

## Clean Coal/ Dirty Air/ Trading Filth (A)<sup>1</sup>

A few months after the first Earth Day, April 22, 1970, Congress passed and President Nixon signed the Clean Air Act Extension of 1970, which, for the first time, gave the federal government a major role in controlling air pollution. This case is concerned with how the federal government dealt with the emission of sulfur dioxide (SO<sub>2</sub>) from coal-fired electric generating stations.

### The 1970 Act and the EPA

Before 1970, environmental protection was principally a matter for the states, rather than the federal government. Environmentalists argued that the typical state agency was badly understaffed and lacked sufficient expertise, so that it could not even pretend to understand the environment it was trying to regulate. Moreover, even though state agencies frequently took the form of independent commissions, not under the governor's direct control, their membership was often dominated by the very interests that had most to gain from pollution. (State public utility commissions were among the first agencies created on this model, intended to be expert and above politics.)

In response to this perception, the 1970 Act placed primary responsibility on a single Environmental Protection Agency (EPA) Administrator situated within the executive branch. It required the Administrator to set quantitative clean air targets that would "protect the public health" while allowing for an "adequate margin of safety" and to reach these targets by 1977 at the latest. These National Ambient Air Quality Standards or NAAQS are periodically revised in light of new information.

Once having set air quality targets, the next step was to define the best means of achieving the clean air targets by 1977. As far as *existing power plants* were concerned, Congress required that state-level administrators develop State Implementation Plans (SIPs). The binding federal constraint was that, taken together, polluters within each airshed had to reduce emissions sufficiently to bring local conditions into compliance with the NAAQSs. Because different airsheds had different air quality and contain different polluters with different cleanup costs, various SIPs required old plants to reduce their SO<sub>2</sub> discharges by widely varying amounts.

So far as *new power plants* are concerned, the Act's provisions for new source performance standards (NSPS) required all plants of the same type, regardless of their location, to meet the same emission ceiling for each pollutant. The EPA Administrator was required by section 111 to set emissions standards that could be satisfied by the "best system of emission reduction which (taking into account the cost of achieving such reduction) the Administrator determines has been adequately demonstrated."

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This insistence on better performance from new plants makes some sense. Old plants, after all, had often been designed with little or no thought to pollution control. New limitations would often require expensive retrofitting, and the costs of retrofitting might vary enormously from plant to plant. In contrast, new plants could be designed from the start to take pollution reduction into account. But by lifting the NSPS process out of the general effort to tailor cutback requirements for existing plants to local environmental goals, the Act made it easier for policymakers to tighten NSPSs without regard to environmental benefits.

### **The 1971 NSPS Decision**

In deciding on an NSPS for coal-fired powerplants in 1971, the EPA had to deal with a pair of ambiguous features of the Act. First, there is the instruction that the Administrator take cost "into account" in making his decision. Does the Act require contemplation of cost figures in the abstract, or does it allow an assessment of the net costs generated by a control system after its environmental benefits have been taken into consideration? Second, a proposed system must be "adequately demonstrated" before it becomes the basis for a cleanup requirement. This phrase suggests that the EPA could have relied on new cleanup technologies that had been "demonstrated" in pilot plants and taken the risk that they might fail to work effectively when deployed at scale, or it could have satisfied itself with well-established technologies that had already been deployed at scale, and thereby lessened incentives to innovate. But could it set a schedule of increasingly tough requirements over an extended period to stimulate innovation?

In any case, the agency did not address these questions. Instead, it read the language in section 111 as if a standard could be established on the basis of a narrow engineering judgment. In the early 1970s there existed two methods for reducing SO<sub>2</sub> emissions from coal-fired plants: physical coal cleaning, or "washing," and flue gas desulfurization, commonly known as "scrubbing." Physical coal cleaning removes sulfur from coal before the coal is burned. Freshly-mined coal is crushed, passed through a screen, and wetted, so that heavy, sulfur-bearing fragments settle out. This inexpensive process does not remove sulfur that is chemically bonded to the coal, but it can remove from 20 to 40 percent of the sulfur initially present. The alternative technology, scrubbing, depended on the maintenance of a large-scale chemical reaction in a structure constructed next to the powerplant that requires continuous on-site supervision. Although the early scrubbers available in 1971 (only 3 were in operation) removed about 75 percent of the SO<sub>2</sub> in flue gases, they were prone to frequent breakdowns.

Thus the EPA squarely faced the problem of how to trade off certainty and economy against incentives for further technological development. Rather than dealing directly with this problem, the agency focused its attention on the question whether the scrubber was practically available in some engineering sense, that is, whether scrubbers could be made operational in the near future. On the basis of this work, the Administrator determined that the capacity of scrubbers to eliminate about 70 percent of a coal-burner's sulfur oxides had been adequately demonstrated and proceeded to the task of translating this engineering judgment into regulatory policy.

At this point the agency had to confront the fact that before the Administrator could tell the industry how many pounds of SO<sub>2</sub> a plant could emit for each million BTU (MBTU) of energy it produced, it had to determine the amount of sulfur originally in the coal that the plant burned. But America's coal reserves ranged from one to more than ten pounds in sulfur content. To make matters even more difficult for the Administrator, these coals were distributed unevenly

throughout the coal-producing regions. Roughly half of the nation's reserves lay west of the Mississippi in the Northern Great Plains and Rocky Mountain regions, and consisted largely of low sulfur coal. Eastern reserves primarily from the Midwest and the Appalachians-contained much higher proportions of higher sulfur coal.

It is not possible to multiply a constant percentage removal by a variable initial sulfur content to yield a single nationwide numerical ceiling on power plant emissions. Moreover, although the statute directed the Administrator to look at the “best system” in defining applicable emissions standards, it did not authorize him to force polluters actually to install that system if they could meet the limit in some other way. Thus, whatever ceiling the Administrator might set, polluters might find it cheaper simply to burn low sulfur coal than to install scrubbers. The threat of a massive shift to lower sulfur coal would, in turn, generate significant losses for and thus powerful political pressures from the Eastern producers of high sulfur coal.

In its initial 1971 decision, the agency simply announced a ceiling and made a few casual remarks in its support. The numerical ceiling for emissions was set at 1.2 pounds of SO<sub>2</sub> per MBTU. In support, it was simply stated that this ceiling would permit Eastern plants to scrub the average coal, which was said to contain about 4 pounds of sulfur per MBTU ( $[1 - 0.70] \times 4 \text{ lb} = 1.2 \text{ lb}$ ). At the same time, the agency recognized that utilities might respond to this ceiling by burning 1.2 pound coal rather than burning coal with more sulfur and installing a scrubber. The regulation simply stated that burning low sulfur coal could be used to satisfy the new standard.

To be clear, it was not as though EPA devoted much attention to the New Source Performance Standard (NSPS). In 1971, it was an infant agency confronting a clear congressional deadline requiring it to reach specified clean air targets by 1977. If the EPA were to reach these targets, its prime problem was to get the states to induce existing polluters to cut back on existing pollution, not to plan for new plants that would come on line in 1980 or 1990.

When the 1.2 pound standard was appealed by the utility industry<sup>2</sup>, the District of Columbia Circuit court found that EPA had failed to take account of the sludge generated by a typical scrubbing operation. The standard was remanded to the EPA with the instruction that it consider this solid waste problem. However, the agency merely re-promulgated its original NSPS standard, this time declaring explicitly that it had taken sludge into account.

### **Influencing the Next Agenda**

Soon after the 1971 NSPS was announced, one chapter of the Navajo tribe sued EPA, contending that the standard did not adequately control the complex of massive coal-burning facilities located near Four Corners, Arizona. Because low sulfur coal was readily available in the Southwest, the plants would be able to meet the 1.2 pound standard without scrubbing. The Navajo tribes argued that the EPA should nonetheless require the plants to install scrubbers.

If scrubbing were generally required, Southwestern power plants would nonetheless use Western low sulfur coal because, taking into account shipping costs, it was by far the cheapest coal available. But in the East and Midwest, many plants would have a choice between nearby

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<sup>2</sup> The Administrative Procedures Act, passed in 1946, empowers federal courts to invalidate any federal regulation if it is found to be "arbitrary and capricious, an abuse of discretion, or otherwise not in accordance with the law." The Clean Air Act also requires reversal of a decision that is found to be "in excess of statutory jurisdiction, authority, or limitations, or short of statutory right." Major environmental regulations are almost always challenged in court by one or more interest groups, sometimes for opposite reasons.

high sulfur coal and more distant low sulfur varieties. If the emissions ceiling remained at 1.2 and scrubbing were also required, these utilities would lose all economic incentive to pay the costs of shipping low sulfur coal. Instead, they would use their percent scrubbers on the high-sulfur coal available nearby. The Navajo suit was highly visible but ultimately unsuccessful.

Other highly visible battles concerned emissions from existing coal-fired plants. If the Act's NAAQS were to be met, many of these plants would have to cut their emissions substantially, but under the law, each plant's lawful emissions could be determined only after a state agency had calculated the cutback required to assure regional compliance with the ambient standards for SO<sub>2</sub>. Those calculations could be challenged in court.

Moreover, utilities, predictably, tried to minimize the cost of the changes required of them. Instead of building scrubbers or burning low sulfur coal, they proposed to reduce their effective contributions to the *local* sulfur oxide problems by building "tall stacks," up to 1000 feet high. And to respond to the temporarily higher SO<sub>2</sub> concentrations created by inversions or other unfavorable meteorological conditions, the utilities proposed an "intermittent control strategy." They would hold a reserve of low sulfur fuels to burn during inversions or bring their cleanest plants on line first.

Environmentalists argued that tall stacks would improve local conditions only at the expense of more distant regions. They also opposed "intermittent controls," which imposed significant burdens on future efforts to monitor compliance. Environmental groups brought suit to challenge the legality of the utilities' strategies under the Clean Air Act and came to emphasize mandatory scrubbing as their preferred remedy for utility foot-dragging, while the utilities insisted that scrubbers were unreliable. The scrubber "solution" was thus present in the minds of policymakers when the NSPS was again considered.

### **The 1976 Maneuvers**

By 1976, most areas of the nation rarely experienced violations of the NAAQS for SO<sub>2</sub>. But Congress did not ask whether the SO<sub>2</sub> emissions standard needed to be changed. And the treatment of new coal-burning plants did not emerge directly upon the legislative agenda. Instead, it emerged as an issue as congressional staffers grappled with a far more pressing issue: the treatment of the "clean air regions."

Although the 1970 Act had established minimum air quality objectives for the nation, many areas in the nation already enjoyed air far cleaner than the Act required. The 1970 Law did not clearly address these areas. In these areas, did the 1970 Act allow pollution up to the minimum standards? When EPA began to approve SIP's that permitted power plants to degrade clean air regions, the Sierra Club challenged the legality of this decision, and it won in court.

Thus unless Congress amended the Act, the EPA could not approve state plans which permitted increases in the levels of pollutants in clean air areas. This would have been a serious obstacle to Western economic development. House staffers working under Congressmen who supported the protection of clean air areas turned to the solution advanced by the Navajos: a scrubbing requirement for all new plants. Even if the Act was amended to allow the EPA to permit pollution to increase in clean air areas, requiring all new coal-burners to scrub would at least provide some protection to clean air regions.

As noted above, the 1970 version of section 111 directed the Administrator to set performance standards that reflected "the degree of emission limitation achievable through the

application of the best system of emission reduction." The 1976 House committee proposal required a standard that "reflects the degree of emission reduction achievable through the application of the best technological system of continuous emission reduction." On its face this language would also seem to permit reliance on low-sulfur coal to control emissions. The House committee report, however, explicitly stated that scrubbing or some other "add-on" technology would be required of all new coal-burners.

Eastern coal interests were predictably receptive this "new" NSPS proposal. If Eastern utilities were forced to install scrubbers, it would be possible for them to meet the 1.2 NSPS while continuing to buy cheap high sulfur coal. It was only if utilities remained free to substitute low sulfur coal for scrubbers that a shift away from high sulfur coal was even conceivable. Thus, it made sense for the dirty coal producers to abandon their campaign to weaken pollution standards and support the costliest possible clean air solution: universal scrubbing. In so doing, they abandoned their traditional alliance with utilities, who wanted to minimize the expense of pollution control requirements.

Though controversies over existing plants and clean air regions predisposed public interest lawyers favorably toward the scrubber, leading environmental lawyers were aware of the heavy costs of imposing particular technologies on industry rather than permitting them to search out the cheapest way of meeting emission requirements. Rather than explicitly campaigning for simply reducing the 1971 emissions standard, however, public interest lawyers embraced the dirty coal rhetoric. For example, Joseph Brecher, on behalf of the Sierra Club, condemned the 1971 standard because "eastern high sulfur coal, which is now available, is having a hard time getting a market because of the comparative cheapness of bringing in western low sulfur coal." This was unusual because environmentalists typically do not protest when a government initiative forces industry to discard "dirty" inputs and substitute "clean" ones.

Throughout the subsequent 1976 legislative process the partisans of scrubbing had no incentive to enlarge the debate on this issue. And because the utility industry concentrated its assault against protection for "clean air" areas, no significant lobby invested resources in documenting the shaky relationship between universal scrubbing and any of the aims that Congress was considering. Revision in the language of section 111 via rarely examined committee report language passed through the House untouched, and the Senate committee saw no need to include any revision of section 111 in its proposals. The House amendment to section 111--with its report language--was included in the bill that emerged from conference. At that point, however, the conference measure encountered determined opposition from Western industry and automakers and, in response to a threatened filibuster, the controversy was shelved until the following session.

### **The 1977 Amendments**

In 1977, a new Congress and a new President still faced the need to amend the Clean Air Act. But the "energy crisis" had replaced the "environmental crisis" as the central problem on President Carter's domestic agenda. Independence from foreign oil in electricity generation could be purchased only by burning more domestic coal. Yet, to make coal burning politically acceptable, the administration would have to deal with environmental anxieties. Recent congressional history suggested that promoting scrubbing would be an easy way to convert a dangerous opponent into a formidable ally.

Not that the administration was ignorant of the costs of scrubbing or the regional interests involved. But billions of dollars in costs appeared insignificant in the context of comprehensive energy planning, especially when scrubbing promised great political benefits. Universal scrubbing was therefore attached, as an environmental safeguard, to the steps in the energy plan that were intended to encourage utilities to increase their use of coal. Because scrubbing was now part of the administration's comprehensive energy plan, it was no longer appropriate for the EPA, or anybody else in the executive, to ask hard questions about the relationship of scrubbing to any of the environmental goals before Congress as it prepared 1977 clean air legislation.

In 1977 the House-passed bill contained the 1976 version of section 111 and the accompanying report language, but the Senate bill proposed no change in section 111. The conference committee was mainly concerned with other issues, so the fate of section 111 was mainly in the hands of staff. Senate staffers generally opposed scrubbing and added a new subsection stating that unless it is "not feasible" to permit polluters to choose, the Administrator may not require a particular "design, equipment, work practice, or operational standard." But House staffers inserted language to the effect that although the Administrator was to set an emission limit, an acceptable power plant standard also had to require

the achievement of a percentage reduction in the emissions from such category of sources from the emissions which would have resulted from the use of fuels which are not subject to treatment prior to combustion.

That is, the Administrator must not only require a power plant to discharge no more than X pounds of sulfur oxide per MBTU, but also to reduce the sulfur in the coal by Y percent. By setting the percentage reduction requirement at a level only scrubbers could achieve, the Administrator could force all coal-burners to install scrubbers. But the Administrator could set  $Y = 0$ , since he or she also had to consider "the cost of achieving ... emission reduction[s]" before requiring the use of the "best technological system."

House and Senate staff inserted additional provisions in the conference report alternately favoring and disfavoring compulsory scrubbing. Taken together with the law itself, as passed in August, 1977, the result was a document whose legal meaning was hopelessly confused.

### **The EPA Takes Action**

EPA was internally divided on how to proceed. The Office of Planning and Management which viewed forced scrubbing as a pure waste, while the Office of Air, Noise, and Radiation felt that it was wrong for an administrative agency to deny political activists (in this case the clean air-dirty coal lobby) the fruits of their congressional victory. Because the EPA was in the Executive Branch, White House would have to approve the new NSPS, and the Department of Energy (DOE) could argue against full scrubbing to the White House.

In the fall of 1977, the Air Office circulated a proposed NSPS that would leave the 1.2 pound ceiling in place but require full scrubbing – i.e., 90 percent removal. Using a consulting firm's detailed computer model of coal supply and electricity production, alternative possible rules were examined by analysts in EPA and DOE. By January 1979, the Planning Office had come to favor a simple proposal that would tolerate some increases in  $SO_2$  in the West, where there was no  $SO_2$  problem, while reducing Eastern loads more significantly. Simply reducing the old 1.2 emission ceiling to 0.55 would force everyone to scrub somewhat since no coal could pass the lower ceiling without advanced technology. Costs would nonetheless be hundreds of

millions of dollars lower than with full 90 percent scrubbing so long as polluters were allowed to decide for themselves how to mix lower sulfur coal and higher scrubbing percentages to reach the 0.55 ceiling. Moreover, the simple proposal to lower the ceiling to 0.55 promised lower SO<sub>2</sub> emissions nationwide, as well as significant emission reductions in the areas east of the Mississippi where the health threat was most serious.

In 1978 the President had issued an Executive Order requiring agencies to conduct an "economic impact analysis" for every "significant" regulation and established the Regulatory Analysis Review Group (RARG), a group of economists whose job it was to review the analysis generated by the front-line agency. Just as the EPA had not addressed the benefit of tightening the NSPS, neither did the RARG. In January, 1979, after extensive modeling analysis, the RARG came out in favor of the Planning Office proposal to lower the ceiling from 1.2 to some lower number and to permit utilities to mix scrubbing and low sulfur coal in the way that would most cheaply meet the ceiling.

But so far as Eastern coal interests were concerned, lowering the emission ceiling to 0.55 would deprive them of their hard fought victory in Congress. Such a low ceiling would make it impossible to scrub the higher sulfur Eastern varieties into compliance. But this time environmentalists were not their allies. Although they preferred to go further and require full scrubbing in the West, they counted the proposed reduction in the emission ceiling as a victory. Reducing the ceiling from 1.2 to 0.55 would raise electric utilities' costs, however, and the utilities were happy to join forces with their former Eastern mining allies in opposing the 0.55 proposal.

Political pressure from utilities and Eastern coal interests pushed the Administrator back to the initial Air Office proposal, universal 90 percent scrubbing under a 1.2 ceiling. But within the agency, a full scrubbing decision under external political pressure would demoralize the Planning Office. Outside the agency, the DOE remained adamantly opposed to full scrubbing, and the technocrats in the Executive Office would defend its RARG report.

A new technology, dry scrubbing, offered a way out of the box in the spring of 1979. Although no dry scrubbers were in operation in the U.S. at the time, a research report indicated that dry scrubbing could operate considerably more cheaply than wet scrubbing if it were not required to eliminate more than 70 percent of a coal's sulfur content. Attention within EPA then turned to a two-tier proposal: 70 percent scrubbing would be allowed on the condition that the plant met a 0.6 ceiling; otherwise the ceiling would be 1.2 and 90 percent scrubbing would be required. The computer model said that the costs of this proposal were nearly as low as the simple 0.55 ceiling and that it would yield lower SO<sub>2</sub> emissions.

While the DOE still remained opposed to any scrubbing on the grounds that it was excessively costly, White House staff were pleased, and the two-tier proposal became the new NSPS. The Sierra Club challenged this standard in court, but in 1981 the Court of Appeals for the District of Columbia held that EPA had not exceeded its statutory authority in issuing the NSPS, and the court declined to set it aside.<sup>3</sup>

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<sup>3</sup> Sierra Club v. Costle 657 F. 2d 298 (1981).

**Questions for Discussion**

- 1) Who were the major actors in the 1970, 1971, 1976, and 1977 policy decisions and what interests did they represent?
- 2) What interests were not represented or incorporated at the several stages in the evolution of the coal policies?
- 3) Putting political feasibility aside, how would you have changed the 1970 law (as it affected coal-fired power plants)? The 1971 NSPS? The 1977 NSPS?
- 4) What effect would you expect this set of policies to have had on the construction of new coal-fired power plants? On the maintenance of old power plants?

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