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PART IV

POLLUTION CONTROL

In this Part, we consider the complex statutes and regulations that have been developed to address air and water pollution. The two major federal anti-pollution laws, the Clean Air Act and the Clean Water Act, both rely primarily on "command and control" regulations. The Clean Air Act began with a primary focus on air quality and protecting human health, but has evolved more toward technology-based approaches. The Clean Water Act emphasized technology-based controls for many years, but is now moving haltingly toward a more water-quality-based regime. Their distinct trajectories demonstrate the need to combine technology-based and impact-based strategies. Experience with the federal pollution laws also shows the limits of command-and-control regulation. Under both the Clean Air and Clean Water Acts, efforts have been made in recent years to add market-based instruments and voluntary measures to the mix. Such non-traditional measures offer some advantages, but also pose their own distinct challenges.

CHAPTER TEN

AIR POLLUTION CONTROL

SECTION 1. INTRODUCTION AND OVERVIEW

Air pollution presents one of the most serious environmental problems of the modern age. As Robert Arvill noted,

> [A]n average person requires over thirty pounds of air a day or about six pints every minute, and he has to take it as it comes. He would not readily stand in sewage or drink dirty water. Yet daily the individual draws 26,000 breaths, between 18 and 22 each minute, many of which—if not all in some cases—are of filthy air.

R. Arvill, *Man and Environment* 97 (1967).

The legal response to air pollution has evolved from reliance on the common law to remarkably detailed federal regulation. The federal Clean Air Act is important both for the specific ways that it approaches air quality protection and as an example of several key strategies and challenges for environmental regulation.

A. HISTORICAL BACKGROUND

In pre-colonial North America, thanks to a variety of natural sources and the deliberate use of large-scale fire by some Native Americans, the air always had some pollutants. European settlement, though, followed by industrialization and urban growth, produced pollution on a far more dramatic scale. By the beginning of the 20th century, pollution from coal soot was so bad in industrial cities like Pittsburgh that "[e]pisodes would frequently blot out the sun, requiring gaslights at midday." John Bachmann, Will the Circle Be Unbroken: A History of the U.S. National Ambient Air Quality Standards, 57 Journal of the Air and Waste Management Association 652 (2007).

Legal authority to address smoke and soot was available, but not widely used. Early town planning made some effort to separate industrial activities from residential and commercial areas, as much for fire safety reasons as for concern over smoke pollution. The courts endorsed air pollution regulation as early as 1859, when a New Orleans ordinance regulating "dense smoke" was upheld, New Orleans v. Lambert, 14 La. Ann. 247 (1859), and the constitutionality of smoke abatement ordinances was firmly established against due process and equal protection challenges by the U.S. Supreme Court in 1916, in Northwestern Laundry v. Des Moines, 239 U.S. 486 (1916). But although everyone agreed that smoke and soot were a nuisance, their health impacts were not firmly established. As a

result, not everyone agreed that pollution reduction was important, or that it should take priority over industrial expansion. Some industrial cities even prided themselves on their polluted air, which they saw as an indicator of the prosperity associated with a robust industrial economy. The lack of available substitutes for coal as an inexpensive power source both for industry and for residential heating in this era also contributed to reluctance to adopt strong pollution regulation.

Although a growing number of U.S. cities adopted "smoke ordinances" intended to limit pollution from large industrial sources and engineers worked to improve the technology of pollution control, air quality continued to deteriorate. Just after World War II, however, a series of dramatic events shifted the political landscape by making the health costs of air pollution apparent.

> In 1948, as Pittsburgh was enjoying dramatic improvements from its smoke program, just 29 km away the small industrial community of Donora experienced an air pollution disaster that could not be ascribed solely to smoke. An unusual meteorological inversion resulted in a 4–day buildup of fog, PM [particulate matter], and SO_x [sulfur oxides] from steel and zinc smelters and sulfuric acid plant emissions. During the episode, 20 people died, and 6000 people (approximately 43% of the total Donora population) suffered respiratory problems described as "a gasping for air and complaints of unbearable chest pains." The Donora story made national headlines * * *.
>
> The second transforming development was the unexplained occurrence of eye-burning smog events beginning in 1943 in Los Angeles, one of the major urban areas that used virtually no coal. Although it is called smog, it consisted neither of smoke nor fog, and it turned out to be a new form of air pollution that appeared as widespread haze that burned the eyes. * * *

Seeking expert advice, in 1946 the Los Angeles Times hired Raymond Tucker * * * to study the problem and recommend solutions. Tucker's recommendations focused on banning obvious sources of PM and SO_x emissions such as incinerators and fires at waste dumps, monitoring industrial emissions, and penalizing diesel truck drivers with smoky emissions. In 1947, California passed the first statewide legislation authorizing county air pollution regulations for anything other than smoke, and Los Angeles County immediately formed an Air Pollution Control District. But there was no "silver bullet" strategy * * *. When the kinds of sensible measures Tucker recommended were later adopted, dust fall was reduced, but the controls failed to address the main sources of the smog problem. In addition to initial regulatory activities, the city, industry, and the state mounted research and monitoring programs to better understand the nature, sources, and effects of smog. In this case, officials perceived the sudden and growing eye-stinging smog episodes as an economic threat to an area whose growth in part depended on the attraction of its warm, sunny skies to health seekers.

Near the end of 1952, (December 5–12), the worst air pollution disaster on record occurred in London, England. Initially, heavy fog obliterated visibility, causing traffic accidents and canceling events, but eventually official reports noted crowded hospitals and increased mortality. A year later, a report set the number of deaths at approximately 4000 (today estimates of the totals are as much as three times higher). This not only cemented the relationship between pollution and health, but also resulted in a substantial increase in research and monitoring, both in the United States and in Europe.

Bachmann, supra.

The Donora, Los Angeles, and London incidents brought attention to the health and economic costs of air pollution. They invigorated air pollution research and monitoring, notably through new commitments of federal funding. Regulatory authority remained with state and local governments, which moved at varying paces. California was the first to develop ambient air quality standards, although its standards were less strict than those LA authorities thought necessary. California's efforts accounted for fully 60% of the expenditures by state and local authorities to address air pollution during this period. Id.

In 1963, disappointed by the pace of state progress, Congress authorized federal action against some pollution sources, but only in narrowly defined circumstances and after byzantine procedural mazes were navigated. By 1966, little progress had been made at either the federal or the state and local level in developing air quality standards, much less in achieving those standards. In 1967, Congress directed the states to adopt air quality standards and develop plans to achieve those standards.

In the late 1960s, the environmental movement was in full swing. The public was focused on pollution problems, both air and water, and politicians were eager to respond. The ink was hardly dry on the 1967 version of the Clean Air Act before new federal air pollution legislation was being proposed. It was already clear that the process for implementing the 1967 law was cumbersome and time-consuming, and that technology-based emission limits might need to be combined with air quality standards. In 1970, prodded by a "race to the top" among politicians with national ambitions, Congress enacted the framework of the modern Clean Air Act. Despite two rounds of major amendments, in 1977 and 1990, that framework remains essentially intact today. It calls for national uniform air quality standards, primarily implemented by the states but backstopped by a variety of federal technology-based controls on both stationary and mobile sources. EPA, then only a month old itself, was given the daunting task of issuing the air quality and emission limitation regulations called for by the new law.

B. OVERVIEW OF THE CLEAN AIR ACT

1. *Ambient air quality standards.* The primary focus of the Clean Air Act at the outset was the identification and achievement of healthy air quality throughout the nation. To that end, § 108 directs EPA to identify

pollutants suitable for the issuance of national standards, and § 109 requires that EPA issue national ambient air quality standards (NAAQS) for those "criteria pollutants."

2. *State implementation plans and attainment of the standards.* Air quality standards, of course, do not by themselves produce clean air. They must be translated into controls on individual sources. Initially, the CAA relied entirely on the states to perform that translation step, requiring that they develop plans to achieve the national air quality standards within their borders, without contributing to air pollution problems elsewhere. When states failed to rapidly make progress toward cleaning up their skies, Congress added attainment deadlines and a variety of sanctions for non-attainment. It remains true today, however, that states have the primary responsibility for deciding what trade-offs to make to meet the national standards.

3. *Mobile source regulation.* The 1970 CAA introduced for the first time aggressive federal regulation of air pollution emissions from mobile sources (most importantly automobiles and trucks, but also trains, airplanes, and offroad vehicles). These national standards preempt state regulation in order to protect the national market in vehicles. Because California had adopted tailpipe emission controls before 1970, the CAA allows EPA to waive preemption of more stringent California standards. Other states may choose to adopt California's standards or EPA's, but may not develop their own. The mobile source regulations are detailed and complex, including regulation not only of engine emissions but of fuel composition. For our purposes, they are important primarily as the leading US example of an explicitly technology-forcing approach to pollution and as a current battleground over the extent of federal preemption of state standards.

4. *Federal stationary source regulation.* The CAA also creates an important federal role in the regulation of new and modified stationary sources. EPA sets industry-wide technology-based "new source performance standards" (NSPS). Potentially more stringent standards also apply specifically to new sources in clean-air and nonattainment areas. These special requirements for new or modified sources have significantly altered the economics of the electric power industry, encouraging utilities to continue using old plants well past what was expected to be the term of their useful life. They have also generated a series of disputes about exactly what it means for a source to be "new" or "modified." We will consider new source regulation in the context of the politics and environmental effects of "grandfathering" sources that predate regulation.

5. *Prevention of significant deterioration.* The primary thrust of the 1970 CAA was to clean up areas suffering from significant air pollution. The prevention of significant deterioration (PSD) program originated in a judicial mandate. In Sierra Club v. Ruckelshaus, 344 F.Supp. 253 (D.D.C. 1972), the district court, looking to the CAA's declared purpose of protecting and enhancing air quality, overturned EPA regulations allowing states to submit SIPS that would allow pollution levels in clean air areas to rise to

the level of the NAAQS. The D.C. Circuit and then the Supreme Court affirmed without opinion. 412 U.S. 541 (1973). EPA subsequently issued "non-degradation" regulations, but those were superseded in 1977 by amendments to the CAA creating what is now known as the PSD program. PSD requires a special sort of new source review for major new and modified stationary sources in areas that are in attainment of the relevant NAAQS. The new or modified facility must meet not only the category-wide NSPS, but also individually identified best available control technology. PSD also sets a type of air quality standards more stringent than the NAAQS for attainment areas, calling for EPA to set acceptable "increments," that is increases in pollution above baseline levels. The permissible increment levels vary with the designation of the area; many national park lands are by congressional fiat in the most protective class. States can also designate lands for strong PSD protection, but have not rushed to do so. Anyone seeking a permit for construction of a new or modified source in an attainment area must demonstrate, through air pollution modeling, that the new source will not cause a relevant increment to be exceeded. For a detailed description of the PSD program, see Craig N. Oren, Prevention of Significant Deterioration: Control–Compelling Versus Site–Shifting, 74 Iowa L. Rev. 1 (1988).

6. *Hazardous air pollutants.* As enacted in 1970, CAA § 112 (42 U.S.C. § 7412) called for EPA to identify, and develop health-based emission standards providing an ample margin of safety for, any air pollutant that might cause or contribute to serious adverse health effects. EPA found itself virtually paralyzed by this standard, unable to reliably identify safe levels of pollutants but unwilling to flatly prohibit their emission, at the potential cost of shutting down important industrial sectors. In twenty years, EPA listed only 8 substances as hazardous air pollutants. In the 1990 amendments to the CAA, Congress took control of the hazardous air pollutant program, ordering EPA to issue technology-based regulations for a list of 189 pollutants, and requiring EPA to add substances to the list if they may cause adverse human health effects. Within six years of promulgating technology-based standards, EPA was to evaluate any remaining health risks, report them to Congress, and issue additional regulations to reduce remaining health risks below a maximum cancer risk of 1 in 1 million based on maximum lifetime exposures. The hazardous air pollutant program, which continues to suffer from delays and high resource demands, illustrates the challenges of risk-based regulation. For a description of EPA's struggle to effectively implement the program, see Victor B. Flatt, Gasping for Breath: The Administrative Flaws of Federal Hazardous Air Pollution Regulation and What We Can Learn from the States, 34 Ecology L. Q. 107 (2007).

7. *Marketable emission permits for sulfur oxides.* In the 1990 CAA amendments, Congress adopted a system of tradable emission permits to address the problem of acid rain caused by emission of SO_x. Permits were distributed to major sources on the basis of past emissions. New sources, or those which want to increase emissions must acquire permits from existing sources. The number of available permits has also been gradually ramped

down over time, so that even existing sources must acquire additional permits if they want to continue emitting at a constant level. The SO_x permit program is the oldest and largest marketable pollution permit program in the United States. It provides lessons about such programs that may be useful for development and implementation of similar programs for greenhouse gas emissions, or for water pollution discharges. Marketable pollution allowances are considered in more detail in Section 5 of this chapter.

8. *Individual stationary source permits.* The CAA's focus on air quality is in some respects difficult to implement. While SIPs may allocate the available pollutant increment among the region's sources, it may be difficult for regulators, the interested public, or even the sources themselves to keep track of applicable requirements. The situation is further complicated by the plethora of different technology-based requirements that may apply to any one source under the NSPS, PSD, non-attainment and hazardous air pollutant programs. A mechanism is needed to oversee compliance with all these requirements and facilitate the imposition of sanctions on sources that exceed their authorized emissions. The 1990 CAA amendments provided that mechanism, mandating that each major stationary source have a permit incorporating all applicable operating requirements. CAA §§ 501–507 (42 U.S.C. §§ 7661–7661f). Title V also helps to make up for EPA's frequent delays in issuing category-wide emission limitations, requiring that where EPA has not issued limits applicable to the source category equivalent limitations must be determined and imposed, on a case-by-case basis, in each permit.

SECTION 2. NATIONAL AMBIENT AIR QUALITY STANDARDS

The heart of the Clean Air Act is the federal definition of national ambient air quality standards and their implementation by the states. Defining an acceptable level of air pollution turns out to be a surprisingly difficult task. Achieving that level is even more challenging.

A. SETTING NATIONAL AMBIENT AIR QUALITY STANDARDS

CLASS DISCUSSION PROBLEM: A NAAQS FOR CO_2?

In June 2003, the states of Massachusetts, Connecticut, and Maine filed suit against EPA, seeking an order compelling EPA to list CO_2 as a criteria pollutant and to develop a NAAQS for CO_2. The lawsuit is based on the dangers of global warming. The states point out that EPA has long recognized publicly, on its web site among other places, that CO_2 emissions from fossil-fuel burning power plants, automobiles, and a wide variety of other sources contribute to global warming, which may have a variety of serious impacts including raising sea level, altering precipitation patterns and water availability, and affecting human health as well as other species.

In 1998, Jonathan Cannon, then General Counsel for EPA, wrote a memorandum concluding that CO_2 was an "air pollutant" potentially subject to regulation under the CAA if it meets the definition of a "criteria" pollutant. In 2003, however, EPA reversed course, taking the position that it did not have the authority to regulate emissions of CO_2 or other greenhouse gases in order to address the problem of global climate change. EPA argued, among other things, that the NAAQS system is "fundamentally ill-suited to addressing global climate change" because actions taken by states and EPA cannot alone bring the U.S. into attainment with any NAAQS that might be set for CO_2. To support its position, EPA cited a Supreme Court decision holding that the grant of authority to the FDA to regulate "drugs" and "devices," broadly defined, did not authorize regulation of cigarettes. Food and Drug Administration v. Brown & Williamson Tobacco Corp., 529 U.S. 120 (2000). CO_2 regulation, EPA noted, would have broad impacts, "affecting every sector of the nation's economy and threatening its overall economic health."

In 2007, in a case dealing with the regulation of emissions from mobile sources, the Supreme Court ruled that CO_2 is an "air pollutant" under the Clean Air Act, making it eligible for regulation. Massachusetts v. EPA, 549 U.S. 497 (2007). Based on the material that follows, must EPA now set a NAAQS for CO_2? How would EPA determine the appropriate level of CO_2 in the atmosphere? What consequences would follow? Would the designation of a NAAQS for CO_2 help to address the problem of global warming?

Excerpts From the Clean Air Act

42 U.S.C. §§ 7401–7671q.

Sec. 108. Air quality criteria and control techniques

(a) Air pollutant list; publication and revision by Administrator; issuance of air quality criteria for air pollutants

(1) For the purpose of establishing national primary and secondary ambient air quality standards, the Administrator shall within 30 days after December 31, 1970, publish, and shall from time to time thereafter revise, a list which includes each air pollutant—

(A) emissions of which, in his judgment, cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare;

(B) the presence of which in the ambient air results from numerous or diverse mobile or stationary sources; and

(C) for which air quality criteria had not been issued before December 31, 1970, but for which he plans to issue air quality criteria under this section.

(2) The Administrator shall issue air quality criteria for an air pollutant within 12 months after he has included such pollutant in a list under paragraph (1). Air quality criteria for an air pollutant shall

accurately reflect the latest scientific knowledge useful in indicating the kind and extent of all identifiable effects on public health or welfare which may be expected from the presence of such pollutant in the ambient air, in varying quantities. * * *

Sec. 109. National primary and secondary ambient air quality standards

(a) Promulgation.

(1) The Administrator—

(A) within 30 days after December 31, 1970, shall publish proposed regulations prescribing a national primary ambient air quality standard and a national secondary ambient air quality standard for each air pollutant for which air quality criteria have been issued prior to such date; and

(B) after a reasonable time for interested persons to submit written comments thereon (but no later than 90 days after the initial publication of such proposed standards) shall by regulation promulgate such proposed national primary and secondary ambient air quality standards with such modifications as he deems appropriate.

(2) With respect to any air pollutant for which air quality criteria are issued after December 31, 1970, the Administrator shall publish, simultaneously with the issuance of such criteria and information, proposed national primary and secondary ambient air quality standards for any such pollutant. The procedure provided for in paragraph (1)(B) of this subsection shall apply to the promulgation of such standards.

(b) Protection of public health and welfare.

(1) National primary ambient air quality standards, prescribed under subsection (a) of this section shall be ambient air quality standards the attainment and maintenance of which in the judgment of the Administrator, based on such criteria and allowing an adequate margin of safety, are requisite to protect the public health. Such primary standards may be revised in the same manner as promulgated.

(2) Any national secondary ambient air quality standard prescribed under subsection (a) of this section shall specify a level of air quality the attainment and maintenance of which in the judgment of the Administrator, based on such criteria, is requisite to protect the public welfare from any known or anticipated adverse effects associated with the presence of such air pollutant in the ambient air. Such secondary standards may be revised in the same manner as promulgated.

* * *

(d) Review and revision of criteria and standards * * *.

stated that the [final] selection should be a policy decision." Also, although relative proximity to peak background ozone concentrations did not, in itself, necessitate a level of 0.08, EPA could consider that factor when choosing among the three alternative levels. Most convincing, though, is the absence of *any* human clinical studies at ozone concentrations below 0.08. This lack of data amply supports EPA's assertion that the most serious health effects of ozone are "less certain" at low concentrations, providing an eminently rational reason to set the primary standard at a somewhat higher level, at least until additional studies become available. Overall, therefore, we disagree with Petitioners that in selecting 0.08 ppm rather than a lower or higher level, EPA reached "inconsistent conclusions." The Agency could reasonably conclude that existing data support a standard below 0.09 but do not yet justify a standard below 0.08.

* * *

NOTES AND QUESTIONS

1. *Why national standards?* The NAAQS set minimal air quality standards that must be met nationwide. Does that make sense, or would it be more sensible to allow state or local governments to determine the appropriate level of air quality? What problems did determining national ozone and $PM_{2.5}$ standards pose for EPA? Why might Congress have demanded national standards? Do states retain any discretion with respect to air quality?

2. *Averaging times and exceedances.* The NAAQS set the allowable concentration of criteria pollutants in the ambient air based on specified averaging times. Note that for most criteria pollutants EPA has set multiple NAAQS employing different averaging times. Why does EPA believe that both short and longer-averaging-time standards are necessary? What does the 24–hour $PM_{2.5}$ standard, for example, accomplish that the annual standard does not? In addition to averaging times, the NAAQS must specify the number of permissible exceedances over a certain length of time. Why should any exceedances be permitted? With respect to the $PM_{2.5}$ standard, the D.C. Circuit deferred to EPA's judgment that it should permit exceedances of the daily standard up to 2% of the time, or roughly 7 days in a year. Could a court ever strike down EPA's choice of exceedance level? Under what circumstances?

3. *What can be the subject of a NAAQS?* In Massachusetts v. EPA, 549 U.S. 497 (2007) (excerpted in Section 3 below), the Supreme Court ruled that CO_2 is an "air pollutant" within the definition of the Clean Air Act. What, if anything, is left out of the statutory definition? Could EPA set NAAQS for heat, odors, light, or noise? What is "ambient" air? Could EPA set a § 108 standard for indoor air quality? For pollution in the stratosphere, for example with respect to chemicals capable of destroying stratospheric ("good") ozone? Does it matter whether the pollutant in question is initially emitted at ground level?

4. *What findings must be made?* What must EPA find in order to support a specific NAAQS level? If it finds no threshold "no effects" level, must the agency set a zero NAAQS? If not, how should it decide the appropriate non-zero level? How did it choose ozone and $PM_{2.5}$ levels in the revisions challenged in the *American Trucking Associations* litigation? Do you agree with the D.C. Circuit that those choices were entitled to deference? What other choices could EPA have made? What does it mean that the standard must be "requisite" to protect the public health? Under what circumstances would that foreclose an overly-protective standard?

Rejecting an industry claim that EPA's NAAQS for coarse PM was too stringent, the D.C. Circuit emphasized the precautionary nature of the NAAQS:

> Although the evidence of danger from coarse PM is, as the EPA recognizes, "inconclusive," the agency need not wait for conclusive findings before regulating a pollutant it reasonably believes may pose a significant risk to public health. * * * As this court has consistently reaffirmed, the CAA permits the Administrator to err on the side of caution in setting NAAQS.

American Farm Bureau Federation v. EPA, 559 F.3d 512, 533 (D.C. Cir. 2009).

5. *The role of costs.* In *American Trucking*, the Supreme Court unanimously concluded that the CAA does not permit consideration of costs in the setting of a NAAQS. Do you agree with that interpretation of the statute? Assuming it is correct, is it a justifiable policy choice? Can costs in fact be ignored? Is it irrational to bar their explicit consideration, or will that simply push their consideration underground? What goals might foreclosing explicit consideration of costs further? Justice Breyer reads the majority opinion as presuming, based on congressional silence, that the agency is not to consider costs. Is this a fair reading? If a statute is unclear or ambiguous, how should a court decide whether it allows consideration of costs? To what extent should it defer to the agency's view on that question?

Following *American Trucking*, what opportunities remain for consideration of costs? Are they sufficient? How feasible and useful would it be to estimate costs at the point of setting a NAAQS? Would that exercise be more appropriate at later regulatory points, such as implementation of the NAAQS or development of technology-based emission limits for new sources?

If the NAAQS were required to meet a cost-benefit test, it appears that they could do so. Because NAAQS are "major rules" with substantial economic impacts, they are routinely accompanied by cost-benefit analyses, even though EPA cannot consider those comparisons in setting the standards. In addition, EPA periodically prepares cost-benefit reviews of its standards for submission to Congress. CAA rules routinely pass those reviews, and in fact are responsible for the vast majority of the economic benefits from EPA's overall regulatory programs. EPA's most recent report, "The Benefits and Costs of the Clean Air Act: 1990 to 2020, Final

Report—Rev. A (Apr. 2011),"is available at http://www.epa.gov/air/sect812/feb11/fullreport.pdf. It estimates that the CAA provided net benefits between $110 billion and $3.7 trillion in 2010, and forecast that those benefits will be at least 50% higher in 2020.

6. *The role of science advisors.* What is the role of the Clean Air Scientific Advisory Committee (CASAC)? Would it ever be justifiable for EPA to reject CASAC's advice with respect to proposed NAAQS? To what extent are the judgments that must be made to arrive at a NAAQS scientific, and to what extent are they appropriately policy judgments? Should a reviewing court be more inclined to defer to a NAAQS decision if EPA follows CASAC's advice? Should it take an especially "hard look" if that advice is ignored?

The D.C. Circuit addressed those questions in a challenge to EPA's 2006 revisions of the PM NAAQS. The 1997 standards upheld in *American Trucking* sparked additional research and monitoring. New data and reanalysis of older studies led a majority (but not all) of the CASAC members to call for tightening of the 24–hour fine PM NAAQS to 30–35 μm^3 and the annual NAAQS to 13–14 μm^3. EPA career staff made similar recommendations. The agency ultimately followed CASAC's (and staff's) advice on the daily NAAQS, but not on the annual standard, which it set at 15 μm^3. 71 Fed. Reg. 61144 (Oct. 17, 2006). Environmentalists and a coalition of states challenged the rule, arguing in part that EPA should have set the annual standard at the levels recommended by CASAC and staff. The court remanded the annual standard, holding that EPA had not adequately explained its decision not to adopt the stricter recommendations. EPA announced in 2009 that it would reconsider the 2008 ozone NAAQS, which also were not as strict as CASAC recommended and which also had been challenged by environmental groups. 75 Fed. Reg. 2938 (Jan. 19, 2010).

7. *Compelling NAAQS establishment.* Can EPA be compelled to list additional criteria pollutants, such as CO_2? On what basis? *See* NRDC, Inc. v. Train, 545 F.2d 320 (2d Cir. 1976), requiring EPA to develop ambient air quality standards for lead.

8. *Secondary NAAQS.* The Clean Air Act directs EPA to set primary NAAQS to protect the public health, and secondary NAAQS to protect the public welfare. Currently only one secondary NAAQS, for SO_x, differs from the primary standard. In connection with the 2006 revision of the fine PM standards, EPA staff suggested that the agency adopt a secondary NAAQS for fine PM that would protect visibility at a target level between 40 and 60 kilometers, based on a number of research studies surveying public perceptions of the acceptable level of visibility. EPA rejected the staff recommendation, declining to set a specific target visibility range, but nonetheless deciding that the primary standard would adequately protect visibility. 71 Fed. Reg. 61144, 61207–61208 (Oct. 17, 2006). The D.C. Circuit remanded, holding that the EPA must decide what level of visibility protection is needed to protect the public welfare. American Farm Bureau Federation v. EPA, 559 F.3d 512 (D.C. Cir. 2009). How should EPA approach that determination? Does a national standard for visibility make sense? If so,

how should the acceptable visibility level be identified? Should EPA be allowed to consider costs in setting secondary NAAQS?

9. *Risk assessment and the NAAQS.* EPA routinely prepares (or has consultants prepare) a quantitative risk assessment in the course of its periodic review of the NAAQS for each criteria pollutant. That risk assessment is not necessarily decisive, however. EPA is very aware of the limitations of risk assessments in this context, including uncertainties and untested assumptions. The D.C. Circuit is inclined to defer to EPA's views of the weight risk assessments deserve in NAAQS determinations. See American Trucking Associations v. EPA, 283 F.3d 355, 374 (D.C.Cir. 2002); American Farm Bureau Federation v. EPA, 559 F.3d 512, 527–28 (D.C. Cir. 2009).

B. IMPLEMENTING THE NAAQS: STATE IMPLEMENTATION PLANS

The mere establishment of NAAQS does not purify the atmosphere. A mechanism is needed to translate the NAAQS into limitations on the emission of criteria pollutants from various sources. The Clean Air Act directs the states to issue "state implementation plans" (SIPs) to achieve the NAAQS within their borders.

SIPs combine two distinct functions. First, they serve as planning documents, assessing the state's air quality problem and determining in general terms the extent and nature of improvement needed to attain or maintain the NAAQS. This assessment requires not only the identification of current levels of criteria pollutants and the sources emitting those pollutants, but extensive computer modeling to determine what can be changed and what impacts alternative strategies would have on air pollution levels. Second, SIPs serve as regulatory instruments, allocating the acceptable level of emissions among the various sources, including both stationary and mobile sources, and accounting for new sources or increased emissions from existing sources over time. SIPs must be submitted to EPA for approval. Approved SIP provisions are enforceable under federal as well as state law.

Excerpts From the Clean Air Act

42 U.S.C. §§ 7401–7671q.

Sec. 101. Congressional findings and declaration of purpose

(a) The Congress finds—

(1) that the predominant part of the Nation's population is located in its rapidly expanding metropolitan and other urban areas, which generally cross the boundary lines of local jurisdictions and often extend into two or more States;

* * *

(3) that air pollution prevention (that is, the reduction or elimination, through any measures, of the amount of pollutants produced or

created at the source) and air pollution control at its source is the primary responsibility of States and local governments; and

(4) that Federal financial assistance and leadership is essential for the development of cooperative Federal, State, regional, and local programs to prevent and control air pollution.

Sec. 110. State implementation plans for national primary and secondary ambient air quality standards

(a) Adoption of plan by State * * *

(1) Each State shall, after reasonable notice and public hearings, adopt and submit to the Administrator, within 3 years (or such shorter period as the Administrator may prescribe) after the promulgation of a national primary ambient air quality standard (or any revision thereof) under section 7409 of this title for any air pollutant, a plan which provides for implementation, maintenance, and enforcement of such primary standard in each air quality control region (or portion thereof) within such State. In addition, such State shall adopt and submit to the Administrator (either as a part of a plan submitted under the preceding sentence or separately) within 3 years (or such shorter period as the Administrator may prescribe) after the promulgation of a national ambient air quality secondary standard (or revision thereof), a plan which provides for implementation, maintenance, and enforcement of such secondary standard in each air quality control region (or portion thereof) within such State. * * *

(2) Each implementation plan submitted by a State under this chapter shall be adopted by the State after reasonable notice and public hearing. Each such plan shall—

(A) include enforceable emission limitations and other control measures, means, or techniques (including economic incentives such as fees, marketable permits, and auctions of emissions rights), as well as schedules and timetables for compliance, as may be necessary or appropriate to meet the applicable requirements of this chapter;

(B) provide for establishment and operation of appropriate devices, methods, systems, and procedures necessary to—

(i) monitor, compile, and analyze data on ambient air quality, and

(ii) upon request, make such data available to the Administrator;

(C) include a program to provide for the enforcement of the measures described in subparagraph (A), and regulation of the modification and construction of any stationary source within the areas covered by the plan as necessary to assure that national ambient air quality standards are achieved * * *;

(D) contain adequate provisions—

(i) prohibiting, consistent with the provisions of this title, any source or other type of emissions activity within the State from emitting any air pollutant in amounts which will—

(I) contribute significantly to non-attainment in, or interfere with maintenance by, any other State with respect to any such national primary or secondary ambient air quality standard, or

(II) interfere with measures required to be included in the applicable implementation plan for any other State under part C to prevent significant deterioration of air quality or to protect visibility,

(ii) insuring compliance with the applicable requirements of sections 7426 and 7415 of this title (relating to interstate and international pollution abatement);

(E) provide necessary assurances that the State * * * will have adequate personnel, funding, and authority under State law to carry out such implementation plan (and is not prohibited by any provision of Federal or State law from carrying out such implementation plan or portion thereof) * * * and necessary assurances that, where the State has relied on a local or regional government, agency, or instrumentality for the implementation of any plan provision, the State has responsibility for ensuring adequate implementation of such plan provision;

* * *

(H) provide for revision of such plan—

(i) from time to time as may be necessary to take account of revisions of such national primary or secondary ambient air quality standard or the availability of improved or more expeditious methods of attaining such standard, and

(ii) * * * whenever the Administrator finds on the basis of information available to the Administrator that the plan is substantially inadequate to attain the national ambient air quality standard which it implements or to otherwise comply with any additional requirements established under this Act;

* * *

(K) provide for—

(i) the performance of such air quality modeling as the Administrator may prescribe for the purpose of predicting the effect on ambient air quality of any emissions of any air pollutant for which the Administrator has established a national ambient air quality standard, and

(ii) the submission, upon request, of data related to such air quality modeling to the Administrator;

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