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Regional Haze: EPA's Proposal to Improve Visibility in National Parks and Wilderness Areas

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ABSTRACT

On July 31, 1997, the Environmental Protection Agency proposed a new regulatory program to improve visibility in the nation's national parks and wilderness areas. The program, required by Sections 169A and 169B of the Clean Air Act, would require all 50 states to develop long-term strategies to improve visibility by reducing regional haze. This report provides background concerning regional haze and discusses issues that have been raised concerning the proposed rule. Congress has held several hearings on the proposal, and has expressed concern that the rule not be implemented in advance of the schedule for new air quality standards on fine particulates ($PM_{2.5}$). In P.L. 105-178, enacted June 9, 1998, Congress addressed this issue, by stipulating that plans implementing the regional haze rule be submitted on the same schedule as those for $PM_{2.5}$ nonattainment areas. This report will be updated as developments warrant.

Regional Haze: EPA's Proposal to Improve Visibility in National Parks and Wilderness Areas

Summary

On July 31, 1997, the Environmental Protection Agency proposed a new regulatory program to reduce "regional haze." The proposed program would require the states to develop and implement long-term strategies to attain a congressionally mandated goal of remedying the impairment of visibility in national parks and wilderness areas resulting from man-made air pollution.

Regional haze results from the presence of small particles, generally ranging in size from 0.1 to 1.0 micrometers in diameter, in the air. These particles absorb and scatter sunlight, with the effect of reducing contrasts, washing out colors, and making distant objects indistinct or invisible. Because of this pollution, the current visual range in the East is only about 20 miles, about one-fifth of the range one could expect in the absence of air pollution. In the West, visibility is better, ranging up to 90 miles, but even there it is only half to two-thirds of its natural range.

Contributors to the regional haze problem include sulfates from fossil-fueled power plants and smelters; nitrates and organic matter from the same sources, as well as from cars and trucks; elemental carbon from forest fires, prescribed burns, and diesel engines; and soil dust from unpaved roads, construction, and agriculture. Because of their small size, the particles tend to remain suspended for long periods of time and to travel long distances. Thus, addressing the problem will require planning on a regional basis, and will involve measures in all 50 states.

The proposed regulations would require the states to develop plans to improve visibility by one "deciview" (a measure of visibility) every 10 to 15 years. As a first step, the states would be required to review major stationary sources of pollution to identify those potentially subject to Best Available Retrofit Technology (BART), as required in Section 169A of the Clean Air Act.

The proposed rule was open to public comment until December 5, 1997. Since then, EPA has been reviewing the comments it received and deciding what to include in the final regulation. At least five groups of issues have arisen: 1) the potential impacts on various economic sectors (with special concern for the continued use of prescribed burning in agricuture and forestry); 2) the choice of methodology (i.e., "deciviews"), and whether improvement should be measured in terms of emission reductions or visibility improvement; 3) what constitutes reasonable further progress, as required by the Act -- in particular whether a goal of one deciview improvement is sufficiently ambitious, or appropriate for all regions; 4) whether EPA paid sufficient attention to the work of the Grand Canyon Visibility Transport Commission, which completed a five-year study of the visibility issue and made recommendations in June 1996; and 5) federal-state issues, including the respective powers of federal land managers and state governments. Congress has also expressed concern that the regional haze rule not be implemented in advance of the schedule for new standards on fine particulates; in P.L. 105-178, enacted June 9, 1998, Congress addressed this issue, by stipulating that plans implementing the regional haze rule be submitted on the same schedule as those for $PM_{2.5}$ nonattainment areas.

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Introduction

On July 31, 1997, the Environmental Protection Agency proposed a new regulatory program to improve visibility in the nation's national parks and wilderness areas. This "regional haze" program uses the authority of Section 169A of the Clean Air Act, first granted the Agency in 1977, and reinforced by Section 169B in the Act's 1990 amendments.

This report provides background concerning the regional haze program and the issues that have been raised concerning the proposed rule. The report is divided into five sections. Section I discusses the nature of the visibility problem and the sources of regional haze. Section II provides a brief history of legislative and regulatory attempts to address the problem. Section III discusses the proposed rule. Section IV places the rule in context, discussing how it relates to other EPA initiatives, including revision of the air quality standards for ozone and particulates and the acid rain program, and providing a brief discussion of benefits and costs. Section V discusses five sets of issues that have been raised since the rule was proposed.

A formal public comment period on the proposed rule ended December 5, 1997. Since then, EPA has been reviewing the comments received and deciding what to include in the final regulation. Promulgation is not expected before late summer 1998. The rule would then be implemented over a multi-year period.

EPA faces significant choices in finalizing the regulations, with potential impacts on a variety of economic sectors and regions. States will have decisions to make, too, once the rule is final. As a result, the Congress is likely to retain an interest in the program and its implementation.

I. Nature of the Problem

Impairment of visibility due to air pollution occurs throughout the United States. According to the National Academy of Sciences,

> ... the average visual range in most of the western United States, including national parks and wilderness areas, is 100-150 km (about 60-100 miles), or about one-half to two-thirds of the natural visual range that would exist in the absence of air

> pollution. ... In most of the East, including parklands, the average visual range is less than 30 km (about 20 miles), or about one-fifth of the natural visual range.[1]

This reduction in visibility is caused by the presence of small particles, generally ranging in size from 0.1 to 1.0 micrometers in diameter, in the air. Such particles absorb and scatter sun light. In doing so, they reduce contrasts, wash out colors, and make distant objects indistinct or invisible. Especially in national parks and wilderness areas, but more generally in any area dependent on tourism, a reduction in visibility vitiates the experience sought by visitors and reduces the economic value of assets related to tourist services.[2]

Some of the particles that create this reduction in visibility are emitted directly to the atmosphere. Others form as a result of atmospheric reactions involving gaseous precursors. Whatever their source, they tend to remain suspended for long periods of time and to travel long distances, creating a widespread problem known as regional haze.

The primary causes of regional haze are sulfates, organic matter, elemental carbon (soot), nitrates, and soil dust. As noted in the National Academy of Sciences report:

> The major cause of reduced visibility in the East is sulfate particles, formed principally from sulfur dioxide (SO_2) emitted by coal combustion in electric utility boilers. In the West, the other four particle types play a relatively greater role than in the East. The causes and severity of visibility impairment vary over time and from one place to another, depending on meteorological conditions, sunlight, and the size and proximity of emission sources.[3]

Humidity also plays a role. Because moisture in the air can facilitate the formation of fine particles in atmospheric reactions, visibility in the East would generally be less than that in the arid West, even in the absence of air pollution. Estimates of the natural visual range in the East are on the order of 90-100 miles, versus 140-150 miles in the West. Because of pollution, however, the current visual range in the East is only one-fifth of the natural range, whereas in the West it is half to two-thirds what it would otherwise be.

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[1]Committee on Haze in National Parks and Wilderness Areas, National Research Council, National Academy of Sciences, *Protecting Visibility in National Parks and Wilderness Areas* (Washington: National Academy Press, 1993), p. 1. Hereafter cited as NAS Report.

[2]There may also be health benefits related to the reduction of fine particle pollution, but the proposed regulations are aimed primarily at improving welfare, not health.

[3]NAS Report, p. 2.

II. Efforts to Address the Problem

The federal government has had a long-standing interest in protecting national parks against a variety of perceived threats, including impaired visibility. The goal of Section 169A of the Clean Air Act, calling for the "prevention of any future, and the remedying of any existing, impairment of visibility" resulting from manmade air pollution in national parks and wilderness areas, is consistent with the purpose of the National Park Service Organic Act of 1916 which is: "To conserve the scenery and the natural and historic objects and wildlife therein, and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."[4]

Prevention of Significant Deterioration. Legislative developments that have led to the current attention to visibility and regional haze began with the Air Quality Act of 1967. In that Act, Congress inserted into one of the fundamental purposes of clean air legislation the phrase "to protect and enhance the quality of" the Nation's air resources. In 1972, this phrase was used by the Sierra Club in a lawsuit against EPA to argue that the Clean Air Act required EPA to disapprove any State Implementation Plan that permitted "significant deterioration" of air quality. The district court agreed, and rulings on appeal left the district court opinion intact.[5] Thus, EPA had to review all State Implementation Plans (SIPs), disallow any that inadequately protected clean air areas, such as national parks, and promulgate regulations to prevent future significant deterioration of air quality in these areas. The resulting Prevention of Significant Deterioration (PSD) regulations were promulgated in 1974, with amendments in 1975.[6] The regulations focused on preventing further deterioration of air quality in pristine areas of the country by specifying how much increase in pollution levels would be permitted. PSD regulation applied only to new sources of air pollution and only to sulfur dioxide and particulates.

1977 Amendments to the Clean Air Act. These PSD regulations for clean air areas were codified, with some changes, as Part C of Title I in the 1977 Amendments to the Clean Air Act. The primary change was to single out for maximum protection national parks and other important national sites (P.L. 95-95). Later regulation by EPA added nitrogen oxides to the pollutants covered by the PSD program.[7] Mandatory class I areas — those areas that receive the maximum amount of protection — include most national parks, national wilderness areas, and national memorial parks, currently 156 areas. In addition, the Congress added Section 169A to address visibility impairment caused by existing sources of pollution in any mandatory class I areas where visibility was an important value. Thus, PSD and Section 169A act in tandem, with PSD controlling new sources of impairment, and Section 169A controlling existing sources of impairment.

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[4]39 Stat. 535, Ch. 408, Act of August 25, 1916.

[5]Sierra Club v. Ruckelshaus, 344 F. Supp. 253 (D.D.C. 1972), aff'd., 4 Environment Reporter (Cases) 1815, 2 Environmental Law Reporter 20656 (D.C. Cir. 1972), aff'd. by equally divided Court sub. nom. Fri v. Sierra Club, 412 U.S. 541 (1973).

[6]40 CFR 52.21.

[7]53 Federal Register 40656 , October 17, 1988; 40 CFR Parts 51 and 52.

Implementation. Implementing these provisions protecting visibility has not been easy, particularly Section 169A respecting existing sources. First, EPA had to define what visibility was. In general, visibility impairment from human activities manifests itself in two ways: (1) plume blight, where a clearly identifiable plume of smoke emanates from one or more sources; and (2) regional haze, where a uniform reduction in visual range occurs, or a layered discoloration by hovering bands of air tinged brown, yellow, or red. Second, EPA had to promulgate regulations within 24 months of enactment to assure that State Implementation Plans (SIPs) required (1) reasonable progress toward meeting the national goal mentioned earlier, and (2) compliance with several very specific provisions, including Best Available Retrofit Technology (BART) requirements for existing sources.

EPA promulgated rules in 1980 to address visibility impairment that was "reasonably attributable" to a single source or small group of sources — i.e., plume blight.[8] As with many air pollution regulations, these visibility regulations are implemented by states through SIPs. In general, the 36 states with mandatory class I areas were required to revise their SIPs to assure reasonable progress toward the national visibility goal. The major elements of the regulation were: (1) identifying existing sources causing visibility impairment and creating procedures for determining which existing stationary sources should be subject to BART requirements; (2) assessing potential adverse impacts from proposed new sources (or modified old sources) and recommending remedial actions via the New Source Review process and the PSD program; (3) developing a 10-15 year long-term strategy to make "reasonable progress" toward the visibility goal; and (4) conducting visibility monitoring in mandatory class I areas.

As noted, these regulations deal with plume blight only — regional haze reduction was explicitly delayed until some future date. This lack of aggressive implementation of Section 169A extended to the implementation of the 1980 regulations as well. After 35 of 36 states missed the September 1981 deadline for final visibility plans, the Environmental Defense Fund sued the EPA in 1982 to implement the plume blight regulations. The suit was settled in 1984 with the EPA developing a phased-in schedule for compliance with a December 1986 deadline for states to revise their SIPs to include controls on existing sources that hinder visibility goals.[9] This sequential implementation of plume blight regulations actually extended through 1989. So far, the only BART installation to occur under the 1980 regulations has been the installation of sulfur dioxide scrubbers at the Navajo Generating Station in 1991.[10]

During the 1980s, EPA's decision to delay regulating regional haze was subject to a variety of challenges, partly because of the relationship between regional haze and acid rain (both involve sulfur dioxide and nitrogen oxide emissions). In April, 1986, Vermont submitted a visibility plan to EPA focused on visibility problems at Lye

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[8]45 Federal Register 80084, December 2, 1980, 40 CFR 51.300-51.307.

[9]Environmental Defense Fund v. Gearstick, No. CO2-6850 (N.D. CA) (April 20, 1984). See 49 Federal Register 20647, May 16, 1984.

[10]56 Federal Register 50172, October 3, 1991; 40 CFR 52.

Brook National Wilderness Area — the state's only class I area. Arguing that out-of-state sources were responsible for impairing visibility (and thus impeding Vermont's attempts to assure reasonable progress toward the national visibility goal), Vermont proposed a long-term strategy to combat the effects of regional haze. This strategy included a 48-state sulfate reduction plan and the disapproval of the SIPs of eight upwind states that were major contributors to visibility impairment at Lye Brook. In July, 1987, EPA decided to take "no action" on Vermont's regional haze proposal because EPA had yet to act under Section 169A.[11] Vermont sued. Although sympathetic to Vermont's argument, the Second Circuit Court ruled in June, 1988, that EPA's action was in accordance with federal law.[12]

During this same time period, seven states sued EPA to compel issuance of regional haze regulations, under the citizen's suit provision of the Clean Air Act (Section 304). The District Court for Maine ruled in July, 1988 that it did not have jurisdiction in the matter, as EPA's 1980 rule represented a final action, and, therefore, was reviewable only in the D.C. Circuit Court within 60 days of the date of the rule.[13] The states appealed the decision to the Circuit Court which affirmed the District Court decision.[14] In affirming the District Court decision, the Circuit Court agreed that EPA had a mandate under Section 169A to control the "vexing problem of regional haze," but the Court concluded it did not have jurisdiction to compel EPA to move.

1990 Amendments. EPA's inaction during the 1980s prompted the Congress to act on visibility in the 1990 Amendments to the Clean Air Act. Those actions included a new title IV controlling precursors of acid rain and regional haze,[15] and a new Section 169B. In some ways, Section 169B is a triggering mechanism to force EPA to move on Section 169A with respect to regional haze. Specifically, the 1990 Amendments required EPA to establish a Grand Canyon Visibility Transport Commission within 12 months of enactment (and other commissions upon its own discretion or petition from at least two states). Commissions are required to assess the scientific, technical, and other data available on visibility impairment from potential or projected emissions growth in their region. Based on those data, the commissions are to issue a report within 4 years to EPA recommending what measures, if any, should be taken to remedy such impairment. Within 18 months of receiving a Commission's report, EPA is to carry out its responsibilities under Section 169A, including criteria for measuring "reasonable progress" toward the national goal. Finally, states affected by any regulations promulgated under Section 169A are required to revise their SIPs within 12 months of such promulgation.

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[11]52 Federal Register 26973, July 17, 1987.

[12]Vermont v. Thomas. 850 F.2d 99 (2d Cir. 1988).

[13]Maine v. Thomas. 690 F. Supp. 106 (D. Me. 1988).

[14]Maine v. Thomas. 874 F. 2d 883 (1st Cir. 1989).

[15]As noted by Section 401(a)(1): "the presence of acidic compounds and their precursors in the atmosphere and in deposition from the atmosphere represents a threat to natural resources, ecosystems, materials, visibility, and public health."

National Academy of Sciences Report. At the same time that Congress was considering revisions to the visibility provisions of the Clean Air Act, early in 1990, the National Research Council of the National Academy of Sciences established a Committee on Haze in National Parks and Wilderness Areas. The committee, consisting of 13 members, included experts in meteorology, atmospheric chemistry, air pollution monitoring and modeling, statistics, control technology, and environmental law and public policy, most of whom were drawn from academic institutions.

The committee examined patterns of visibility degradation and haze-forming pollutant concentrations in various parts of the United States resulting from natural and anthropogenic sources of gases and particles. It reviewed the scientific understanding of haze formation and visibility impairment, as well as chemical and physical measurement techniques. It evaluated methods for source identification and apportionment, discussed control techniques, and considered policy implications.

In January 1993, the committee issued a final report, which reached eight broad conclusions: 1) progress toward the national goal of reducing visibility impairment will require regional control programs that operate over large areas; 2) strategies should be adopted that consider many sources simultaneously on a regional basis; 3) simple models are available now and could be used as the basis for designing regional visibility programs; more complex models could be used to refine those programs over time; 4) policy and strategies may need to be different in the West than in the East; 5) improving visibility in class I areas (national parks and wilderness areas) will improve it outside those areas as well; 6) reducing emissions to improve visibility will help alleviate other air quality problems, and vice-versa; 7) achieving the national goal of improving visibility will require a substantial, long-term program; and 8) current scientific knowledge is adequate and control technologies are available for taking regulatory action to improve and protect visibility. At the same time, continued progress will require a greater commitment toward atmospheric research, monitoring, and emissions control R&D.[16]

Grand Canyon Visibility Transport Commission. As noted above, in Section 169B(f) of the Clean Air Act, the Congress specifically required EPA to establish a Visibility Transport Commission for the region affecting visibility in Grand Canyon National Park. In June 1996, this commission (consisting of the Governors of Arizona, California, Colorado, Nevada, New Mexico, Oregon, Utah, and Wyoming, and the leaders of five Indian tribes) approved a set of recommendations for improving Western vistas.[17] There were 9 primary recommendations:[18]

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[16]Summarized from NAS Report, pp. 6-11.

[17]*Recommendations for Improving Western Vistas,* Report of the Grand Canyon Visibility Transport Commission to the United States Environmental Protection Agency, June 10, 1996. A ninth state, Idaho, was included in the region, but chose not to participate in the Commission.

[18]The recommendations are summarized in Ibid., pp. i-iii.

- **Prevention.** To prevent and reduce air pollution, the commission recommended policies based on energy conservation, increased energy efficiency, and promotion of the use of renewable resources for energy production.

- **Clean Air Corridors.** The commission recommended careful tracking of emissions growth that may affect air quality in corridors of clean air that are sources of clear air at class I sites.

- **Stationary Sources.** The Commission's Baseline Forecast anticipated that current regulatory programs will reduce emissions of sulfur dioxide from stationary sources (power plants, smelters, and other industrial sources) 13% by the year 2000, although additional measures under consideration might reduce emissions 20-30%. In light of this uncertainty about the effects of current programs and the fact that emissions are being reduced in the short term without additional regulation, the Commission agreed to set regional targets for sulfur dioxide emissions in the year 2000. The ultimate targets would be in the range of 50-70% reduction by the year 2040, but "interim targets may also be needed to ensure steady and continuing emission reductions and to promote investment in pollution prevention."[19] If the targets are exceeded, this would trigger a regulatory program, probably including a regional cap on emissions, with market-based trading.

- **Areas in and near Parks.** The commission concluded that it lacked sufficient data regarding the visibility impacts of emissions from some areas in and near parks. "Pending further studies of these areas, the Commission recommends that local, state, tribal, federal and private parties cooperatively develop strategies, expand data collection, and improve modeling for reducing or preventing visibility impairment in areas within and adjacent to parks and wilderness areas."[20]

- **Mobile Sources.** Recognizing that mobile source emissions are projected to decrease, the Commission recommended capping emissions at the lowest level achieved and endorsed the concept of a 49-state low emission vehicle.

- **Road Dust.** The commission remained uncertain of the possible role of road dust: "The Commission's technical assessment indicates that road dust is a large contributor to visibility impairment on the Colorado Plateau. As such, it requires urgent attention. However, due to considerable skepticism regarding the modeled contribution of road dust to visibility impairment, the Commission recommends further study ... prior to taking remedial action."[21]

- **Mexican Emissions.** Mexican emissions, particularly sulfur dioxide, contribute significantly to visibility impairment on the Colorado Plateau. The

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[19]Ibid., pp. 34-35.

[20]Ibid., p. ii.

[21]Ibid.

Commission called for "continued binational collaboration" on this problem, and better monitoring and emissions inventories.

- **Fire.** The Commission recommended programs to minimize emissions and visibility impacts from prescribed fire, as well as to educate the public. In particular, the recommendations included establishment of annual emission goals for all fire programs, implementing enhanced smoke management programs, and removing administrative barriers to the use of alternatives to burning.[22]

- **Future Regional Coordinating Entity.** The Commission concluded that there was a continuing need for an entity like the Commission to oversee, promote, and support many of the recommendations in the final report. Such an entity has subsequently been established: the Western Regional Air Partnership (WRAP).

The Clean Air Act requires the EPA Administrator to take action under Section 169A within 18 months of receipt of a Commission report. This requirement was among the factors motivating proposal of the regional haze program at this time.

III. The Proposed Rule

The proposed rule appeared in the Federal Register on July 31, 1997.[23] Proposal began a public comment period that was originally scheduled to run until October 20. To solicit comments, the Agency also held a public hearing in Denver on September 18, 1997. At that hearing, numerous cementers requested extra time to submit comments. As a result, EPA extended the comment period 6 weeks, to December 5.

SIP Revisions. As proposed, the rule would require all 50 states to submit revised State Implementation Plans (SIPs) within 12 months of the rule's promulgation, with further revisions due 4 years after the initial revision and every 3 years thereafter. The SIP revision must contain a long-term strategy that demonstrates how measures implemented by the state will improve visibility in each class I area within the state and in class I areas outside the state that may be affected by the state's emissions. As described further below, the SIP must also identify facilities to be subjected to "best available retrofit technology."

Many states, particularly in the Midwest, do not have class I areas (i.e., the national parks and wilderness areas that the rule is designed to protect), but EPA has included all states under the scope of the rule because the fine particles that cause regional haze can travel hundreds of miles.

BART. The Clean Air Act requires the installation of best available retrofit technology (BART) on major stationary sources of pollution in existence on the date

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[22]Ibid., pp. 47-50.

[23]62 Federal Register 41138, July 31, 1997. For an overview, see http://ttnwww.rtpnc.epa.gov/naaqsfin/hazefs.htm .

of enactment (1977), but not more than 15 years old as of that date. BART is less well-defined than other Clean Air Act terms, in part because it has only been used once in the 20 years since enactment (to impose controls on Arizona's Navajo Generating Station in 1991).

The statutory definition of BART stipulates numerous factors to be used in determining what BART is and to what sources it should be applied, including costs of compliance, energy and nonair quality environmental impacts, the degree of improvement in visibility which may reasonably be anticipated to result from the use of the technology, and such site-specific factors as the remaining useful life of the source and the nature of any pollution control equipment in use at the source.

As part of the SIP revision process, states would be required to identify existing stationary facilities that are potentially subject to the imposition of BART. Such facilities are defined in Section 169A of the Act and 40 CFR 51.301(e). Under the statute, they include stationary sources that were placed in operation between 1962 and 1977 and emit at least 250 tons per year of any air pollutant. There are 26 industrial categories listed in the Code of Federal Regulations as potentially subject to BART requirements, including electric utilities, smelters, petroleum refineries, and kraft pulp mills.

Regulations would not be imposed on these industries immediately. Rather, the regulations would give states 3 years after promulgation of the rule to "evaluate BART for applicable sources." The states would then have an additional 2 years to address BART requirements in their State Implementation Plans. EPA would take up to 6 months to determine whether a SIP is complete and an additional 12 months to approve or disapprove the plan, with BART to be implemented "no later than five years after plan approval" -- the autumn of 2009, if all goes smoothly.

EPA also proposed, however, that states preparing SIPs for fine particulate matter ($PM_{2.5}$) need not submit the regional haze SIP revisions until the required date for submittal of the $PM_{2.5}$ revisions. Because of the need to establish a monitoring network and collect 3 years of monitoring data before the states identify $PM_{2.5}$ nonattainment areas and begin the development of SIPS, the BART implementation deadline could slip an additional 5 years in these states, to 2014.[24] In P.L. 105-178, enacted June 9, 1998, Congress codified this proposal and also extended deadlines for areas not designated nonattainment. The enacted language (in Section 6102(c)(2) of the Transportation Equity Act for the 21st Century) stipulates that SIPs implementing the regional haze rule be submitted on the same schedule as those for $PM_{2.5}$ nonattainment areas. In all other areas (i.e., those designated "attainment" or "unclassifiable" for $PM_{2.5}$), SIPs are to be submitted one year after such designation. This would probably imply a BART implementation deadline of 2012 in these areas.

Reasonable Further Progress. In addition to requiring the states to consider imposition of BART, the regulations would set "presumptive reasonable progress

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[24]For a discussion of the $PM_{2.5}$ SIP deadlines, see *Air Quality: Background Analysis of EPA's 1997 Ozone and Particulate Matter Standards*, CRS Report 97-8 ENR, June 19, 1998, pp. 22-23 (note 54).

targets," requiring the states to prevent visibility degradation on the least impaired days and to improve visibility on the most impaired days.

The progress targets are expressed in terms of "deciviews." A deciview is to vision what a decibel is to sound. As defined in the proposal, it is an index of atmospheric haze "that expresses uniform changes in haziness in terms of common increments across the entire range of conditions, from pristine to extremely impaired environments." A one deciview change is "a small but noticeable change in haziness under most circumstances...."[25]

As proposed, the rule would require each state to develop a long-term strategy that addresses regional haze visibility for each class I area within the state and each class I area outside the state which may be affected by emissions from within the state. The areas outside the state are to be defined in consultation with the appropriate federal land managers. The "long term" to be addressed by the strategy is defined as either 10 or 15 years (the Agency is seeking comments on the choice of time period). The strategy must provide for an improvement over the long term period of 1.0 deciview in the average visibility on the 20% most impaired days, and no degradation (i.e., less than a 0.1 deciview deterioration) in the average visibility on the 20% least impaired days.

These reasonable further progress targets are *presumptive*, rather than mandatory: under the proposed rule, states can, if they wish, propose alternate progress targets. If they do so, however, they must provide a justification for the alternate target addressing the statutory factors used in identifying BART (availability of technology, cost of compliance, etc.) and demonstrate the justification to the satisfaction of EPA.

Beginning 5 years after promulgation of the rule and continuing every 3 years thereafter, states must review their progress and revise their plan as appropriate.

Regional Cooperation. The proposed regulations presume a great deal of regional cooperation. Coordination with other states and federal land managers is mentioned frequently in the proposed rule. In most cases, a state will not be able to determine on its own its contribution to regional haze, but must coordinate monitoring, modeling, and strategies with federal land managers, other states, and EPA.

The rule also stipulates that measures to reduce emissions from sources contributing to regional haze "should be consistent with strategies developed in conjunction with other States through regional planning processes to address related

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[25]The quoted material is from Section I.F. of the preamble to the proposed regulation at p. 41145 of the July 31, 1997 Federal Register notice. The actual definition appearing on p. 41157 at 40 CFR 51.301(bb) uses similar language and goes on to provide a mathematical formula for calculating deciviews based on atmospheric light extinction coefficients. As the explanatory material notes, "the deciview is a means of expressing atmospheric light extinction, just as visual range is an expression of atmospheric light extinction. All three of these visibility metrics are mathematically related."

air quality issues," a reference to the regional planning necessary to combat ozone transport and to implement measures addressing EPA's new ambient air quality standards for ozone and fine particulates.[26]

IV. The Rule in Context

Related EPA Programs. While the Clean Air Act provides specific programs for protecting visibility in Sections 169A and 169B, other CAA programs to control air pollutants can reduce emissions that adversely affect visibility. Five of the most important are National Ambient Air Quality Standards, Prevention of Significant Deterioration, acid rain controls, New Source Performance Standards for stationary sources, and motor vehicle emission controls.

National ambient air quality standards (NAAQS) establish maximum levels of designated pollutants to protect health (primary NAAQS) and public welfare (secondary NAAQS). Pollutants for which NAAQS have been set are particulate matter (PM), sulfur oxides, nitrogen dioxide, ozone, carbon monoxide and lead. The Act requires states to implement plans (State Implementation Plans, or SIPs) to meet primary, health-based NAAQS by federally enforceable deadlines; secondary standards do not include such deadlines. In these plans, states have wide latitude to determine which sources must reduce emissions -- so long as the NAAQS is met. Visibility is explicitly included among the values to be protected by secondary NAAQS (§§109(b)(2) and 302(h)). EPA recently revised the particulate matter (PM) and ozone NAAQS, primarily to address adverse health effects; the net effect of the new primary standards for fine particulates ($PM_{2.5}$) and ozone will be to require further reductions in emissions of particulate matter and ozone precursors. Because these pollutants also affect visibility, EPA included an analysis of the impacts of the proposed regional haze rule in a combined regulatory impact statement (RIA) for the final PM and ozone NAAQS issued in July 1997. Moreover, in its discussion of the visibility rule, EPA emphasizes at several points its effort to coordinate the visibility requirements with the implementation of the fine particulate rule: "The planning schedule for the long-term strategy has been developed to facilitate integration with State planning for the PM and Ozone NAAQS. Similarly, EPA intends to address specific visibility emissions control strategies in more detail in conjunction with the PM and Ozone NAAQS control strategies."[27]

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[26]For an explanation of the ozone and fine particulate rules, see CRS Report 97-8, *Air Quality: Background Analysis of EPA's 1997 Ozone and Particulate Matter Standards.*

[27]EPA, *Regional Haze Regulations*, 62 Federal Register 41142, July 31, 1997. Also, "In light of EPA's intent to foster coordinated planning and implementation of the regional haze requirements proposed and the new $PM_{2.5}$ while still addressing the need to ensure reasonable progress in addressing visibility impairment, EPA is also proposing to allow States preparing nonattainment plans for fine particulate matter ($PM_{2.5}$) to submit their regional haze emissions control strategy SIP revisions by but not later than the required date for submittal of the State's $PM_{2.5}$ attainment control strategy SIP revisions" [Ibid., p. 41151]. Similarly, EPA foresees "ultimate integration of monitoring data from the new $PM_{2.5}$ monitoring network and

(continued...)

Prevention of significant deterioration (PSD) (Part C, Subpart 1 of Title I of the Act) is a program to protect air quality where ambient concentrations of pollutants are better than required by NAAQS. The provision classifies areas as to the amount of degradation allowed. All international parks, national parks larger than 6,000 acres, and national memorial areas and wilderness areas larger than 5,000 acres are mandatory class I areas -- those for which the least increment of pollution is allowed.[28] Most other areas are classified class II, which allows moderate degradation. Pollutants subject to PSD increments include PM, sulfur oxides, and nitrogen oxides -- all of which affect visibility. Major new sources in PSD areas must undergo preconstruction review and must install "best available control technology" (BACT); state permitting agencies determine BACT on a case-by-case basis, taking into account energy, environmental, and economic impacts. More stringent controls can be required if modeling indicates that BACT is insufficient to avoid violating an allowable PSD increment or the NAAQS itself. Because visibility is such an important value in class I areas, the visibility sections of the CAA constitute a subpart under the PSD program.

Acid rain controls added to the CAA in 1990 (Title IV) protect natural resources, ecosystems, materials, visibility, and public health (§401(a)(1)) by reducing emissions of sulfur oxides and nitrogen oxides -- reductions required even if NAAQS are being met. These reduction requirements fall primarily on utilities, mostly in the eastern portion of the country. The acid rain control program establishes a two-stage process to reduce emissions of sulfur oxides by 10 million tons and nitrogen oxides by 2 million tons from 1980 levels by the year 2000.

New source performance standards (§111) ensure adoption of best available control technologies (BACT) on all new sources regardless of location, even where primary NAAQS are being met; these standards apply to several pollutants contributing to regional haze, including particulate matter, sulfur oxides, and nitrogen oxides. The provision requires these new sources to install the best system of continuous emission reduction that has been adequately demonstrated. In making this assessment, the CAA requires EPA to take into account "the cost of achieving such reduction and any nonair quality health and environmental impact and energy requirements" (§111(a)(1)). Also, the provision explicitly permits EPA to "distinguish among classes, types, and sizes within categories of new sources for the purposes of establishing such standards" (§111(b)(2)). To take into account technological improvements in control technologies, the Act requires EPA to review and, if appropriate, update the standards of performance every 8 years, unless readily available information indicates such a review is unnecessary. The utility boiler NSPS for sulfur

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[27](...continued)
the visibility monitoring network ...." [Ibid., p. 41152].

[28]An "increment" is the "maximum allowable increase" over baseline concentrations. For PM and SO_2, these increments are set by law. For example, for a class I area, the maximum allowable increase in concentration of PM is 5 micrograms per cubic meter annual geometric mean, and 10 micrograms per cubic meter for the 24-hour maximum.

dioxide is currently under review and an updated utility boiler NSPS for nitrogen oxides has been proposed.[29]

Motor vehicle emission control requirements and nonroad engine standards (Title II) regulate tailpipe emissions, including nitrogen oxides and volatile organic compounds that affect visibility; and also establish related controls, for example on gasoline volatility and emissions from fuel handling and auto refueling. These standards apply in all 50 states.

All these air pollution control programs,[30] although imposed primarily for reasons other than the protection and improvement of visibility, nevertheless will definitely contribute to that goal by controlling pollutants that diminish visibility by causing regional haze.

The existence of these other programs that reduce emissions of pollutants impairing visibility means that visibility is likely to improve even while debate continues over the goals and requirements EPA is proposing for addressing regional haze. However, while visibility improvements may be marked in some areas, it is likely that emissions reductions required by these other programs will be insufficient to improve visibility significantly in numerous areas, especially in the West. Where visibility goals remain unmet, additional pollution control programs are likely to create tensions, as sources that successfully reduce emissions so as to comply with NAAQS implementation plans, acid rain controls, and/or new source performance standards may object to any further emission control requirements on the grounds that they chose the most cost-effective way to meet those prior requirements, and more controls would be costly and inefficient.

Costs. Because of the overlaps among control regimens affecting emissions of pollutants that cause regional haze and impair visibility and because the proposed rule would allow states to adjust targets to parallel ozone and PM NAAQS programs and would give broad discretion to states in determining control measures to meet visibility requirements, it is very difficult to isolate prospective costs of a regional haze control program. EPA's analysis[31] is confined to the 141 class I areas located in 121 counties in the 48 contiguous states. EPA projects that, in order to meet a presumptive target of improving the most impaired days (average of 20% highest days) in 2010 by 1 deciview, 76 of 121 class I area counties would need reductions beyond those achieved by then to meet the $PM_{2.5}$ NAAQS. If the goal were 2015, 58 mandated class I area counties would need additional controls. Virtually all the areas needing further controls would lie west of the Mississippi. Largely because of the acid rain control program, all 29 class I counties in the Northeast, Midwest, and

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[29]62 *Federal Register*, July 9, 1997, pp. 36948-36963.

[30]For a list of major CAA requirements that EPA considered in modeling emissions related to the PM and ozone NAAQS, see EPA, *Regulatory Impact Analyses for the Particulate Matter and Ozone National Ambient Air Quality Standards and Proposed Regional Haze Rule*, July 16, 1997, Table 4.5, p. 4-20.

[31]EPA, *Regulatory Impact Analyses for the Particulate Matter and Ozone National Ambient Air Quality Standards and Proposed Regional Haze Rule*, July 16, 1997, Chapter 8.

Southeast would meet the 2015 target and only 1 Southeast county would not attain the 2010 target.

EPA estimates that regional haze controls would cost $0 if the target does not go beyond the ozone and PM NAAQS implementation plans to a maximum of $2.7 billion per year (in 1990 $) for additional controls to meet the presumptive 2010 goal.[32] This analysis shows, too, that even with additional controls some areas would still fall short of EPA's alternative 2010 or 2015 targets (28 counties for 2010 and 17 for 2015); these areas would be concentrated in the south central and west regions, particularly in Arizona and southern California.

Benefits. EPA estimates that the benefits of the proposed regional haze control program range from $0 if the target does not go beyond the ozone and PM NAAQS implementation plans to a maximum of $5.7 billion annually for the presumptive 2010 goal.[33] This $5.7 billion benefit is not, however, all attributable to the value of visibility improvements per se: it is the sum of the upper range estimates for visibility ($0.57-1.13 billion), incremental health benefits attributable to pollutant reductions beyond those being implemented for meeting NAAQS ($1.1-4.5 billion), plus consumer cleaning cost savings of $0.03 billion.[34]

V. Issues

At least five sets of issues have been raised in the wake of EPA's proposal: 1) the potential impacts on industry and other economic sectors (with special concern for forestry and agriculture, where the use of prescribed burning is an important management tool); 2) the choice of methodology (i.e., "deciviews"), and more broadly whether improvement should be measured in terms of emission reductions or visibility improvement; 3) what constitutes reasonable further progress, as required in the Act -- in particular whether a goal of one deciview improvement is sufficiently ambitious or appropriate for all regions of the country; 4) whether EPA paid sufficient attention to the work of the Grand Canyon Visibility Transport Commission; and 5) questions concerning federal and state government relations, in particular the authority of each level of government vis-a-vis the other, as well as the relationships between federal or state regulators and federal land managers. This section reviews each of these issues in turn.

Concern over potential impacts. As previously noted, it is difficult to project specific private sector impacts of the proposed visibility rule, since states not only bear primary responsibility for establishing control requirements but also are given the option of adjusting the goal. Moreover, the proposal presumes that many requirements will develop through future regional agreements.[35] As a result, EPA's

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[32]Ibid.

[33]Ibid., Chapter 12.

[34]Ibid., pp. 12-49 and 12-66.

[35]EPA's discussion of the proposed regulation notes that the application of visibility program to all states "should not be interpreted by the States to mean that they will necessarily have

(continued...)

impact assessment takes a very broad-brush approach to estimating impacts and costs; however, some commentators on the rule have been more forthright in speculating on specific ones.

As a practical matter, the first impacts of requirements derived from visibility regulations will probably occur in the West. This is because the acid rain program in the East will be reducing sulfur oxide emissions substantially over the next 10 years, and they are the primary cause of visibility degradation east of the Mississippi. In the West, existing CAA requirements will not be reducing the pollutants degrading visibility as much, meaning that controls specifically designed to improve visibility can be expected to come into play there sooner than in the East.

Stationary Sources. The EPA proposal would set in motion a process that could result in the imposition of "Best Available Retrofit Technology" (BART) on existing stationary sources.[36] The BART requirements of the Act[37] (listed at 40 CFR 51.301(e)) could affect 26 source categories (e.g., electric utilities, smelters, petroleum refineries, and kraft pulp mills) which have the potential to emit 250 tons per year of any air pollutant and which began operating between 1962 and 1977.[38] EPA's proposal would require states to inventory sources potentially subject to BART within 1 year of promulgation of the rule, and then would give the states 3 years to complete evaluation of BART for applicable sources (i.e., probably by sometime in 2001). It would remain up to states to determine which, if any, candidate sources would actually have to install BART.

There has been some complaint that EPA's proposal overemphasizes BART controls relative to controls on other sources of pollutants impairing visibility. The western Governors, as a group, prefer market-based approaches rather than BART for the control of stationary sources. The BART procedure is specified in Section 169A, however, and is the only specific regulatory tool mentioned in the section. As a result, EPA had little choice but to require the states to use it; to fault the Agency for doing so is to ignore the mandate that Congress imposed.

Even so, imposition of BART is to be left largely to the discretion of the states, who will implement the requirement through the SIP process. The proposed rule does not require the imposition of BART on all sources.

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[35](...continued)
to adopt control strategies for regional haze immediately. Instead, it means that a State subject to the program first should participate in a regional air quality planning group ...." EPA, *Regional Haze Regulations*, 62 Federal Register 41145, July 31, 1997.

[36]See, for example, the statement of Michael O. Leavitt, Governor of Utah, before the Subcommittee on Forests and Public Land Management, Committee on Energy and Natural Resources, U.S. Senate, October 28, 1997.

[37]See "Plan Revisions to Address Best Available Retrofit Technology (BART)" in EPA, *Regional Haze Regulations*, 62 Federal Register 41149, July 31, 1997.

[38]After 1977, these sources would have been subject to the new source review requirements of PSD.

Forestry and Agriculture. Another potential area of impact involves both the private and public sectors: prescribed burning. In agriculture, fire is used to remove stubble and grass; in forestry, it is used to control brush and to diminish fuel buildup. Smoke from prescribed burning and from wildfires contributes to visibility impairment, and the 1980 visibility regulations included a requirement that states consider smoke management techniques for agricultural and forestry burning in developing long-term strategies for visibility protection. With the new, proposed rule, concern has been expressed that the EPA regulations could hinder prescribed burning in forests, with the potential effect of increasing damages from wildfires. Conversely, if prescribed forest burning were not impeded, then other sources of pollutants impairing visibility would necessarily be subject to more stringent controls (including, perhaps, controls on agricultural burning) to compensate for the impairment of visibility resulting from forest burning.[39]

EPA's position is that sound fire management of prescribed burning is possible, and the agency is working jointly with states and the land management agencies in the Departments of Agriculture, Defense, and the Interior on a policy for managing the impacts of prescribed fires. The Agency released an Interim Air Quality Policy on Wildland and Prescribed Fires, April 23, 1998. Under the policy, EPA encourages states to develop smoke management plans, and, as an incentive, says that it will not count exceedances of air quality standards that result from prescribed or natural fires in determining an area's attainment status if the state has a smoke management plan in place.[40] Overall, it remains uncertain what, if any, impacts the proposed regulation will have on prescribed burning, or on agriculture and forestry more generally, particularly since it will be the states, individually or regionally, that determine local control requirements.[41]

Small Businesses. EPA has certified that the proposed rule will not have a significant impact on small businesses, because the states will be exercising "substantial intervening discretion in implementing the proposed rule."[42] This finding does not mean there will be no small business impact, although impacts are speculative; rather, by claiming that only subsequent state implementation would affect small business, EPA seeks to avoid procedural requirements that would otherwise be imposed by the Small Business Regulatory Enforcement Fairness Act (SBREFA). Nonetheless, EPA has undertaken small business outreach efforts on the

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[39]Statement of Greg E. Walcher before the Subcommittee on Forests and Public Land Management, U.S. Senate, *Hearing: Impact of Regional Haze Rules on Federal Land Management*, Oct. 28, 1997.

[40]"EPA Recommends States Adopt Programs for Managing Smoke from Prescribed Fires," *Daily Environment Report*, May 20, 1998, p. A-2. The policy can be found on EPA's website at www.epa.gov/ttn/oarpg/t1/memoranda/firefnl.pdf

[41]A related issue is the extent to which prescribed burning can be controlled by the states if it occurs on federal land. For a discussion of this issue, see p. 23 below.

[42]EPA, *Regional Haze Regulations*, p. 86.

impacts of the PM and ozone NAAQS and the regional haze rule -- efforts that largely parallel the SBREFA requirements.[43]

Mobile Sources. The Grand Canyon Visibility Transport Commission report recommended additional attention to controlling mobile source emissions, particularly endorsing the concept of a 49-state low emission vehicle whose emissions would be substantially less than those allowed by then-current regulations. Mobile source emissions are directly regulated by Title II of the Clean Air Act, and are outside the purview of Section 169A.

At the time of the Commission's recommendation, EPA did not have authority to require lower emission standards prior to the year 2004. Nevertheless, in February 1998, EPA, the auto industry, and a group of Northeastern states reached agreement on a voluntary National Low Emission Vehicle (NLEV) program, which will be implemented in 8 Northeastern states and the District of Columbia in 1999, and in the rest of the states two years later.[44] This agreement implements the Commission's recommendation and essentially removes this issue from further discussion in the current regional haze debate.

Unpaved Roads. The Grand Canyon Commission also noted that models attribute significant impairment to visibility on the Colorado Plateau from road dust -- a finding that suggests paving unpaved roads could be an effective control measure. However, many question the technical accuracy of this finding, and the Commission gave high priority to further research on the issue.

Mexican Sources. Finally, particularly in the Southwest, emissions from Mexican sources may significantly contribute to visibility impairment. The visibility regulation does not provide any mechanism for addressing this issue directly, but several U.S.-Mexican agreements provide for cooperation in solving environmental problems of the border region -- including attainment and maintenance of primary and secondary NAAQS.[45] Such cooperation could lead to controls on major Mexican sources of sulfur oxides, particularly smelters and/or coal-fired power plants.

Choice of Methodology. A second set of issues raised in debate over the proposed rule concerns the methodology chosen by EPA to be the measure of progress in improving visibility. As explained earlier in this report, the rule sets a target of improving visibility by 1.0 deciview over either a 10 or 15-year period. EPA requested comments concerning both the choice of time period and the proposed use of deciviews as the means of measuring visibility improvement.

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[43]Ibid.

[44]63 Federal Register 11374, March 9, 1998.

[45]Notably, the "Agreement between the United States of America and the United Mexican States on Cooperation for the Protection and Improvement of the Environment in the Border Area (*La Paz* Agreement)"; an annex to this agreement was used by EPA as the vehicle for implementing §815 of the CAA, "Establishment of Program to Monitor and Improve Air Quality in Regions along the Border between the United States and Mexico" (added by the 1990 Clean Air Act Amendments). See, EPA, *U.S.-Mexico Border XXI Program Framework Document* (October 1996 [EPA 160-R-96-003]), Appendix I.

A deciview is a small but noticeable change in haziness, determined by use of a mathematical formula that uses logarithmic values of atmospheric light extinction coefficients. The term was coined by Marc Pitchford of the National Oceanic and Atmospheric Administration (NOAA) and William Malm of the National Park Service in a 1994 article that appeared in the journal *Atmospheric Environment*.[46] The idea behind the use of deciviews is that changes on the scale have a linear relationship to human perception: i.e., a change from 10 to 11 and a change from 30 to 31 are both small, perceptible changes to a human observer. The other available measures (such as light extinction or visual range) "do not express perception linearly. For example, a 5-mile change in visual range can in some cases be very significant, such as a change from 5 to 10 miles in an impaired environment, whereas it may be barely perceptible on a clearer day (such as from 95 to 100 miles)."[47]

EPA argues that use of this measure as the way of defining reasonable progress makes sense "because of the importance that progress ... be measured in terms of 'perceptible' changes in visibility, and due to the simplicity of its useful scale."[48] It also conforms closely to the recommendations of the National Academy of Sciences, whose Committee on Haze, writing before the appearance of Pitchford and Malm's article, concluded that existing measures of visibility, such as visual range, were not well-suited to measuring the "vague and qualitative" definition of visibility impairment in the Clean Air Act. The NAS Committee recommended that an index of visibility impairment be developed:

> The ability to make quantitative connections between optical properties of the atmosphere and human judgments of visibility is still in the developmental stage because of the complexity of the physical and psychological phenomena. To quantify visibility impairment, an index must be developed that can incorporate the complexity of those phenomena; the index also must be understandable and useful to the general public and policy makers as well as to scientific researchers. Because impairment is based largely on human judgments of the visual environment, the human element must be incorporated in the development of such an index. In addition, the index must be based on properties of the physical environment that can be readily measured and monitored to enable enforcement of air quality standards.[49]

Not everyone agrees that the deciview approach is the appropriate one, however. Gov. Michael Leavitt of Utah, testifying to a Senate subcommittee on behalf of the Western Governors' Association, argued that:

> Visibility improvement or "reasonable progress" should not be based strictly on a visibility standard, a quantitative deciview measurement. Given the current state of the science and technical air quality management tools as well as the inherent

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[46]Marc L. Pitchford and William C. Malm, "Development and Applications of a Standard Visual Index," *Atmospheric Environment*, Vol. 28, No. 5, 1994, pp. 1049-1054.

[47]Regional Haze Regulations, Preamble, 62 *Federal Register* 41145, July 31, 1997.

[48]Ibid.

[49]NAS Report, p. 354.

> nature of visibility management in the West, visibility measurement should be used as a tool but not a standard.[50]

Instead, Leavitt and others would prefer to use emissions-based measures for determining progress. Such measures would be more in line with traditional air pollution control programs, and have the advantage of being more predictable for industry and other sectors subject to compliance.

What Constitutes "Reasonable Further Progress". Whether or not one agrees with the methodology used to measure progress, a related issue concerns the *amount* of progress that states should be asked to make. EPA has defined reasonable further progress, in all areas of the country, as a 1.0 deciview improvement in visibility every 10 to 15 years. Such a target implies that visibility will continue to be severely degraded for long periods of time in some parts of the West and particularly in the East. (For a map showing current levels of visibility in various regions of the United States, see Figure 1.)

In testimony before a Senate subcommittee, Marcia Frienz of the National Parks and Conservation Association (NPCA), stated:

> Currently, eastern states face a 15 deciview impairment from non-natural haze. Even under the stricter one deciview per 10 years goal, it would take the region 150 years to remedy its severe haze pollution problem! NPCA does not believe this is reasonable progress, particularly when one considers that the man-made haze problem has been created over the last 50 years. For that reason, we recommend that a three deciview rate of improvement over 10 years be adopted for eastern states.[51]

An Associate Director of the National Park Service, speaking to the same subcommittee, was less direct in his recommendations, but painted an even more negative picture of the dimensions of the problem:

> EPA's suggested "reasonable progress" target for the most impaired days needs to be closely examined as it would allow 220-330 years to achieve the national visibility goal in those areas, such as Shenandoah and Great Smoky Mountains National Parks, where visibility is currently very degraded. In addition, the proposed criteria could allow for a slower rate of progress than is actually being achieved in many areas.[52]

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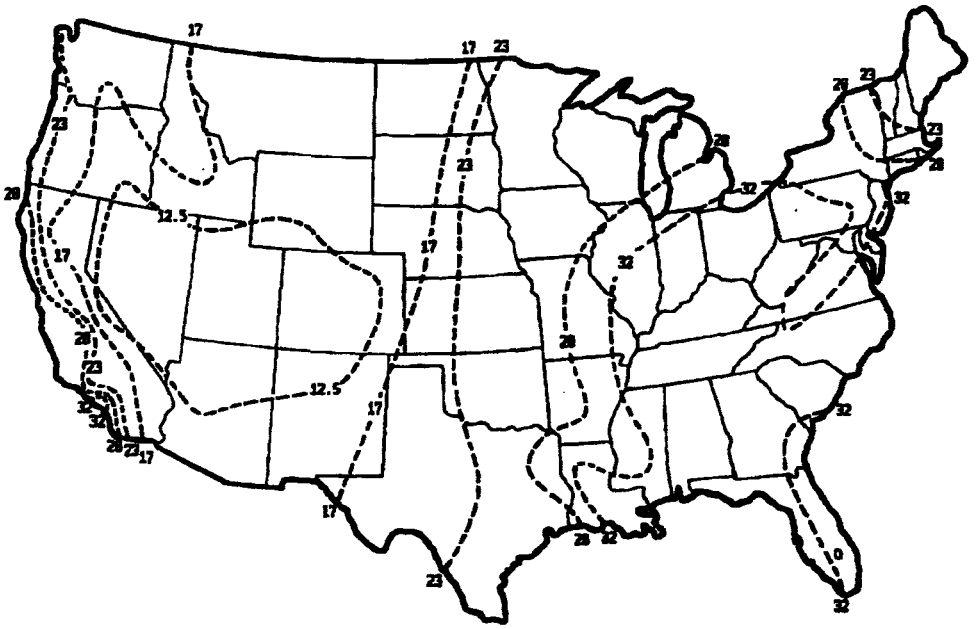
[50]Statement of Michael O. Leavitt, Governor of Utah, before the Subcommittee on Forests and Public Land Management, Committee on Energy and Natural Resources, U.S. Senate, October 28, 1997, p. 5.

[51]Statement of Marcia Frienz, National Parks and Conservation Association, before the Subcommittee on Forests and Public Land Management, Committee on Energy and Natural Resources, U.S. Senate, October 28, 1997, p. 3.

[52]Statement of Dr. Michael Soukup, Associate Director, Natural Resource Stewardship and Science, National Park Service, before the Subcommittee on Forests and Public Land Management, Committee on Energy and Natural Resources, U.S. Senate, October 28, 1997, p. 6.

Figure 1. Median Summer Visibility for Suburban/Non-urban Areas: 1974-1976, Displayed Using the Deciview Scale



Note: Increases on the deciview scale correspond to greater impairment of visibility. Zero on the scale represents visibility in particle-free air, a condition that is not achievable in most cases, even in the absence of pollution. Under normal unpolluted conditions, median visibility would range from 4 to 5 deciviews in the West to about 8 to 9 in the East.

Source: Pitchford and Malm, "Development and Applications of a Standard Visual Index," *Atmospheric Environment*, Vol. 28, No. 5, 1994, p. 1053.

In portions of the West, the reverse problem may occur: here, air quality is still sufficiently good that obtaining a noticeable (i.e., 1.0 deciview) improvement would require substantial effort, and improvements of more than that amount may not be feasible. Anne Smith, who, as a consultant to the Grand Canyon Visibility Transport Commission, developed the model that projected impacts of control measures on visibility at the Grand Canyon, has concluded that the "Maximum Management Alternative" on the Colorado Plateau "generates only 1 deciview of improvement in 50 years in terms of the annual average (from 9 deciviews in 1990 down to 8 deciviews in 2040). In terms of the 20% worst days, which is the focus of the proposed rules, this 'upper bound' generates approximately 1.5 to 2 deciviews of improvement."[53]

However, this conclusion does not take into account certain control possibilities, and may overstate the difficulty of achieving visibility improvement, particularly in the

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[53]Statement of Dr. Anne E. Smith, Decision Focus Incorporated, before the Subcommittee on Forests and Public Land Management, Committee on Energy and Natural Resources, U.S. Senate, October 28, 1997, p.3.

near term. The Maximum Management Alternative, defined as the "maximum visibility improvements possible regardless of the cost of the pollution controls used," did not include mobile source controls or measures that would require international cooperation.[54] Further, the same analysis shows that, due to existing control requirements, visibility will improve until about 2010, by as much as one deciview.[55] As a result, EPA's target, at least for the first 10 to 15 year period, appears to be relatively easily attained both in the West and the East.

Nevertheless, Dr. Smith's larger point is well-taken: beyond 2010, visibility improvements in the West may be difficult to achieve. Because air quality is less degraded there, a less stringent target may be justified, particularly if the first 10 to 15-year period yields projected improvements. Opponents have characterized EPA's proposal as a "one-size fits all" federal regulation. In most respects, given the flexibility EPA is allowing the states to develop their own goals, strategies, and regulatory programs, this criticism seems out of place; but in requiring the same rate of progress in all areas of the country, EPA *is* establishing a sort of "one-size fits all" target, which may be too lenient in some areas, while being difficult to maintain long term in others.

Setting different federal standards for different parts of the country poses its own challenges, however. Typically, the federal government has imposed uniform federal standards to protect health and to provide a level playing field for new major sources. Because states begin with different levels of pollution, the establishment of a uniform federal standard (for example, a National Ambient Air Quality Standard) can have the effect of requiring more stringent measures in some states and local areas than in others.[56] In addition, the states have authority under most environmental statutes to set their own standards (as long as they are more stringent than the federal), and have done so under other parts of the Clean Air Act.

What is unique in the regional haze rule is that the standard is expressed in terms of units of progress, rather than as the ultimate goal. This choice seems mandated by the language of the Act itself, which requires "regulations to assure ... reasonable progress toward meeting the national goal...." Nevertheless, achieving sufficiently rapid progress in the East, while not setting impossible standards in the West, is a challenge that EPA faces in crafting the final regulations.

Grand Canyon Commission Recommendations. A number of interested parties, including many of the participants in the Grand Canyon Visibility Transport Commission process, have complained that EPA's proposal pays insufficient attention to the Commission's recommendations. The Commission assembled a diverse group of interested parties from eight states and spent 5 years analyzing the problem of visibility in the national parks and wilderness areas of the Colorado Plateau, including the Grand Canyon, Bryce Canyon, Zion and other areas. As noted earlier in this

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[54]Ibid.

[55]Ibid., p.2.

[56]For a discussion of the setting of ambient air quality standards, see CRS Report 97-722, *Air Quality Standards: The Decisionmaking Process*.

report, the Commission reached consensus on a set of nine recommendations that addressed a wide range of contributors to the haze problem, including mobile sources, road dust, stationary sources, international sources, and prescribed burning, and recommended a wide array of measures, including further research needs, to address the problem.[57]

EPA's proposed rule discusses the work of the Commission in its preamble, but it does not strictly follow the Commission's recommendations for several reasons. First, the recommendations are useful in outlining future research needs (e.g., tracking emissions growth in clean air corridors, expanding data collection and improving modeling for areas in or near parks, and resolving uncertainties concerning the contribution of road dust to visibility impairment). The Commission report also identifies areas that need additional attention, such as collaboration with Mexico on emissions inventories and monitoring. But many of its recommendations do not address the regulation or reduction of emissions. In this regard, they do not offer a regulatory blueprint.

Second, where the recommendations do address regulation, in many cases they recommend programs for which EPA has limited statutory authority. For example, the Commission recommended "policies based on energy conservation, increased energy efficiency and promotion of the use of renewable resources for energy production," including the adoption of emission fees to replace property or income taxes, and the adoption of stricter energy efficiency standards for motors, appliances, and lighting.[58] But the Clean Air Act gives EPA no authority to promulgate any such requirements.

Third, EPA's proposal is meant to address visibility problems in all areas of the country, not just the eight states that participated in the Commission process. While there are many useful ideas in the Commission report, the visibility problem is substantially different, both in causes and in severity, in other parts of the country: recommendations intended to protect the Grand Canyon do not necessarily fit in the eastern or southern United States.

What EPA has proposed focuses on state planning, allowing the states flexibility to adopt whatever measures they conclude will make progress toward the national goal. It requires the states to measure that progress and revise their plans at 3-year intervals. And it allows the states to adopt alternative progress targets, where they can justify doing so, using criteria spelled out in the Act. This degree of flexibility is unusual in an EPA regulatory program. It appears to be consistent with the statutory authority provided in Section 169A.

Federal-State Issues. The proposed regional haze regulations have also called attention to certain perennial issues of federal-state relations under the Clean Air Act -- in particular, the extent to which federal entities can prevent or penalize actions by states, and vice versa. More specifically, three federal-state issues present themselves: a) whether a federal land manager can block state issuance of permits under the

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[57]For a summary of the recommendations, see the discussion above, on pp. 6-8.

[58]Ibid., p. 30.

Prevention of Significant Deterioration (PSD) program; b) whether the actions of federal land managers (such as prescribed burns on Forest Service lands) are subject to state authority; and c) what authority EPA has to enforce its visibility program requirements on states -- in particular, whether sanctions under Sections 179 and 110(m) of the Clean Air Act apply to states that fail to submit or implement adequate State Implementation Plans.

Federal Land Managers and Permits. Can a federal land manager (FLM)[59] block state issuance of emission permits because of the impact the emissions may have on visibility in class I areas? As a practical matter, it would seem not. It is true that the Clean Air Act gives the FLM an "affirmative responsibility" to protect visibility on federal lands in class I areas.[60] It is also true, more concretely, that where the FLM shows "to the satisfaction of the State" that emissions from a proposed major emitting facility will adversely affect visibility on such lands, the Act instructs that "a permit shall not be issued."[61] Read literally, this directive could be deemed a federal veto. Realistically, however, the unqualified discretion afforded the state to determine when a showing has been made "to [its] satisfaction" means that the state retains control over whether the permit is issued.

Elsewhere in the Clean Air Act, it is required that a state "consult in person with the appropriate [FLM]" before holding a hearing on proposed visibility-related SIP revisions.[62] Plainly, this also falls short of an FLM veto authority over individual emission permits.

State Authority over Federal Land Managers. Turn now to the reverse situation. What authority do states have, through their SIPs as revised in accordance with the new visibility regulations, to regulate emissions on federal lands? In particular, what authority do states have to regulate prescribed burning of National Forest lands? Because the Clean Air Act (like most other federal pollution laws) contains a broad waiver of federal supremacy, states appear to have broad authority to regulate emissions on federal lands -- whether the regulation is contained in a SIP or not. Under the Act, federal agencies "having jurisdiction over any property" or "engaged in any activity resulting ... in the discharge of air pollutants" must comply with state air pollution rules to the same extent as any nongovernmental entity.[63]

Sanctions. Finally, there is the issue of sanctions, long a sensitive one under the Clean Air Act. (Title I of the Clean Air Act provides both mandatory and discretionary authority for the EPA Administrator to impose sanctions on states that have not submitted adequate State Implementation Plans. Sanctions take two principal forms: 1) withholding federal highway funds, and 2) 2:1 offsets -- requiring

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[59] "Federal Land Manager" is defined as the Secretary of the department with authority over the federal lands in question. CAA § 302(i).

[60] CAA § 165(d)(2)(B).

[61] CAA § 165(d)(2)(C)(ii).

[62] CAA § 169A(d).

[63] CAA § 118(a).

permit applicants in nonattainment areas to assure offsetting emission reductions twice as great as the emissions to be released by a proposed facility. For a more thorough discussion of Clean Air Act sanctions, see *Highway Fund Sanctions for Clean Air Act Violations,* CRS Report 97-959 ENR.)

What sanctions can be imposed on states for failing to revise their SIPs to meet the visibility-related requirements of EPA's regional haze regulation, when it is issued?[64] Reading closely the mandatory sanctions provision[65] and the discretionary sanctions provision[66] in the Act, it would appear that the latter fits this situation more closely. If this interpretation is correct, then in the event of a state's failure to make the SIP revision, EPA may, but does not have to, impose the highway sanctions and/or the 2:1 emissions offset sanctions (in nonattainment areas), and must, should the state's failure continue, promulgate a federal implementation plan revision.[67]

But while CAA sanctions may be imposed for failure to submit an adequate SIP, they may not be imposed, following procedural compliance, for not achieving visibility goals. That is, where visibility-related SIP revisions are made by the state and approved by EPA, sanctions may not be imposed if the new SIP measures prove to be less effective than believed at the outset. As an initial matter, proposed 40 C.F.R. § 51.306(d)(5) allows a state to adopt an "alternate reasonable progress target" if the original target can be shown to be unattainable due to such factors as availability of source control technology, costs of compliance with the original target, the remaining useful life of sources, etc. Only if the state cannot make the required showing, or simply refuses to try, would matters move to the next phase. In such event, the CAA calls for an EPA finding that the SIP is "substantially inadequate," and an EPA deadline of no more than 18 months for the state's submission of plan revisions.[68] If such SIP revisions are not timely submitted, the Act contemplates that 18 months after the determination of nonsubmission EPA must impose either the highway sanction or (in nonattainment areas) the 2:1 emissions offset sanction,[69] may also withhold air pollution program grants,[70] and must, should the non-submission continue, promulgate a federal implementation plan revision.[71]

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[64] Such SIP revisions are required by CAA § 169B(2).

[65] CAA § 179(a).

[66] CAA § 110(m).

[67] CAA § 110(c)(1).

[68] CAA § 110(k)(5). See also CAA § 110(a)(2)(H)(ii) (state-submitted SIP, to be approvable, must provide for revision of plan if substantially inadequate to comply with Act's requirements).

[69] CAA § 179(a). Some ambiguity exists as to whether CAA § 110(m), rather than CAA § 179(a) might govern in this circumstance. If section 110(m) controls, then EPA imposition of the highway and emission offset sanctions is discretionary, not mandatory.

[70] CAA § 179(a).

[71] CAA § 110(c)(1).

Conclusion

The regional haze rule, on its own, appears unlikely to have much impact on air quality before the year 2010. It proposes relatively modest goals for visibility improvement. These goals appear likely to be met or surpassed in most sections of the country as a result of regulations already being implemented -- notably the acid rain program and controls on mobile sources and non-road engines. In states required to implement programs to control fine particles -- which EPA and other observers believe includes most of the states -- implementation of the regional haze program will be delayed to coincide with PM control measures, which are unlikely to be determined before 2009.

However modest its immediate impact, the proposed rule is one of several regulations that point in the same direction. Along with the nonattainment provisions of the 1990 Clean Air Act, the revised air quality standards for ozone and particulates (promulgated in July, 1997), the acid rain program, the regional efforts to control ozone transport developed by the Ozone Transport Assessment Group and the Ozone Transport Commission, the threat of action to control interstate sources of air pollution under Section 126 of the Act, the implementation of revised New Source Performance Standards for stationary sources of pollution, and new standards for mobile sources that are now being implemented, these regulations will help move the nation toward noticeably cleaner air.[72] In this respect, the haze regulations may function almost as "standby" regulations: in case the other measures being implemented do not improve visibility in national parks and wilderness areas, the tools of the regional haze program would be available to do so.

At the same time, EPA faces significant choices in finalizing the haze regulations, which could substantially affect the reach and impact of the rule. For example, adoption of more stringent targets for visibility improvement, or standards that emphasize emission reductions from specific types of sources rather than the more general goal of visibility improvement, could make regional haze regulation more of a controlling factor on the regulatory agenda.

States will have decisions to make, too, once the rule is final. Successful implementation of the rule will require consultation and decision-making on a regional basis. In its proposal, EPA has placed significant emphasis on the regional consultations and decision-making required, but at present, the institutional structures necessary for regional decision-making are nonexistent. The regions themselves require definition.

As a result, Congress is likely to retain an interest in the regional haze program and its implementation. Congress can express this interest in a number of ways. It can review regulations and their implementation under both its general oversight authority and under the new congressional regulatory review process; it can use the

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[72]For descriptions and discussion of these other programs, see CRS Issue Brief 97007, *Clean Air Act Issues*, and the Clean Air Act section of CRS Report 97-49 ENR, *Summaries of Environmental Laws Administered by the Environmental Protection Agency*.

appropriations process to shape implementation; and it periodically revisits issues by considering amendments to the authorizing legislation -- in this case, the Clean Air Act, whose authorization expires September 30, 1998. Whether the regional haze program will be considered in any of these congressional fora is likely to depend on the final form of the rule that EPA chooses to promulgate.