textsuperscript{31} The House, through a few minor changes to the language of sec-

\textsuperscript{29} Id. at 34, 78, 102.

\textsuperscript{30} Id. at 66-78.

\textsuperscript{31} Id. at 47-54. Ackerman & Hassler acknowledge that the 1976 Senate bill required BACT as a component of its PSD plan, and argue that this "was keyed to the protection of clean air regions and did not require scrubbing on a national basis." Id. at 147, n. 38. They also contend that EPA has "not treated BACT as requiring standards more stringent than NSPS" and that EPA's initial conception of BACT permitted the use of either low-sulfur coal or scrubbers. Id. A response to these contentions is warranted here.

First, electric utilities tend to avoid siting plants in areas that are nonattainment for sulfur dioxide due to the potentially more stringent emission controls (lowest achievable emission rate) and emission offset requirements in such areas. As of August 1980, only a handful of areas in the country (18 entire counties and 70 portions of counties) were classified as SO$_2$ nonattainment; the National Commission on Air Quality has predicted that only four major metropolitan areas (Pittsburgh, Indianapolis, Gary, and Chicago), several sites near copper smelters, and 24 miscellaneous areas will exceed the primary SO$_2$ standard in 1982. NATIONAL COMMISSION ON AIR QUALITY — TO BREATHE CLEAN AIR 3.4-5,32 (1981) [hereinafter cited as NCAQ REPORT]. In practice, therefore, virtually all new coal-fired plants will be subject to BACT reviews through the PSD permitting process.

Second, BACT reviews often result in emission rates below those allowed by NSPS. NCAQ found BACT determinations more stringent than NSPS in 24 of 50 plants reviewed (in a file of PSD permits issued between April 1978 and December 1979). Id. at 3.5-43. For these 24 plants, BACT-induced emission reductions (compared to NSPS) were 20 percent for SO$_2$ and 26 percent for particulates. Id.

Finally, as shown in the text accompanying note 16, supra, EPA initially conceived the case-by-case BACT review for new power plants in its PSD rulemaking in 1973. It retreated from this proposal in its final PSD promulgation in 1974 due to concern that a case-by-case BACT review might be inconsistent with the then-current NSPS. In short, BACT reviews could have resulted in scrubber requirements for power plants which otherwise might have avoided scrubbers by burning low-sulfur coal under the 1971 NSPS.
tion 111 and an accompanying statement praising the use of locally available coal and requiring the use of add-on controls, sought to require scrubbers for all new coal-fired power plants.\(^\text{32}\) This amendment was pushed through in a low-visibility atmosphere,\(^\text{33}\) but the authors overlook a central issue; forced scrubbing was recognized by both the House and the Senate as an implicit element of the high-visibility PSD policy. By limiting their analysis to the legislative history of section 111, Ackerman and Hassler present an incomplete picture of the considerations that led to universal scrubbing, and to the multiple statutory mechanisms created to enforce it.

First, a word about these mechanisms. A number of amendments to the Clean Air Act would be needed to allow any new coal-fired power plant to utilize low-sulfur coal without scrubbers. Section 111 would have to be restored to its 1970 status by dropping the requirement for a percentage reduction of emissions based on application of the best technological system of continuous emission reduction.\(^\text{34}\) Next, changes to the Act's PSD provisions would be needed:


\(^{33}\) See CLEAN COAL/DIRTY AIR at 29-54.

\(^{34}\) The 1970 Clean Air Act Amendments authorized the Administrator of EPA to promulgate nationally applicable standards of performance for new sources and defined the term "standard of performance" to mean "a standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which (considering the cost of achieving such reduction) the Administrator determines has been adequately demonstrated." Clean Air Act Amendments of 1970, Pub. L. No. 91-604 § 111(a)(1) (1970). As amended in 1977, section 111 states that for fossil-fired power plants:

[A] standard of performance shall reflect the degree of emission limitation and the percentage reduction achievable through the application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated.

CAA § 111(a)(1), 42 U.S.C. § 411(a)(1). Amended in 1977, section 111 defines the phrase "technological system of continuous emission reduction" to mean either "a technological process for production or operation by any source which is inherently low-polluting," or "a technological system for continuous reduction of the pollution generated by a source before such pollution is emitted into the ambient air, including precombustion cleaning or treatment of fuels." CAA § 111(a)(7), 42 U.S.C. § 411(a)(7).

Read without reference to its 1977 legislative history, section 111 does not
(1) Elimination or substantial relaxation of the 3-hour and 24-hour SO\textsubscript{2} increments in Class II PSD areas;\textsuperscript{35}

(2) Modification of the air quality related values/visibility test for sources that may affect air quality or visibility at mandatory Class I areas;\textsuperscript{36} and


Faced with ambiguous statutory language — conflict between the emphasis upon technological systems of emission reduction and the related definition recognizing “inherently low-polluting” processes — EPA reasonably looked to the legislative history of section 111 to reach its conclusion that use of low-sulfur coal without scrubbers would be inconsistent with congressional intent. \textit{But see Clean Coal/Dirty Air} at 30, 114-15.

\textsuperscript{35} The short-term PSD Class II increments for SO\textsubscript{2} [\textit{supra} note 24] can impose siting constraints even on scrubber-equipped coal-fired power plants: “Power plants that are 1000 Mwe or larger emitting 0.8 lb/SO\textsubscript{2}10\textsuperscript{6} Btu, or 2000 Mwe or larger emitting 0.5 lb./SO\textsubscript{2}10\textsuperscript{6} Btu, may cause maximum (24-hour average ground-level) SO\textsubscript{2} concentrations in excess of the PSD Class II increment of 91 \textmu g/m\textsuperscript{3}, according to calculations based on conservative screening techniques recommended by the EPA.” Douglas Latimer, Systems Applications, Inc., \textit{Power Plant Impacts on Air Quality and Visibility: Siting and Emission Control Implications} (Rep. No. EF79-101, EPA Office of Planning and Evaluation, August 14, 1979) at 62. \textit{See also Nat’l Academy of Sciences, On Prevention of Significant Deterioration of Air Quality 82-85 (1981)} [hereinafter cited as \textit{Nat’l Academy of Sciences}].

\textsuperscript{36} Section 165 of the Act [42 U.S.C. § 7475(d)] contains an “air quality related values” test for sources whose emissions may affect air quality or visibility at PSD Class I areas. The PSD Class I increments for SO\textsubscript{2} and particulate matter shift the burden of proof under this test from the Class I federal land manager (the Secretary of the Interior or Agriculture) to the PSD permit applicant: before any of the increments are consumed, a source may have its PSD permit denied if a federal land manager can convince the permitting authority (EPA or the state) that the source’s emissions would have an adverse impact on air quality related values or visibility at a Class I area; conversely, a source may receive a PSD permit even though its emissions would exceed one or more Class I increments if its owner can convince the federal land manager that its emissions would not adversely impact the air quality related values or visibility at the Class I area. CAA § 165(d), 42 U.S.C. § 7475(d). \textit{See Nat’l Academy of Science, supra note 35, at 21-23, 78-80.}

There is evidence that visibility degradation can occur at western Class I areas well before the Class I PSD increments are consumed. Littlejohn, Shaver, and Malm, \textit{The Inadequacy of PSD Increments to Protect Visibility in Class I Areas}, 31 J. AIR POLLUTION CONTROL A. 879 (1981). Fine particulate sulfates caused by the atmospheric transformation of SO\textsubscript{2} to SO\textsubscript{4} over long (100-500 km) downwind
distances impair visual range and reduce contrast. Id.; NAT'L ACADEMY OF SCIENCES at 23-28. Littlejohn, et al., note that the addition of just 1 ug/m² of fine particulate to a clean atmosphere with relative humidity less than 60 percent reduces visual range by 30 percent. Given an expected SO₂ emission reduction of 1.1 million tons by 2000 in the West and West central regions (see infra note 59) due to the 1979 RNSPS, elimination of scrubber requirements for plants burning low-sulfur western coal could impair visibility at many western Class I parks and wilderness areas. See NAT'L ACADEMY OF SCIENCES, at 84, and Latimer, supra note 35, at 61-63. Controls on power plant siting alone cannot prevent long-range sulfate-related visibility impairment (Latimer at 63), so BACT is the only practical means to protect visibility in pristine areas of the West. But see CLEAN COAL/DIRTY AIR at 77 (suggesting a scrubber retrofit design requirement for western power plants, but noting that “forced scrubbing in the West does not look quite as silly as it does in the East”).

37 The CAA defines BACT as “an emission limitation based on the maximum degree of reduction of each pollutant subject to regulation under this Act emitted from or which results from any major emitting facility, which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility through application of production processes and available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of each pollutant.” CAA § 169(3); 42 U.S.C. § 7479(3). The requirement for a “maximum degree of reduction of each pollutant” would have to be eliminated from this provision to enable most new power plants to avoid the application of scrubbers.

38 See supra note 36.

39 A coal-fired electric power plant proposed to be sited in a SO₂ nonattainment area would be required to meet the lowest achievable emission rate for SO₂, defined as the more stringent of: (1) the most stringent emission limitation in any State Implementation Plan for this source category, or (2) the most stringent emission limitation which is achieved in practice by such a source. CAA § 171(3), 42 U.S.C. § 7501(3). In no event could such a source be permitted to control SO₂ emissions at a level less stringent than applicable NSPS. Id. In practice, however, LAER determinations usually track applicable NSPS. NCAQ Report at 3.4-62.

Permit requirements in nonattainment areas are further conditioned upon a showing that a net air quality benefit will result from construction of the source, CAA § 173(1), 42 U.S.C. § 7503(1). This is accomplished by obtaining one or more emission offsets from existing sources in the area which, other things equal, would
Clean Coal/Dirty Air overlooks many of the emission control issues presented by PSD and nonattainment area policies. The PSD omission is critical, for it was primarily in this arena that the scrubber battle was fought in 1977. Both houses regarded the best available control technology requirement as the centerpiece of their PSD proposals. The Senate included a BACT requirement in both its 1976 and 1977 PSD proposals, while the House viewed its changes to section 111 as a functional component of its PSD plan.41

Analyses prepared for Congress in 1976 recognized that BACT was a euphemism for forced scrubbing. A February 1976 EPA study noted that both the House and Senate proposals “will probably require installation of the flue gas desulfurization systems (i.e., scrubbers) on practically all new coal-fired power plants, whereas EPA’s significant deterioration regulations would not.” Ackerman and Hassler reviewed this study and misconstrued the relationship of BACT to the House and Senate PSD proposals:

The technocrats’ principal task was to examine the impact of the highly controversial PSD proposals. But the EPA staff also cast a sidelong glance at the House efforts to impose universal scrubbing through Section 111. . . .

The EPA emphasized that the invisible amendment to Section 111 was a very expensive proposition — by 1990 adding 14 billion dollars over the level of expenditure required by PSD alone.43

This is a mistaken interpretation of the EPA study. EPA’s $14 billion estimate represented the incremental cost of BACT

become more difficult and costly given increased SO2 emissions from the new source. Most emission offsets have been obtained from intra-company sources; the “external” offset, or purchase of emission rights from a neighboring polluter, is relatively rare. NCAQ Report at 3-4-54.

41 S. 252, 95th Cong., 1st Sess. § 6 (1977); 3 LEG. HRS. 588; S. 3219, 94th Cong., 2d Sess. § 6 (1976); 6 LEG. HRS. 4622.

42 See H.R. REP. No. 294, 95th Cong., 1st Sess. 127, 130, 133, 141, 166-69; 4 LEG. HRS. 2594, 2597, 2600, 2603, 2633-36. The House Report’s analysis of the “Effect on Energy Resources” of the House’s PSD proposal is confined almost exclusively to a discussion of the impact of proposed section 111 NSPS revisions on domestic coal markets. Id. at 166-69; 4 LEG. HRS. 2633-36.


44 CLEAN COAL/DIRTY AIR at 33-34 (footnotes omitted, emphasis added).
requirements in the House and Senate PSD proposals.\textsuperscript{44} EPA assumed that each proposal would require an additional 95,000 megawatts (MW) of electric generating capacity to install scrubbers during the years 1980-1990, on top of the 175,000 MW of scrubber-equipped capacity expected to come on-line during that period.\textsuperscript{45}

The new source BACT requirement was so central to the PSD proposals advanced by the House and the Senate that committee reports and other legislative materials typically referred to BACT as the mechanism for achieving specific PSD policy objectives:

In the long run, the growth potential of these clean air areas may be quickly filled without a reasonable policy to prevent significant deterioration.\ldots Under the policy to prevent significant deterioration in this bill, the growth options should be enlarged. This is because the provision requires any major source be constructed to utilize the best available control technology.\textsuperscript{46}

\ldots

This procedure to prevent significant deterioration requires a case-by-case determination by the States of best available control technology for any new major emitting facility that will be built in a clean air region. Thus, each State is free to — and encouraged — to examine and impose requirements for the use of the latest technological developments as a requirement in granting the permit. This approach should lead to rapid adoption of improvements in technology as new sources are built, not the stagnation that occurs when everyone works against a single national standard for new sources.\textsuperscript{47}

\ldots Areas of uneaven terrian are frequently constrained by the national primary and secondary air quality standards.\ldots In such cases, the nondegradation requirements for the use of best available control technology will enable such areas to control pollution and allow further growth.\textsuperscript{48}

\ldots

\textsuperscript{44} EPA, \textit{Preliminary Analysis}, supra note 42, at II-5, III-1, V-8.
\textsuperscript{45} Id. at V-1.
\textsuperscript{46} S. Rep. No. 127, 95th Cong., 1st Sess. 31; 3 Leg. His. 1405.
\textsuperscript{47} Id. at 18; 3 Leg. His. 1392.
\textsuperscript{48} 122 Cong. Rec. 15,575 (1976); 6 Leg. His. 4552 (Senator Edmund Muskie).
... Permitting unrestricted deterioration of air quality up to the ambient standards involves trying to cure a condition after it has developed rather than using practical and currently available means to prevent or minimize the condition in the first place. . . .

The committee approach to prevention of significant deterioration (together with the requirement proposed by the committee in section 111 that all new major industrial sources meet a standard achievable through the use of available control technology) will help provide the necessary health protection for all Americans.49

Any doubt that may have existed about the technological implications of the Senate's PSD proposal should have been dispelled by Senator Muskie during Senate debates on June 8, 1977:

One of the cornerstones of a policy to keep clean air areas clean is to require that new sources use the best technology available to clean up pollution. . . .

To encourage this result, the bill requires the use of pollution control systems which achieve the maximum degree of continuous emission reduction, determined by the States on a case-by-case basis. . . .

The record to date under the new source performance standards approach has been disappointing. The most glaring example occurs in the control of new coal-fired powerplants — the largest and fastest growing stationary source of sulfur oxides and particulates. . . .

A typical new 1,000 megawatt coal-fired powerplant using clean coal and no control technology for sulfur oxides emits 144 tons per day when operating at full load. When controlled with technology currently being used today, these emissions can be reduced to 14 tons per day.

In some cases the new source standards mean that requiring the "best technology" will result in no improvement in emission control at all — a disappointing result. . . .

Reliability of new pollution control technologies has also been challenged, particularly against sulfur oxides emission control systems.

In an EPA study on scrubber development issued in May

of 1977, it was reported that 122 flue-gas desulfurization systems with a rating of 50,000 megawatts are either operational, under construction, or planned in the United States. The efficiency of these systems in removing sulfur dioxide was reportedly to be in the range of 80 to 90 percent. . . . [D]evelopments have reached the stage where these systems are clearly a viable means of pollution control. And evidence available to the Environmental Protection Agency and the committee indicates that sulfur oxide control systems are, in fact, more reliable than electric generating equipment.\(^{50}\)

\(^{50}\) 123 Cong. Rec. 18,022-23 (1977); 3 LEGIS. HIST. 728-29 (emphasis added). \textit{But see id.} at 18,168, 3 LEG. HIS. 958; Senators Bumpers and Muskie engaged in a brief colloquy that suggested BACT may not require scrubbers on units burning low-sulfur coal.

Mr. Bumpers: H.R. 6161, the House-passed version of the Clean Air Act Amendments of 1977, would amend section 111 of the Clean Air Act. . . .

I understand that this language may have been intended to require EPA to compel the use of scrubbers at all new coal-fired power plants in the United States.

The pending bill, S. 252, does not amend section 111. I would like to make explicit my belief that it is not the intention of the Senate to require that scrubbers be installed universally. . . .

At a time when this Nation faces a national energy crisis, States or regions with abundant low-sulfur coal or other low-polluting resources should be able to use these resources so long as they meet whatever uniform emission limitations EPA may set. The important point is whether the new source emission limitations are met, not the type of technology used to meet them.

I would like to ask the Senator from Maine, the manager of the bill, whether he agrees with this position.

Mr. Muskie: I agree with the Senator from Arkansas. New source performance standards are set forth as limitations on emissions. The means chosen to achieve those limitations is within the control of the owners of the source.

Senator Muskie evaded the thrust of Senator Bumpers' question. Senator Muskie did not deny that the Senate's BACT requirement, with its definition requiring the "maximum degree of reduction" (\textit{supra} note 37), would entail scrubbers for low-sulfur power plants. Indeed, just prior to this colloquy, Senator Muskie inserted in the record a rebuttal to material previously inserted in the record by Senator Garn (May 19, 1977) charging that the Carter Administration's positions on coal conversion and Clean Air Act reform were irreconcilable. In part, Senator Muskie cited results from the February 1976 EPA study (\textit{supra} note 42) that assumed the Senate's BACT proposal would require scrubbers on all new coal-fired power plants. 123 CONG. REC. 18,163-64 (1977); 3 LEG. HIS. 951-53. Along with this submission, Senator Muskie also inserted a June 7, 1977, letter from EPA Administrator Costle which read in pertinent part:

Regarding the current PSD provisions [of S. 252], studies by EPA and
Clean Coal/Dirty Air also overlooks the relationship between scrubbing requirements and the PSD increment and land classification scheme. An EPA/Federal Energy Administration study prepared for Congress in 1975 indicated that the House and Senate proposals for Class I (national park and wilderness) areas and SO₂ increments could have precluded scrubber-equipped 1,000 MW plants from locating in 22 to 40 percent of the country. If such plants were controlled only at 1971 NSPS levels (1.2 lbs. SO₂/MMBtu), the proposed Class I increments could have precluded plant siting in 75 to 88 percent of the country. Similar constraints were noted for the proposed Class II SO₂ increments (covering all parts of the country other than Class I areas and SO₂ nonattainment areas). However imperfect these conclusions may seem in retrospect, they highlight congressional awareness of the need for widespread utilization of scrubbers under the PSD policy.

Clean Coal/Dirty Air was written prior to the release of the Report of the National Commission on Air Quality. Among other things, the National Commission on Air Quality (NCAQ) found that PSD air quality goals can be furthered in the absence of the Class

---

51 EPA/FEA, supra note 50, at 24.
52 Id.
53 Id. at 36 (10 to 47 percent of planned capacity in a sample of 74 power plants could not comply with proposed Senate and House Class II SO₂ increments).
54 NCAQ Report, supra note 31.
II increments so long as BACT requirements are retained. In short, universal scrubbing is the key to the prevention of significant air quality deterioration.

Thus, contrary to Ackerman and Hassler's belief that forced scrubbing grew from the low-visibility revision to section 111, Congress developed this policy as an integral component of the PSD plan now codified in Title I, Part C of the Act. The PSD policy was analyzed and debated extensively in both the House and the Senate, was grounded upon several major policy considerations, and was impervious to the criticisms of industry lobbying groups. It was primarily in this context that forced scrubbing became a recognized, and essential element of the Clean Air Act.

B. Environmental and Economic Impacts of Forced Scrubbing

Clean Coal/Dirty Air asserts that forced scrubbing requirements were engineered by a "bizarre coalition" of environmental groups and high-sulfur coal producers. If the low-sulfur coal option were eliminated, high-sulfur producers would be assured of continued demand for their relatively inexpensive coal by new scrubber equipped plants, provided that the SO_2 emission ceiling remained in the vicinity of 1.2 lbs./MMBtu. However, environmentalists viewed forced scrubbing as a means to reduce new plant emissions below 1.2 lbs./MMBtu. The clean air/dirty coal coalition thus resulted from a coincidence of self-interest. Ackerman and Hassler contend that this self-interest is injurious to the environmental and economic health of the country.

55 Id. at 2.1-34, 35 (Findings 148, 150). NCAQ Finding 150 is particularly noteworthy:

Commission studies suggest that a program requiring best available control technology determinations alone (without the increment system) would result in emissions growth equivalent to that obtained through the current program with increments, if best available control technology determinations were made in a manner consistent with its current definition requiring the maximum degree of control considering cost and other factors. Studies also suggest that implementation of new source performance standards and state emission limits alone (without either best available control technology or the increment requirements), in most cases, would result in greater emissions growth than that obtained through the current program (emphasis added).

56 Clean Coal/Dirty Air at 31.

57 Id. at 37.
The authors' environmental arguments are fundamentally unsound. They contend, for example, that "scrubbing is not only a costly way of providing the next generation with outdated machinery, but it will expose many northeastersners of the present generation to greater sulfur oxide concentrations than they would otherwise suffer." To the contrary, recent EPA data indicate that the 1979 RNSPS should reduce SO₂ emissions in all regions of the country: 2.2 million tons will be reduced overall by the year 2000, with 1.1 million tons in the East and East Central regions, and 1.1 million tons in the West and West Central regions being reduced. The current standard also minimizes utili-

58 Id. at 73.
59 The following table summarizes EPA's findings:

<table>
<thead>
<tr>
<th>Region</th>
<th>(Millions of tons of SO₂)</th>
<th>1.2 lb.ₐ</th>
<th>1.2 lb.ₗ₇₀-ₙ₉₀%ₗb</th>
<th>0.6 lb.ₗc</th>
<th>70%ₗₗ₉₀ lb.ₗd</th>
</tr>
</thead>
<tbody>
<tr>
<td>East</td>
<td>6.82</td>
<td>5.99</td>
<td>6.19</td>
<td>6.52</td>
<td></td>
</tr>
<tr>
<td>East North Central</td>
<td>7.74</td>
<td>7.49</td>
<td>7.49</td>
<td>7.67</td>
<td></td>
</tr>
<tr>
<td>East South Central</td>
<td>2.76</td>
<td>2.72</td>
<td>2.70</td>
<td>2.76</td>
<td></td>
</tr>
<tr>
<td>Subtotal, Eastern U.S.</td>
<td>17.32</td>
<td>16.20</td>
<td>16.38</td>
<td>16.95</td>
<td></td>
</tr>
<tr>
<td>West North Central</td>
<td>2.52</td>
<td>2.32</td>
<td>2.39</td>
<td>2.46</td>
<td></td>
</tr>
<tr>
<td>West South Central</td>
<td>2.28</td>
<td>1.56</td>
<td>1.64</td>
<td>2.15</td>
<td></td>
</tr>
<tr>
<td>West</td>
<td>1.02</td>
<td>0.80</td>
<td>0.88</td>
<td>0.94</td>
<td></td>
</tr>
<tr>
<td>Subtotal, Western U.S.</td>
<td>5.82</td>
<td>4.66</td>
<td>4.91</td>
<td>5.55</td>
<td></td>
</tr>
<tr>
<td>Total, U.S.</td>
<td>23.14</td>
<td>20.88</td>
<td>21.29</td>
<td>22.50</td>
<td></td>
</tr>
<tr>
<td>Change from 1971 NSPS</td>
<td>—</td>
<td>—</td>
<td>-2.26</td>
<td>-1.85</td>
<td>-0.64</td>
</tr>
</tbody>
</table>

Note: Emission projections assume no change in existing, more stringent state law.
ₐ 1.2 lb. SO₂/MMBtu emission ceiling (1971 NSPS).
ₗ₇₀-ₙ₉₀%ₗb 70%-90% SO₂ reduction; 1.2 lb. SO₂/MMBtu ceiling (1979 RNSPS).
ₗc 0.6 lb. SO₂/MMBtu ceiling.
ₗₗ₉₀ lb.ₗd 70% SO₂ reduction for uncontrolled emission rates greater than 0.8 lb. SO₂/MMBtu; no reduction for emission rates below 0.8 lb. SO₂/MMBtu.

ty SO₂ emissions in relation to alternative NSPS approaches under review by Congress and EPA.⁶⁰

A major misconception about RNSPS emission rates undermines Ackerman and Hassler’s argument for lowering the emission ceiling below 1.2 lbs. SO₂/MMBtu:

Assume, for example, that the ceiling had been set at 1.2 pounds per MBTU. Then it is easy to imagine cases in which adding a requirement that polluters scrub 90 percent of the sulfur out of their coal yields absolutely no emission reduction. If cheap high-sulfur coal is readily available, cost-minimizing utilities may continue to discharge 1.2 MBTU and simply substitute higher sulfur coal for the more expensive varieties they might otherwise burn. But lowering the 1.2 ceiling guarantees lower emissions from new plants, while inviting utility executives to define the cheapest way of meeting the new target.⁶¹

In fact, it is extremely difficult to imagine cases in which a 90 percent scrubbing requirement with a 1.2 lb. ceiling would not result in lower emissions. Ackerman and Hassler suggest that utilities would seek out coals with a sulfur content of 12 lbs. SO₂/MMBtu. Such ultra-high-sulfur coal simply does not exist in appreciable quantities.⁶² Typical high-sulfur coals from Ohio, western Kentucky, Indiana, and Illinois average 6 to 7 lbs. SO₂/MMBtu.⁶³ Ninety percent reduction of these potential emissions would produce controlled rates of 0.6 to 0.7 lbs. SO₂/MMBtu, substantially below the 1.2 lb. ceiling.

In addition to their environmental arguments, Ackerman and Hassler point out that forced scrubbing is not cost effective. If acid rain or other air quality concerns in the East dictate prompt remedial action, the authors insist that coal washing at existing plants should be pursued since it costs just 2$ to 9$/lb. of SO₂ removed, versus 7$ to 45$/lb. for a scrubber.⁶⁴ Here, they overlook

---

⁶⁰ See supra note 59. The alternative standards specified by EPA in this study reflect the agency’s perception of possible NSPS reform options.
⁶¹ Clean Coal/Dirty Air at 69-70.
⁶² Chapman & Wells, supra note 7, at 2-1, 4-11, 4-19, 4-30, 4-39 and 4-63.
⁶³ Id.
⁶⁴ Clean Coal/Dirty Air at 67. The authors’ claim that the marginal cost of high-sulfur coal cleaning ranges from 2$ to 9$/lb. of SO₂ removed is at odds with recent EPA estimates. Chapman & Wells, supra note 7 at 2-3, report that washing all coal delivered to utilities in 1979 from Ohio and Illinois (in addition to the amounts actually washed) would cost 215$/lb. SO₂. Id. at 2-3 (calculated from data in $/ton SO₂).
a basic premise of new source performance standards: it is cheaper to control pollution from new sources at the outset than it is to clean it up later, when the environmental damage already has been done. Ackerman and Hassler evidently have little regard for this approach: "[T]wenty years from now technology may have moved far beyond the scrubber in its search for clean air. At the very least, it will be possible to retrofit spanking new 2010 scrubbers into 1980 plants, rather than rely on creaky museum pieces. Why then, act now?"65

This is illogical. Retrofitting thirty-year old plants in 2010 would make sense only if the environmental consequences of failing to do so would be unacceptably great. And yet those consequences would exist all along, perhaps not fully perceived or matured to the stage of irreparable harm, for as much as thirty years. In any case, there could be no rational economic basis for retrofitting "spanking new 2010 scrubbers" onto thirty-year old plants heading into mothballs.

Forced scrubbing is not cheap by any means, but neither is clean air. It costs about $1,100 to remove a ton of SO₂ through 70 to 90 percent scrubbing.66 Additional washing of high-sulfur coal would cost $300-$700 per ton of SO₂.67 Yet with the current interest in acid rain mitigation, it is scarcely relevant to oppose forced scrubbing at new plants merely because cost effective means may exist to reduce SO₂ emissions at existing sources. Much analytical attention is being devoted to finding cost effective and equitable means to reduce emissions at existing sources in the East.68 High-sulfur coal washing, an across-the-board emissions rollback, or an emission ceiling for existing plants may be mandated eventually. However, until the technical basis and

65 Clean Coal/Dirty Air at 73.
66 45 Fed. Reg. 8210, 8218 (1980). The EPA's base case estimate of the incremental cost of SO₂ removal under the 1979 RNSPS was $1,036/ton; this drops to $914/ton under the sensitivity analysis with assumed higher oil prices and lower nuclear growth. Id. at 8218-19.
67 Chapman & Wells, supra note 7, at 2-3.
political will exist to support such actions, any retreat from BACT requirements for new sources will be opposed vigorously by the Northeast and by Canada. Moreover, stringent emission control standards for new sources may be an essential ingredient to any Congressional agreement on acid rain-related emission reductions, because any relaxation of new source emission standards would necessitate tighter controls on existing sources in order to achieve a given reduction in total emissions.

IV. Sierra Club v. Costle: RNSPS Justified

EPA promulgated Revised NSPS for electric utilities on June 11, 1979. The new standards required 70 to 90 percent removal of potential sulfur dioxide emissions, depending on coal type, and retained the earlier 1.2 lb. SO₂/MMBtu emission ceiling. The final rules offended industry and environmentalists alike. Electric utilities claimed that the 90 percent removal requirement for high-sulfur coal could not be met, while environmental groups charged that a full control standard should have been promulgated, and complained that the decision to retain the 1.2 lb. emission ceiling had been tainted by ex parte contacts with Senator Robert C. Byrd (D-W. Va.) and other political leaders.

---


On October 6, 1981, Senator George Mitchell (D-ME) introduced S. 1706, the “Acid Deposition Control Act.” The bill seeks a 10 million ton reduction in current SO₂ emissions within 10 years in a 31-state eastern “acid deposition impact region,” with the burden of control allocated among states proportional to their existing SO₂/MMBtu. If a state failed to adopt implementing measures within 28 months after enactment, all fossil-fuel electric generating facilities in the state would be required to comply with a 1.2 lb. ceiling within three years of enactment. Id.

For further discussion of this issue, see infra nn. 139 et. seq. and accompanying text.


Id.; Plants burning low-sulfur coal with potential uncontrolled emissions of 0.6 lb. SO₂/MMBtu or less are required to remove 70 percent of the potential emissions; plants burning low- or intermediate-sulfur coals with potential uncontrolled emissions between 2 and 6 lbs. SO₂/MMBtu are permitted to remove 70 to 90 percent of the emissions, provided that controlled emissions are 0.6 lb. SO₂/MMBtu or less; plants burning high-sulfur coals with potential uncontrolled emissions of 6 lbs. SO₂/MMBtu or more are required to remove 90 percent of potential emissions. 40 C.F.R. § 60.43a.


See 657 F.2d 298, 312, 316-18.
Industry and environmental organizations immediately petitioned EPA to reconsider the RNSPS; these petitions were denied on February 6, 1980. Meanwhile, the Sierra Club and other groups had filed for judicial review of the standards in the United States Court of Appeals for the District of Columbia. Sierra Club v. Costle was decided on April 29, 1981, and a 253 page slip opinion was issued by Judge Wald. In this case, Judge Wald concluded, "we have taken a long while to come to a short conclusion: the rule is reasonable."

Sierra Club addressed four issues relevant both to the criticisms of the 1979 RNSPS put forward by Clean Coal/Dirty Air, and to the current reauthorization of the Clean Air Act:

1. The reasonableness of EPA's variable control standard;
2. The cost and energy impacts of variable scrubbing compared to alternative approaches;
3. EPA's rationale for retaining the 1.2 lb. SO₂ emission ceiling; and
4. The achievability of the 90 percent removal standard for high-sulfur coal.

A. The Reasonableness of EPA's Variable Control Standard

Sierra Club must have been a disappointment to the authors of Clean Coal/Dirty Air, who offered this advice to the court of appeals prior to its decision:

Section 111 did not force a solution on the EPA. It only obliged the agency to give the scrubber a high priority on its decision-making agenda and required the EPA to use its expertise to see whether the scrubber made environmental sense given its heavy costs. . . .

Applied to the scrubbing controversy, these principles [full inquiry, textual priority, and coordination] demand a strong re- demand to the administrator. On reconsideration, he should not take the asserted threat to eastern coal as a sufficient reason for requiring scrubbing.

---

76 657 F.2d at 316.
78 657 F.2d at 410.
79 CLEAN COAL/DIRTY AIR at 114-15.
The court of appeals was not alone in its rejection of Ackerman and Hassler's counsel. As the court noted, "the parties share the view that the Act prohibits reliance on burning untreated low-sulfur coal alone as a system of emission control." 80

A threshold question in Sierra Club concerned EPA's statutory authority to promulgate RNSPS requiring less than full (e.g., 90 percent) scrubbing for low-sulfur coal. Following its review of section 111 and its legislative history, 81 the court examined the rulemaking record and determined that the variable control standard was supported by the agency's findings. 82 Thus, the court rejected the Sierra Club's contention that EPA should have set a removal standard for low-sulfur coal greater than 70 percent based solely on technological achievability. 83

The 70 to 90 percent standard was proposed late in EPA's RNSPS proceeding. EPA initially had proposed across-the-board 85 percent removal with a 1.2 lb. SO$_2$ ceiling. 84 Subsequent analyses by EPA suggested that a reduced emission ceiling (0.55 lb.) and 33 percent scrubbing might be more cost-effective. 85 However, there was one difficulty with the lowered ceiling: it would preclude the utilization of most eastern high-sulfur coal. 86

80 657 F.2d at 317 n.38.
81 Id. at 316-22.
82 Id. at 340.
83 Id. at 329.
84 43 Fed. Reg. 41,154, 42,158 (1978). The proposed 85 percent SO$_2$ reduction was to be achieved continuously over each 24-hour period of operation. The final promulgation required 70 to 90 percent SO$_2$ removal on a 30-day rolling average.
86 See CLEAN COAL/DIRTY AIR at 172-73 nn.56, 60, 63-64. The National Coal Association assembled coal reserve sulfur data for reserves in Ohio, northern West Virginia, Illinois, Indiana and western Kentucky, and announced at an EPA hearing in April 1979 that a 0.55 lb./SO$_2$ ceiling would preclude 75 to 100 percent of the reserves in certain areas from use in new units. Id. at 172-73 n.60. This finding assumed that utilities would not purchase coals requiring more than 85 percent scrubbing to meet the 0.55 ceiling. The preclusion would drop to 17 to 45 percent if 90 percent scrubbing were assumed. Id.

Ackerman and Hassler attack the National Coal Association's (NCA) presentation as "radically misconceived" because "[m]easuring preclusion in percentage terms ignores the fact that, given the East's rich reserves, even a small percentage of available coal will keep miners occupied for decades." Id. at 99.

Some major eastern mining firms have invested 50 years or more acquiring rights to large contiguous tracts suitable for efficient deep or surface mining.
The legislative history of section 111 was packed with praise for the use of locally available coals, and political opposition to a 0.55 lb. ceiling soon arose. EPA allegedly retreated to the original 1.2 lb. ceiling following meetings between Administrator Douglas Costle and Senator Robert C. Byrd in April and May of 1979, and an April 1979 National Coal Association presentation to EPA on the impact of a reduced emission ceiling.

Following these consultations, EPA reviewed its rulemaking record and found support among some western utilities for a new dry scrubbing technology that promised to be cheaper and less energy- and water-intensive than conventional wet limestone systems. The record and EPA investigations indicated that a removal requirement greater than 70 percent for low-sulfur coal would discourage the development of dry scrubbers. The final

Other things being equal, the pursuit of profit maximization dictates that the most economic, easily accessible reserves will be the first to be assembled and mined. Recognition of this fact led the National Coal Association to collect proprietary sulfur data for reserve tracts owned by member companies which were "planned to be developed in the near future. . . " 44 Fed. Reg. 33,580, 33,596 (1979).

Common sense recommends EPA's choice of a 1.2 lb. SO₂ ceiling in both its 1970 and 1979 NSPS rulemakings. High-sulfur steam coal has been the fuel of choice for electric power generation in much of the East and nearly all of the Midwest for over 60 years. Absent compelling environmental arguments against continued use of the East's plentiful high-sulfur reserves, it now appears very late in the evolution of federal environmental policies for EPA, or Congress, to restrict domestic market opportunities for billions of tons of eastern reserves already acquired and available for mining. Indeed, Congress recognized this in the legislative history of section 111. See infra note 87.

Although the 1977 House Report concluded its analysis of deficiencies in the 1971 NSPS by noting that the optional scrubbing standards "create a disadvantage for Midwestern and Eastern States where predominantly higher sulfur coals are available"; "do not provide for maximum practicable emission reduction using locally-available fuels"; "aggravate compliance problems for existing coal-burning stationary sources which cannot retrofit and which must compete with larger, new sources for low-sulfur coal"; "increase the risk of early plant shutdowns . . . with greater risk of unemployment"; and "operate as a disincentive to the improvement of technology for new sources." H.R. Rep. No. 294, 95th Cong., 1st Sess. 197 (1977); 4 Leg. Hist. at 2654.

The National Coal Association took the lead in opposing the 0.55 lb. SO₂ ceiling. See supra note 86; CLEAN COAL/DIRTY AIR at 98-100.

See 657 F.2d at 388 n.437; CLEAN COAL/DIRTY AIR at 98-101.


657 F.2d at 347-51; CLEAN COAL/DIRTY AIR at 101 nn. 72, 73. Judge Wald stated that "the support in the record for selecting 70 percent as the magic percent-
rule incorporated a 70 to 90 percent variable control option partly to promote dry scrubbing technology in the West.92

The court of appeals assessed the reasonableness of EPA's variable control standard by examining, inter alia, the reliability of statistical models developed by EPA and its consultants to predict the long-term energy, economic, and emissions impacts of alternative RNSPS approaches;93 the legality of a variable control standard in light of section 111 and its legislative history;94 and the soundness of EPA's conclusion that the variable control option would promote the policies of the Clean Air Act.95 This last inquiry merits particular attention.

First, the court rejected the Sierra Club's argument that a variable control standard was inconsistent with the PSD and visibility protection policies of the Act.96 It found that EPA's variable control approach reduced emissions at least as well as any other option, including full scrubbing, and that a full control approach might simply shift several hundred thousand tons of SO2 emissions from the West to the East, at an incremental annual cost of over $1 billion.97 Furthermore, it recognized that the
PSD new source review process could force tighter emission standards under appropriate circumstances.98

Second, the court agreed with EPA that variable control accomplishes the purposes of the legislative history of section 111: elimination of the competitive advantage low-sulfur coal states enjoyed under the 1971 optional-scrubbing NSPS; maximizing the use of locally available fuels; and freeing low-sulfur coals for use in existing plants where it is more difficult to control emissions.99 It also upheld EPA's belief that the flexibility afforded by variable control "will promote a more 'balanced coal demand within the utility sector.'"100

B. Comparative Scrubber Cost and Energy Impacts

EPA had argued in Sierra Club that the variable control option was superior to a full control alternative because it "strikes the proper balance between environmental, economic, and energy considerations, whether or not wet scrubbing or dry scrubbing technology is used."101 The court agreed.102 The question Ackerman and Hassler pose, whether the 70 to 90 percent standard is inferior to 33 percent scrubbing with a 0.55 lb. emission ceiling, was not before the court.103

The advantages of variable over full scrubbing were documented in EPA’s macroeconomic studies. The advantages included:

1. Equivalent national emission rates in 1995;

<table>
<thead>
<tr>
<th>Coal Sulfur Content (lbs. SO2/MMBtu)</th>
<th>Coal Consumption for RNSPS Generating Plants, Alternative NSPS, 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 1.67</td>
<td>10.1 NSPS 1979 RNSPS 0.6 lb. 70%/0.8 lb.</td>
</tr>
<tr>
<td>1.68 and above</td>
<td>2.2 NSPS 1979 RNSPS 5.9 lb.</td>
</tr>
<tr>
<td></td>
<td>4.2 RNSPS 1979 RNSPS 5.9 lb.</td>
</tr>
<tr>
<td></td>
<td>2.4 RNSPS 1979 RNSPS 4.2 lb.</td>
</tr>
</tbody>
</table>

ICF, INC, ANALYSIS OF ALTERNATIVE NSPS REGULATIONS, supra note 59, Table I-11. See supra note 59 and accompanying table for definitions of alternative NSPS.

98 Id. at 339 (citing 44 Fed. Reg. at 33,584 (1979)).
99 Id. at 339-40.
100 Id. at 339 (citing 44 Fed. Reg. 33,580, 33,583). Recent EPA analyses of alternative emission standards confirm that the 1979 RNSPS will promote a balanced demand for low- and high-sulfur coals among new electric generating plants:

Coal Consumption for RNSPS Generating Plants, Alternative NSPS, 2000

<table>
<thead>
<tr>
<th>Coal Sulfur Content (lbs. SO2/MMBtu)</th>
<th>Coal Consumption for RNSPS Generating Plants, Alternative NSPS, 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 1.67</td>
<td>10.1 NSPS 1979 RNSPS 0.6 lb. 70%/0.8 lb.</td>
</tr>
<tr>
<td>1.68 and above</td>
<td>2.2 NSPS 1979 RNSPS 5.9 lb.</td>
</tr>
<tr>
<td></td>
<td>4.2 RNSPS 1979 RNSPS 5.9 lb.</td>
</tr>
<tr>
<td></td>
<td>2.4 RNSPS 1979 RNSPS 4.2 lb.</td>
</tr>
</tbody>
</table>

ICF, INC, ANALYSIS OF ALTERNATIVE NSPS REGULATIONS, supra note 59, Table I-11. See supra note 59 and accompanying table for definitions of alternative NSPS.

101 657 F.2d at 336.
102 Id. at 338.
103 Id. at 336 n.138.
(2) Smaller sludge disposal requirements;
(3) Greater coal-fired power plant capacity;
(4) A reduction of 200,000 barrels per day of oil consumption in 1995;
(5) A savings of roughly a half billion dollars in annualized costs in 1995; and
(6) Lower incremental control costs, $1.161 per ton of SO\textsubscript{2} under variable control versus $1.323 per ton for full control.\textsuperscript{104}

In sum, the court found that EPA's modeling efforts provided adequate support for variable scrubbing in light of the environmental, cost, and energy considerations required to be taken into account in NSPS rulemaking.\textsuperscript{105}

In contrast, Ackerman and Hassler favor EPA's earlier option of 33 percent scrubbing with a 0.55 lb. SO\textsubscript{2} emission ceiling.\textsuperscript{106} They argue that there are 30 billion tons of eastern low-sulfur coal that could be burned under a 0.55 ceiling, and that "[w]e will be well into the new century before the East confronts a serious supply problem—at which point Americans may well have found a better way of desulfurizing coal, thereby permitting the use of the remaining 160 billion tons for exploitation in the East."\textsuperscript{107}

The slender cost and emission reduction advantages\textsuperscript{108} that a 33 percent/0.55 ceiling standard might have over the 1979 RNSPS are sufficiently uncertain that EPA's reluctance to render 160 of 190 billion tons of eastern coal unfit for new plant use is

\textsuperscript{104} Id. at 336-38.
\textsuperscript{105} Id. at 338.
\textsuperscript{106} See CLEAN COAL/DIRTY AIR at 102.
\textsuperscript{107} Id. at 98.
\textsuperscript{108} Ackerman and Hassler cite 1979 data prepared for EPA by ICF, Inc. which indicated a $280 million incremental cost advantage in 1995 for a 0.55 lb. ceiling/33% scrubbing standard (incremental costs of $2.97 billion/yr. versus $3.25 billion/yr. for the RNSPS), and a slight 120,000 ton/SO\textsubscript{2} nationwide emission increase (20.57 million tons in 1995 for 0.55 lb. ceiling/33% scrubbing, versus 20.45 million tons for the RNSPS). Compared to the RNSPS, the 0.55 lb. standard would decrease SO\textsubscript{2} emissions east of the Mississippi by 190,000 tons in 1995, while increasing western SO\textsubscript{2} emissions by 310,000 tons. Id. at 102.

Compared to the optional-scrubbing 1971 NSPS, the RNSPS will increase scrubber-equipped generating capacity by 160,700 megawatts in 2000 (262,400 MW for the RNSPS versus 101,700 MW for the 1971 NSPS), and will increase national electricity rates by 1.23 percent. ALTERNATIVE NSPS, supra note 59, Table I-6 (1981).
understandable. This hesitation is comprehensible in light of the legislative history of section 111,109 and is quite sound in view of the difficult and imprecise art of economic forecasting.110

The focus upon electric utility costs that characterizes much of Clean Coal/Dirty Air affords little insight into the broader social, environmental, and economic issues raised by the 1979 RNSPS rulemaking. The bottom line of 33 percent scrubbing with a 0.55 lb. SO2 emission ceiling embraces far more than calculated utility investment, operating cost, and rate impacts. In this case, an overall national cost/benefit calculation, including factors such as direct and indirect employment dislocation costs in eastern high-sulfur coal areas, the environmental costs of concentrating many new strip mines in a relatively narrow area of central and southern Appalachia,111 and the full range of public infrastructure costs associated with this concentrated new mine development, should be required in major NSPS rulemaking proceedings.112 Clean Coal/Dirty Air's recognition that "the problem is of intergenerational dimension—the children of today's miners will work at new mines opened in response to changing demand patterns,"113 is no substitute for a comprehensive assessment of this type.

109 See supra note 87.
110 EPA Administrator Costle acknowledged the uncertainties inherent in the agency's statistical model: "The truth of the matter is that the model that we are using is a reasonably good model, but you can alter the outcome from that model dramatically by just simply changing a few key initial assumptions. . . ." 657 F.2d 332 n.116. See also Dewees, The Costs and Technology of Pollution Abatement, APPROACHES TO CONTROLLING AIR POLLUTION 291-334 (Friedlander ed. 1978).
111 Most low-sulfur eastern coal reserves are located in Virginia, southern West Virginia, eastern Kentucky, and Alabama. See Chapman & Wells, supra note 7, at 2-1 (Table 2-1).
112 Adverse environmental impacts from implementation of NSPS are to be taken into account by the Administrator. Essex Chemical Corp. v. Ruckelshaus, 486 F.2d 427, 433 (D.C. Cir. 1973), cert. denied, 416 U.S. 969 (1974). Under Portland Cement Ass'n v. Ruckelshaus, 486 F.2d 375 (D.C. Cir. 1973), cert. denied, 417 U.S. 921 (1974), NSPS promulgations are to be accompanied by an impact evaluation functionally equivalent to the detailed environmental impact statements required by the National Environmental Policy Act. 486 F.2d at 384. Because the 1979 RNSPS retained the 1.2 lb. SO2 emission ceiling, EPA did not have an opportunity to analyze the consequences of a 0.55 lb. ceiling.
113 CLEAN COAL/DIRTY AIR at 98.
C. *The 1.2 Pound Emission Ceiling*

When EPA promulgated the RNSPS, it announced that the 1.2 lb. SO$_2$ MMBtu emission ceiling had been retained since "the Administrator had to determine a level that was appropriate when a 90 percent reduction in potential emissions was applied to high-sulfur coals." The agency's analyses of coal sulfur content indicated that up to 30 percent of eastern high-sulfur coal reserves would require more than 90 percent scrubbing if the ceiling were set below 1.2 lb.

The Environmental Defense Fund (EDF) challenged the ceiling determination on procedural grounds, alleging that *ex parte* contacts involving EPA officials, industry groups, various executive branch personnel, and then-Senate Majority Leader Robert C. Byrd had tainted the Administrator's decision. EDF claimed that prior to these contacts, EPA had rejected all RNSPS options involving a 1.2 lb. ceiling. The court held that EPA's procedures during the post comment period, when the irregularities were alleged to have occurred, were lawful, and therefore it did not determine whether any alleged errors were of "central relevance" to the outcome.

---

115 Id.
116 657 F.2d at 386.
117 Id. at 396. The Clean Air Act authorizes the court of appeals to reverse the administrator only if it finds his action to be:

(A) arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law;

(B) contrary to constitutional right, power, privilege or immunity;

(C) in excess of statutory jurisdiction, authority, or limitations, or short of statutory right; or

(D) without observance of procedure required by law. . .

CAA § 307(d)(9), 42 U.S.C. § 7607(d)(9) (Supp. II 1978). The Act specifically limits the court's authority to reverse the administrator for procedural error:

In reviewing alleged procedural errors, the court may invalidate the rule only if the errors were so serious and related to matters of such central relevance to the rule that there is a substantial likelihood that the rule would have been significantly changed if such errors had not been made.

CAA § 307(d)(8), 42 U.S.C. § 7607(d)(8) (Supp. II 1978). The court of appeals reviewed all of the contacts EDF challenged, 657 F.2d at 397-410, and declined EDF's invitation to extend to EPA's informal rulemaking the restrictions on *ex parte* contacts applicable to formal rulemaking proceedings. 657 F.2d at 402 (citing Home
The procedural irregularities EDF challenged were mostly technical, such as EPA's failure to include in the rulemaking docket a summary of a meeting with Senate staff: "[w]e find no evidence that this oversight was anything but an honest [inadvertence]; furthermore, a briefing of this sort . . . is not the type of oral communication which would require a docket entry under the statute." As for the meetings involving EPA Administrator Costle and Senator Byrd, the court found "no persuasive evidence" that the criteria had been met for overturning the rule due to improper congressional pressure.


When dry scrubbing gained prominence at the last moment, EPA did not stop to invite yet another round of comments in the Federal Register. Similarly, the agency docket does not contain elaborate summaries of the discussions held between outsiders and agency officials . . . Nonetheless, we believe that judges should resist such formalistic temptations and sustain the agency's procedural handling of the case.

For a discussion of Sierra Club's implications for executive branch and congressional involvement in regulatory reform, see Sohn & Litan, Sierra Club v. Costle — Regulatory Oversight Wins in Court, REGULATIONS, July/August 1981 at 17.

118 657 F.2d at 404.

119 Id. at 409. The criteria developed in D.C. Fed'n of Civic Assocs. v. Volpe, 459 F.2d 1231 (D.C. Cir. 1971), cert. denied, 405 U.S. 1030 (1972), provided the court of appeals with the rule of decision in Sierra Club. First, the content of the congressional pressure upon Administrator Costle must have been "designed to force him to decide upon factors not made relevant by Congress in the applicable statute." Second, the Administrator's "determination must be affected by those extraneous considerations." 657 F.2d at 409.

An article in the Washington Post indicated that Senator Byrd may have strongly hinted he would withhold his support for the SALT Treaty and the windfall oil profits tax unless EPA retained the 1.2 lb. SO$_2$/MMBtu emission ceiling. 657 F.2d at 409 n.539 (citing Washington Post, May 5, 1979, at A-1). The court of appeals noted: "We do not believe that a single newspaper account of strong 'hint(s) represents substantial evidence of extraneous pressure significant enough to warrant a finding of unlawful congressional interference." Id. Rather, the court supported Senator Byrd's actions:

Americans rightly expect their elected representatives to voice their grievances and preferences concerning the administration of our laws. We believe it entirely proper for Congressional representatives vigorously to represent the interests of their constituents before administrative
The substantive underpinnings of the decision to retain the 1.2 lb. ceiling were straightforward. Taking into account conservative utility attitudes toward scrubber efficiency, EPA evaluated coal seam sulfur data and found that:

[A] significant portion (up to 22 percent) of the high-sulfur coal reserves in the Eastern Midwest and portions of Northern Appalachian coal regions would require more than a 90 percent reduction if the emission limitation was established below . . . (1.2 lb./million Btu) on a thirty-day rolling average basis.

Mindful of the legislative history of section 111, the Administrator also determined that a 1.2 lb. ceiling was appropriate because a “more stringent emission limit would be counter to one of the basic purposes of the 1977 Amendments, that is, encouraging the use of higher sulfur coals.”

D. The 90 Percent Removal Requirement

Electric utilities argued in *Sierra Club* that EPA could not support its finding that 90 percent sulfur removal was achievable on high-sulfur coals. EPA maintained that scrubbing and coal washing could achieve the 90 percent standard even in the most difficult cases. The utilities counter-argued that EPA’s promulgation was based on 90 percent removal by scrubbers alone, and that it was procedurally improper for EPA to claim that the standard could be met by a combination of scrubbing and coal agencies engaged in informal, general policy rulemaking, so long as individual Congressmen do not frustrate the intent of Congress as a whole as expressed in statute, nor undermine applicable rules of procedure. *Id.* at 409. But see *Clean Coal/Dirty Air* at 114. Ackerman and Hassler state: The problem with Byrd’s intervention was not procedural but substantive. . . . The agency was wrong to listen to Byrd for the same reason it was wrong to allow the rhetoric of the House committee report to narrow its scrubbing inquiry. The cave-in before a powerful Senator only dramatizes the danger of moving beyond the text of an agency-forcing statute.

*110 See 44 Fed. Reg. 33,580, 33,596 (1979).* The EPA assumed that “utilities would purchase coal that would provide a 10 percent margin below the emission limit” and that utilities would prefer to buy washed high-sulfur coal which could meet the 90 percent reduction requirement through 85 percent scrubbing. *Id.*

*111 Id.*

*112 Id.*

*122* 657 F.2d at 356.

*114 Id.*
washing.\textsuperscript{125} EPA prevailed on the latter count,\textsuperscript{126} but was hard pressed to justify the 90 percent standard.

EPA advanced a three-stage argument in support of the 90 percent removal requirement: (1) a long-term median sulfur dioxide removal of 92 percent can be achieved by scrubbers alone; (2) when 92 percent long-term median removal efficiency is adjusted to account for scrubber performance variability, an average SO\textsubscript{2} reduction of 86-89 percent results; and (3) scrubbers operating at these performance levels could achieve the 90 percent standard in conjunction with other sulfur removal methods such as coal washing.\textsuperscript{127}

Data from operating scrubbers offered inconclusive support for EPA's contentions about long-term median performance. Much of the data had been obtained from plants equipped with unconventional (magnesium oxide, sodium-based double alkali, or Wellman-Lord) scrubbers rather than typical lime/limestone systems.\textsuperscript{128} The standard allegedly could be met by conventional lime/limestone systems.\textsuperscript{129} EPA had test data from only two lime/limestone systems, and it argued that the long-term 92 percent median removal efficiency could be interpolated from the performance of these two systems and from data of nonlime Japanese and United States units burning low-sulfur coal.\textsuperscript{130} The court disagreed.\textsuperscript{131}

EPA's 92 percent long-term median removal finding was finally upheld on the strength of three factors. First, reports in the record reviewed "in great detail the kind of changes in future scrubbers that could be expected to increase their performance."\textsuperscript{132} Second, there was evidence that scrubber vendors routinely guaranteed 90 percent removal, and the record included a comment from the Industrial Gas Cleaning Institute indicating that its membership could meet 92 percent long-term median removal.\textsuperscript{133}

\textsuperscript{125} Id.
\textsuperscript{126} Id. at 358.
\textsuperscript{127} Id. at 360.
\textsuperscript{128} Id. at 362.
\textsuperscript{129} Id.
\textsuperscript{130} Id. at 363.
\textsuperscript{131} Id. "We agree that splitting the difference between data for lime scrubbers treating high sulfur coal exhaust and the data for nonlime/limestone systems treating low sulfur coal is an unacceptable method. . . ."
\textsuperscript{132} Id.
\textsuperscript{133} Id. at 364.
Finally, the court looked to the prospective, technology-forcing character of the Clean Air Act in general, and NSPS in particular, and upheld EPA's judgment "that the standard can be set at a level that is higher than has been actually demonstrated over the long term by currently operating lime scrubbers at plants burning high sulfur coal."  

The record offered better support for EPA's data on scrubber variability, and the achievability of the 90 percent removal standard by a combination of high-sulfur coal washing and scrubbing. The court thus sustained the 90 percent removal requirement for high-sulfur coal.  

V. RNSPS IN RETROSPECT  

Judge Wald's conclusion in Sierra Club is an able summary of the seven-year struggle over scrubber requirements for new coal-fired power plants:  

Since the issues in this proceeding were joined in 1973 when the Navajo Indians first complained about sulfur dioxide fumes over their Southwest homes, we have had several lawsuits, almost four years of substantive and procedural maneuvering before the EPA, and now this extended court challenge....  

We reach our decision after interminable record searching (and considerable soul searching). We have read the record with as hard a look as mortal judges can probably give its thousands of pages. We are not engineers, computer modelers, economists or statisticians, although many of the documents in this record require such expertise — and more.  

Cases like this highlight the critical responsibilities Congress has entrusted to the courts in proceedings of such length, complexity and disorder. Conflicting interests play fiercely for enormous stakes, advocates are prolific and agile, obfuscation runs high, common sense correspondingly low, the public intent is often obscured.  

We cannot redo the agency's job; Congress has told us, at least in proceedings under this Act, that it will not brook reversal for small procedural errors; Vermont Yankee reinforces the

---

134 Id.  
135 Id. at 364-67.  
136 Id. at 367-73.  
137 Id. at 373.
admonition. So in the end we can only make our best effort to understand, to see if the result makes sense, and to assure that nothing unlawful or irrational has taken place. In this case, we have taken a long while to come to a short conclusion: the rule is reasonable.135

VI. CONCLUSION

Since Sierra Club was decided, the electric utility industry has decided to press its appeal in Congress rather than the Supreme Court.139 Several NSPS reforms are being encouraged by various groups. These groups urge the repeal of the percentage reduction requirement of section 111;140 a statutory reduction of the 90 percent RNSPS removal requirement for high-sulfur coal;141 10-year protection from additional emission control requirements for NSPS sources;142 establishment of promulgated NSPS as uniform federal emission limitations for new sources in PSD and nonattainment areas;143 and revision of the effective date for NSPS from the date of proposal to the date of their promulgation.144

In addition, the NCAQ and industry groups have marshaled many arguments against the current PSD program, particularly the PSD increments for Class II and Class III areas.146 Visibility protection requirements for Class I national parks and wilderness areas also have attracted criticism due to potential conflicts with western energy development.146

135 Id. at 410 (footnotes omitted).
139 Court sends NSPS battle back to Congress, COAL OUTLOOK, May 4, 1981.
140 Edison Electric Institute, Necessary Clean Air Act Amendments Affecting Stationary Sources (1981) [hereinafter referred to as Edison Electric Institute].
141 This approach has been proposed by Representative James T. Broyhill (R-N.C.). See supra note 2 and accompanying text.
143 Nat'l Envtl. Dev. Ass'n.
144 E.g. Edison Electric Institute at 6; Clean Air Act Position Paper at 10.
146 See supra notes 2, 55, 142-143.
147 E.g. Nat'l Envtl. Dev. Ass'n at 15-16; The Business Roundtable, Position Paper on the Clean Air Act Visibility Program (1981); Western Energy Supply
It is now recognized that stringent new source emission controls can accomplish the objectives of the PSD policy in Class II and III areas. Continued reliance on emission controls can justify elimination of much of the procedural complexity that has characterized the PSD permitting process. Similarly, case-by-case reviews for best available control technology can mitigate adverse air quality impacts at Class I parks and wildernesses.

In theory, elimination of the percentage reduction provision of section 111 and the Class II PSD increments could enable many new coal-fired electric generating plants to avoid the use of scrubbers by burning low-sulfur coal. In practice, however, only low-sulfur eastern plants may be able to avoid scrubbers in this manner unless fundamental changes also are made to the Act's Class I area air quality protections. But even if such changes occur, most western states independently require scrubbers on new coal-fired plants.

The impact of proposed NSPS and PSD relaxations on eastern


147 NCAQ REPORT, supra note 31, at 2.1-34 (NCAQ findings 148, 150).
148 Id. at 2.2-12-15 (NCAQ recommendations 66, 68-70, 72).
149 Id. at 2.1-33 (NCAQ finding 147).
150 The air quality related values/visibility test of section 165(d) would require full scrubbing on nearly all new western power plants to minimize adverse visibility impacts at western Class I areas. See supra note 36 and accompanying text.
151 SCENARIO SPECIFICATIONS, supra note 68, at 3-32. ICF indicates the following emission limits (lb. SO2/MMBtu) for western states under the 1971 NSPS (optional-scrubbing) and 1979 RNSPS (forced scrubbing), respectively:

<table>
<thead>
<tr>
<th>State</th>
<th>1971 NSPS</th>
<th>1979 RNSPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montana</td>
<td>1.2/0.61*</td>
<td></td>
</tr>
<tr>
<td>Wyoming</td>
<td>0.2/0.2*</td>
<td></td>
</tr>
<tr>
<td>Idaho</td>
<td>1.2/1.0</td>
<td></td>
</tr>
<tr>
<td>Colorado</td>
<td>0.4/0.4*</td>
<td></td>
</tr>
<tr>
<td>New Mexico</td>
<td>0.34/0.34*</td>
<td></td>
</tr>
<tr>
<td>Utah</td>
<td>1.2/1.0</td>
<td></td>
</tr>
<tr>
<td>Arizona</td>
<td>0.8/0.69*</td>
<td></td>
</tr>
<tr>
<td>Nevada</td>
<td>1.2/0.20*</td>
<td></td>
</tr>
<tr>
<td>California</td>
<td>0.13/0.13*</td>
<td></td>
</tr>
<tr>
<td>Washington</td>
<td>1.2/1.0</td>
<td></td>
</tr>
<tr>
<td>Oregon</td>
<td>1.2/1.0</td>
<td></td>
</tr>
</tbody>
</table>

*More stringent state law.
utility emissions would hinge upon changes in the NSPS SO2 emission ceiling. Under the current 1.2 lb. ceiling, elimination of the Class II and III PSD increments and universal scrubbing requirements clearly would increase eastern utility SO2 emissions relative to the status quo. Many new generating units would be designed to meet the 1.2 lb. standard through low-sulfur coal alone; others would use locally-available high-sulfur coal and scrubbers. The recent escalation of unit train freight costs suggests that few nonscrubber units would be constructed in high-sulfur coal areas. According to EPA's 1981 projections, reversion to the 1971 optional-scrubbing NSPS with a 1.2 lb. ceiling would increase eastern electric utility SO2 emissions by 1.1 million tons by the year 2000.

Other EPA projections indicate that SO2 emissions from RNSPS units will total just 1.1 million tons in 1995, or 6 percent of aggregate utility SO2 emissions of 19.3 million tons. By the year 2010, however, when total national utility SO2 emissions should be trending downward, RNSPS units would contribute 6.0 million tons (34 percent) of the 17.4 million ton total utility SO2 output. Over three-quarters of these 6.0 million tons (4.6 million tons) would be emitted by RNSPS units in the 31-state East. If the RNSPS were relaxed to allow new power plants to meet a 1.2 lb. SO2 emission ceiling by low-sulfur coal alone, total eastern utility emissions could increase during the years 2000-2010.

152 See 44 Fed. Reg. 33,580, 33,609 (1979). EPA/ICF estimated in 1979 that 70-71 million tons of western coal would be shipped to the East in 1995 under the 1979 RNSPS, compared to 99-122 million tons under the 1971 optional-scrubbing NSPS. Id. EPA/ICF's 1981 estimates indicate that 58 million tons of western coal will be shipped East in 1995 under the 1979 RNSPS, compared to 73 million tons with the 1971 NSPS. ALTERNATIVE NSPS, supra note 59 at Table 1-13.

153 See supra note 59.

154 ICF, INC., ALTERNATIVE STRATEGIES FOR REDUCING UTILITY SO2 AND NOx EMISSIONS — EXECUTIVE SUMMARY 1, 7 (1981) (draft report prepared for Argonne National Laboratory, U.S. Department of Energy and U.S. Environmental Protection Agency) [hereinafter cited as ALTERNATIVE STRATEGIES]. ICF emission data cited here are base case projections that assume no change in current Clean Air Act programs.

155 Id. ICF's base case national utility SO2 emissions are as follows: 1979, 18.2-18.7 million tons; 1985, 18.5 million tons; 1990, 18.9 million tons; 1995, 19.3 million tons; 2000, 20.1 million tons; 2010, 17.4 million tons.

156 Id.

157 Id. at 7, 11.
reversing the downward emissions trend anticipated for this period.\textsuperscript{158}

Emission considerations such as these may lead Congress to reject industry arguments for elimination of section 111's percent reduction requirement. In the House of Representatives, the bipartisan Luken-Dingell-Broyhill Clean Air Act bill would modify section 111 only to ensure that percent reduction is not extended to industrial boilers.\textsuperscript{159} As of this writing (February 1982), the Senate Environment and Public Works Committee has not produced a comprehensive Clean Air Act bill. However, there is support on this committee for NSPS reforms,\textsuperscript{160} as well as for a strong acid rain control program.\textsuperscript{161} The ingredients thus are present in the Senate for an acid rain/NSPS compromise, trading relaxed NSPS requirements for tighter emission controls at existing plants.

Although several studies have examined the coal market and electric utility cost impacts of NSPS reforms and acid rain control strategies,\textsuperscript{162} no attempt has yet been made to assess the implications of an acid rain/NSPS compromise. Each component of this package would tend to reduce utility demand for high-sulfur coals from northern Appalachia and the Midwest, and to stimulate higher prices and production in the low-sulfur producing areas of the West and central and southern Appalachia.\textsuperscript{163} While the

\begin{itemize}
\item \textsuperscript{158} ALTERNATIVE STRATEGIES, supra note 154, indicates base case eastern utility $\text{SO}_2$ emissions of 17.2 million tons in the year 2000, dropping to 14.6 million tons in the year 2010. \textit{Id.} at 11, table 2.
\item \textsuperscript{159} H.R. 5252, 97th Cong., 1st Sess. \S 103 (1981).
\item \textsuperscript{160} Senators Alan Simpson (R-WY), Pete Domenici (R-NM) and Steven Symms (R-ID) are the major proponents of section 111 reform on the Senate Environment & Public Works Committee.
\item \textsuperscript{162} See supra notes 68, 100, 154 and references therein.
\item \textsuperscript{163} ALTERNATIVE STRATEGIES, supra note 154. The study estimated the impact of several acid rain control measures on state and regional coal production and West-to-East coal shipments. The following indicates potential impacts in major eastern high-sulfur coal producing states:
\end{itemize}
Timing and magnitude of these impacts are uncertain,\textsuperscript{164} the com-

<table>
<thead>
<tr>
<th>Coal Production Under Alternative Acid Rain Control Strategies, Various States, 1990 (Millions of tons/percent change from base case)</th>
<th>1990 Base Case Production</th>
<th>30% SO\textsubscript{2} Rollback\textsuperscript{a}</th>
<th>4 lb. SO\textsubscript{2} Ceiling\textsuperscript{b}</th>
<th>2 lb. SO\textsubscript{2} Ceiling\textsuperscript{c}</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>Tons</td>
<td>% Chg.</td>
<td>Tons</td>
<td>% Chg.</td>
</tr>
<tr>
<td>Ohio</td>
<td>51</td>
<td>-29</td>
<td>42</td>
<td>-18</td>
</tr>
<tr>
<td>Kentucky, West</td>
<td>53</td>
<td>-9</td>
<td>50</td>
<td>-6</td>
</tr>
<tr>
<td>Illinois</td>
<td>80</td>
<td>-21</td>
<td>66</td>
<td>-18</td>
</tr>
<tr>
<td>Indiana</td>
<td>41</td>
<td>-5</td>
<td>41</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>225</td>
<td>-17</td>
<td>199</td>
<td>-12</td>
</tr>
<tr>
<td>Western coal to East</td>
<td>81</td>
<td>25</td>
<td>91</td>
<td>12</td>
</tr>
</tbody>
</table>

\textsuperscript{a.} Thirty percent rollback for 31-state eastern region.
\textsuperscript{b.} All sources subject to a 4.0 lb. SO\textsubscript{2}/MMBtu emission ceiling.
\textsuperscript{c.} All sources subject to a 2.0 lb. SO\textsubscript{2}/MMBtu emission ceiling.

\textit{Id.}, tables 20-21.

ICF's analysis of alternative NSPS also indicates substantial regional production impacts associated with possible NSPS reforms, although major changes do not occur until the year 2000:

<table>
<thead>
<tr>
<th>Coal Production Under Alternative NSPS, 2000 (Millions of tons/percent change from base case)</th>
<th>2000 Base Case\textsuperscript{a} Production</th>
<th>1.2 lb. Ceiling</th>
<th>0.6 lb. Ceiling</th>
<th>70%/0.8 lb.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Region</td>
<td>Tons</td>
<td>% Chg.</td>
<td>Tons</td>
<td>% Chg.</td>
</tr>
<tr>
<td>Northern Appalachia</td>
<td>383</td>
<td>-14</td>
<td>371</td>
<td>-3</td>
</tr>
<tr>
<td>Midwest</td>
<td>344</td>
<td>-28</td>
<td>297</td>
<td>-14</td>
</tr>
<tr>
<td>Subtotal</td>
<td>727</td>
<td>-21</td>
<td>668</td>
<td>-8</td>
</tr>
<tr>
<td>Central and Southern Appalachia</td>
<td>362</td>
<td>19</td>
<td>393</td>
<td>9</td>
</tr>
<tr>
<td>West\textsuperscript{b}</td>
<td>713</td>
<td>14</td>
<td>741</td>
<td>4</td>
</tr>
<tr>
<td>Western coal to East</td>
<td>63</td>
<td>97</td>
<td>85</td>
<td>35</td>
</tr>
</tbody>
</table>

\textsuperscript{a.} With 1979 RNSPS.
\textsuperscript{b.} Northern Great Plains, Rocky Mountains, and Southwest.

\textbf{ALTERNATIVE NSPS}, note 59, table 1-13. \textit{See supra} note 59, for definitions of alternative NSPS.

\textsuperscript{164} A crucial determinant of the long-term impact of an acid rain/NSPS com-
bination of weaker new source standards and tighter existing source controls could have serious adverse consequences for the eastern high-sulfur mining industry. It is by no means clear that section 125 of the Act, the "local coal protection" provision added by the 1977 CAA Amendments, could be invoked successfully to mitigate resulting high-sulfur market losses.\textsuperscript{165}

If Congress elects to defer acid rain controls until additional research on this phenomenon has been completed, but decides to eliminate most of the PSD increment program, then repeal of percent reduction requirements for electric utilities would pose a difficult policy dilemma: a decision to allow new power plants to avoid the use of scrubbers by using low-sulfur coal under a 1.2 lb. $\text{SO}_2$ emission ceiling could be attacked as a retreat from the policy to prevent significant deterioration of air quality, and as an affront to Canada and the Northeast. Conversely, a decision to lower the $\text{SO}_2$ emission ceiling to the point necessary to match emission rates under the RNSPS could preclude major portions of eastern high-sulfur coal reserves from the future electric generating market.

Finally, even an aggressive acid rain control program might not provide a dependable vehicle for the relaxation of section 111. Coal interests in the Midwest and northern Appalachia would be sure to oppose a weakening of section 111 since the prospective loss of new source markets would exacerbate acid rain-related market losses at existing sources (mainly due to fuel switching). Existing sources could potentially lose from an acid rain/NSPS compromise, because each ton of emission increases from NSPS

promise on the eastern high-sulfur coal industry would be utility economic rationality. If utilities behave as cost-minimizers, increased low-sulfur coal prices stimulated by acid rain control and NSPS reform would improve the cost-effectiveness of scrubber retrofits at existing plants burning high-sulfur coal, as well as the economics of scrubbers at new units in high-sulfur coal areas. ICF has estimated that "the differential in the delivered cost of low-sulfur coal would have to be about $0.50/10^6$ Btu higher than the delivered cost of high-sulfur coal . . . before RNSPS plants would opt to use scrubbers and burn high-sulfur coal [assuming reversion of the 1971 1.2 lb. NSPS].\textit{Alternative NSPS, supra} note 59, at 1-10, -15. For the current RNSPS and a 0.6 lb. $\text{SO}_2$ emission ceiling standard, "a considerable narrower price differential between the delivered cost of low and high-sulfur coal would induce RNSPS plants to shift to higher sulfur coals."\textit{Id.} at 1-10, 15. Similar microeconomic decisions would confront existing sources faced with acid rain-related emission cutbacks.

\textsuperscript{165} See, e.g., Friedman, \textit{Clean Air Act Proceedings Affecting National Coal Markets — An Examination of the Authority of the President to Allocate Markets}, 82 W. VA. L. REV. 867 (1980).
relaxations would have to be offset by an additional ton of reductions at existing sources to achieve a given level of net emission reductions. Political considerations traditionally favor the imposition of strict environmental controls at future facilities over a tightening of standards for existing plants. Consequently, Congress may choose to leave section 111 essentially intact, even in the context of an acid rain-related emission rollback program.