

National Park Service
Air Resources Division

Cumulative Impacts Analyses: PSD Increments and Visibility

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Introduction

Poor air quality currently impairs visibility in every national park¹ and most, if not all, wilderness areas. Haze in parks and wilderness areas diminishes the visitor experience in many cases. Sources continue to be permitted without the permitting state knowing if prevention of significant deterioration (PSD) increments are being exceeded or cumulative impacts on air quality related values (AQRV), including visibility, are adverse because information on cumulative impacts is not routinely generated.

Information on cumulative air quality and visibility impacts is not only important to the Federal Land Managers (FLMs), given their mission to protect the health of sensitive resources, but for states as well, which are concerned with sustainable growth, quality of life and economic impact of air pollution.² Many state constitutions provide an affirmative duty of environmental protection or create individual rights to a healthful environment (see Appendix A). And, the Council on Environmental Quality has recognized the impact of cumulative effects on a healthful environment: “Evidence is increasing that the most devastating environmental effects may result not from the direct effects of a particular action, but from the combination of individually minor effects of multiple actions over time.”³

States are generally not examining cumulative effects of growth on air quality—including major and minor stationary sources, mobile and area sources—in accordance with the requirement to periodically assess their PSD state implementation plans (SIPs) to ensure compliance with allowable incremental increases under the Clean Air Act. Proposed PSD sources are generally only performing cumulative increment analyses in select cases. Likewise, states are generally not performing cumulative visibility impact analyses (CVIA),⁴ and some states claim they do not have the authority to require PSD permit applicants to perform CVIA, or are otherwise not doing so. The Environmental Protection Agency (EPA) has provided no guidance or otherwise has not enforced either requirement, although various EPA staff have agreed with the FLM’s positions that both cumulative analyses are required.

Summary on Cumulative PSD Increment Analysis

- The protection of increments is the primary method through which PSD program purposes are realized.
- States are required to know if increment violations exist.
- If increment violations exist, states are required to revise SIPs to correct violations.

¹ National Park Service, Air Resources Division (2002). *Air Quality in the National Parks*. 2d ed. Lakewood, Colorado: U.S. Dept. of Interior, National Park Service, Air Resources Division.

² See, e.g., Washington State Dept. of Ecology (2002). *The Economic Benefits of Clean Air*. Available online at <http://www.ecy.wa.gov/pubs/0202011.pdf>

³ Council on Environmental Quality (1997). *Considering Cumulative Effects under the National Environmental Policy Act*. Available online at <http://ceq.eh.doe.gov/nepa/ccenepa/ccenepa.htm>.

⁴ States will eventually have to do some kind of CVIA to meet the “reasonable progress” goals of the Regional Haze Rule.

- Major new sources are required to conduct cumulative increment analyses; in practice, most states require and the FLMs request cumulative analyses from new sources who are predicted to exceed significant impact levels.

Summary on Cumulative Visibility Impact Analysis

- States are required to track changes in visibility impairment in Class I areas.
- EPA requires states to have the authority to require cumulative visibility analyses.
- EPA's intention is that cumulative visibility analyses for new sources are done.
- FLMs request cumulative visibility impact analyses be done by certain new sources.
- Cumulative visibility impact analyses performed by states as well as new sources are consistent with the national visibility goal and states' requirements to make reasonable progress towards that goal, other air quality analyses required of new sources (such as PSD increment analysis), and "reasonably attributable" visibility program provisions.

Clean Air Act: PSD, SIP Revisions and Visibility

The language and intent of the Clean Air Act (CAA) and its implementing regulations are clear that states are to: 1) track consumption of Prevention of Significant Deterioration (PSD) increment to determine if they are being violated and if they are, to take steps to reverse the violations; and 2) track visibility to insure national visibility goals are being met. Tracking emissions and visibility necessarily requires looking at cumulative impacts from major, minor and area sources, and a reasonable interpretation of the statute, implementing regulations and related guidance documents supports this. New sources, in many cases, are responsible for performing cumulative impact analyses and states would benefit from enforcing mandatory and discretionary requirements. State regulations must be at least as stringent as federal regulations and must embody these requirements.

The purposes of the PSD program, as defined by Congress⁵, are to:

- Protect public health and welfare from actual or potential adverse effects from air pollution, notwithstanding attainment and maintenance of air quality standards;
- Preserve, protect and enhance the air quality in national parks, wilderness areas and other areas of natural, recreational, scenic or historic value;
- Insure economic growth will occur in a manner consistent with the preservation of existing clean air resources;
- Assure that emissions from any source will not interfere with any state's PSD implementation plan; and
- Assure that any relevant permit decision is made only after careful evaluation of all the consequences to such a decision and public participation.

The primary mechanism through which the PSD goals are to be met is the "maximum allowable increase" or increment. State Implementation Plans (SIPs) are required to contain "measures as

⁵ 42 U.S.C. §7470 (§160).

may be necessary . . . to prevent significant deterioration of air quality”⁶ Specifically, SIPs “*shall contain measures assuring*” that *increments* for sulfur oxide and particulate matter “*shall not be exceeded*” (emphasis added).⁷ Increments, or “maximum allowable increases,” for Class I areas are defined for particulate matter as 5 and 10 $\mu\text{g}/\text{m}^3$ for annual and 24-hour respectively, and for sulfur dioxide as 2, 5, and 25 $\mu\text{g}/\text{m}^3$ for annual, 24-hour and 3-hour respectively.⁸ The EPA, through its regulations, has established Class I annual increment levels for nitrogen dioxide that are not to be exceeded (2.5 $\mu\text{g}/\text{m}^3$).⁹ For any other pollutant for which there exists a national ambient air quality standard, the allowable concentration is the lower of the primary or secondary air quality standard.¹⁰

In general, any SIP shall provide for its revision if any applicable provisions in the CAA are not being complied with.¹¹ The CAA is clear that the primary tool of the PSD program is the increment and SIPs must insure increments are not exceeded. To know whether increments have been or will be exceeded, states need some method of assessing the status of increments on a regular basis. The regulatory provision that provides for this assessment is discussed below. Should they find any increments are exceeded—in accordance with the CAA—the SIP must be revised to correct the violation. This requirement is also codified in the regulations discussed below. Additionally, the CAA specifies that states may “take such measures, including issuance of an order, or seeking injunctive relief, as necessary to prevent” emissions that would violate the PSD requirements.¹² Finally, the CAA requires proposed major sources to demonstrate that emissions “will not cause or *contribute to*” violations of the Class I increment.¹³

Some controversy over whether cumulative impact analyses are required is related to the “cause or contribute” language in the CAA as well as the regulations. A literal and logical interpretation of this phrase is that a source either “brings about (the) effect or result” of, or, “supp(lies) in common with others” the effect or result of an increment violation or visibility impairment.¹⁴ The only possible way to determine if a source has contributed to an effect is to do a cumulative impact analysis.

Regarding visibility, Congress’ declared national goal is “the prevention of *any* future, and the remedy of *any* existing, impairment of visibility in mandatory class I Federal areas which impairment results from manmade air pollution.” (emphasis added).¹⁵ The visibility impairment Congress sought to prevent need not be significant. The CAA directs EPA to promulgate regulations that provide guidelines to states to meet this national goal, and requires SIPs that address Class I areas—including SIPs from states “the emissions from which may reasonably be anticipated to cause or contribute to any impairment of visibility” in a Class I area—to contain

⁶ 42 U.S.C. §7471 (§161).

⁷ 42 U.S.C. § 7473(a) (§163).

⁸ 42 U.S.C. §7473(b)(1).

⁹ 40 C.F.R. § 51.66(c).

¹⁰ 42 U.S.C. §7473 (§163).

¹¹ 42 U.S.C. §7410(a)(2)(H).

¹² 42 U.S.C. §7477 (§167).

¹³ 42 U.S.C. §165 (a)(3) (emphasis added).

¹⁴ Mish, F. (Ed.)(1989). *Webster’s Ninth New Collegiate Dictionary*. Merriam-Webster: Springfield, Mass.

¹⁵ 42 U.S.C. §7491(a)(1).

necessary measures to “make reasonable progress” toward the national goal.¹⁶ As discussed below, the regulations direct states to track progress towards national visibility goals and to revise SIPs if sufficient progress is not being made.

The FLMs also have responsibilities under the CAA to safeguard AQRVs, including visibility, during the new source review process. The FLM has “an affirmative responsibility” to protect the AQRVs (including visibility) in Class I areas “and to consider . . . whether a proposed major emitting facility will have an adverse impact on such values.”¹⁷ If an increment would not be exceeded by the contribution of the new facility, the FLM may demonstrate that the facility would nonetheless have an adverse impact on AQRVs (including visibility).¹⁸ If an increment is exceeded, no permit may be issued unless the proposed source demonstrates to the FLM “that the emissions from such facility will have no adverse impact on” AQRVs (including visibility).¹⁹ More specifically, the CAA directs EPA to promulgate regulations regarding analyses required of new source applicants, including an analysis of “ambient air quality . . . soils and vegetation and visibility at the site of the proposed major emitting facility and in the area potentially affected by the emissions from such facility”²⁰ As discussed below, EPA has interpreted this requirement to mean that sources must also analyze the visibility impacts from existing and permitted sources; and the regulations require states to have the authority to request the facility “provide information on . . . [t]he air quality impacts and the nature and extent of any or all general commercial, residential, industrial, and other growth which has occurred since August 7, 1977, in the area the source or modification would affect.”²¹ The need to examine cumulative impacts on visibility is also apparent in the CAA’s visibility protection requirements for older sources. Major stationary sources in existence on August 7, 1977 that had commenced operation after August, 1962 (“BART-eligible” sources), which “cause or contribute to any impairment of visibility” in any Class I area must be retrofitted with the best available technology.”²²

Regulatory Requirements: Increment and Visibility Cumulative Analyses

States as well as some PSD permit applicants have regulatory responsibilities for performing cumulative impacts analyses for increment and visibility impacts. A plain reading of the regulatory language shows that states are required to protect and therefore track both PSD increments and visibility. State Implementation Plans must demonstrate that increments will not be violated, and that reasonable progress is being made towards the national visibility goal. New sources must perform cumulative increment analyses and assure proposed emissions will not adversely affect visibility. As discussed below, EPA has stated that in determining whether there

¹⁶ 42 U.S.C. §7491(b).

¹⁷ 42 U.S.C. §7475(d)(2)(B).

¹⁸ 42 U.S.C. §7475(d)(2)(C)(ii).

¹⁹ 42 U.S.C. §7475(d)(2)(C)(iii).

²⁰ 42 U.S.C. §7475(e)(3)(B). Also note that the analysis “shall be available at the time of the public hearing on the application for such permit.” (42 U.S.C. §7475(e)(3)(C)). Also, EPA stated in the 1996 NSR proposal: “. . . a determination of whether a source will have an adverse effect must consider the AQRV specifically identified by the FLM and, for each affected AQRV, the projected impact of the emissions from the proposed PSD source on the existing background air quality (including the predicted impacts of recently-permitted sources not yet in operation) in the Class I area. Thus, the FLM’s demonstration of adverse impact on AQRV, may consider a source’s impact on existing conditions, which may already be regarded as ‘adverse.’” (61 Fed. Reg. 38284 (July, 23, 1996).

²¹ §51.166(n)(3)(ii).

²² 42 U.S.C. §7491(b)(2)(A).

are adverse effects, the proposed emissions must be added to existing and permitted emissions of other sources, thus requiring a cumulative analysis.

State Increment Tracking

State Implementation Plans are required to “contain emission limitations and such other measures as may be necessary to prevent significant deterioration of air quality.”²³ To track increments, “[t]he State shall review the adequacy of a plan on a periodic basis”²⁴ The review is to “assess periodically whether emissions from exempted or unreviewed sources are endangering an applicable increment.”²⁵ That EPA did not define within what timeframes periodic reviews should occur makes enforcement of this provision difficult but does not nullify the requirement for periodic review. The provision for periodic review (not less frequent than every three years) of the reasonably attributable visibility SIP—discussed below—could be used as guidance for this case.

In addition to the periodic review, if “information becomes available that an applicable increment is being violated,” the SIP shall be reviewed within 60 days of the time when the information became available.²⁶ This information may come from a variety of sources—including the FLMs. If the state or the EPA determines that a SIP is “inadequate to prevent significant deterioration or that an applicable increment is being violated,” the plan must be revised within 60 days of that determination or by a later date if agreed to by the state and EPA.²⁷ Preamble language clarifies that EPA considered periodic assessment as a way to keep track of increment consumption.²⁸ Clearly, for states to comply with the PSD provisions, increments must be tracked on some regular basis.

Source Identification of Increment Consumption

The regulations are clear that to receive a construction permit proposed sources must conduct a cumulative increment analysis. The CAA requirement that proposed sources must demonstrate that emissions “will not cause or contribute to” violations of the Class I increment²⁹ is implemented in the PSD regulations: a facility must “demonstrate that allowable emission increases from the proposed source or modification, in conjunction with all other applicable emissions increases or reductions (including secondary emissions) would not cause or contribute to” an increment violation.³⁰ This requirement is mirrored by most, if not all, states.³¹ EPA explicitly explained that this is a requirement for a cumulative impact increment analysis: to determine how much increment is available for a major source, the source owner “must analyze several types of emissions changes as of its application date (including) emissions changes

²³ 40 C.F.R. §51.166(a)(1).

²⁴ 40 C.F.R. §51.166(a)(4).

²⁵ 43 Fed. Reg. 26381 (June 19, 1978).

²⁶ 40 C.F.R. §51.166(a)(4).

²⁷ 40 C.F.R. §51.166(a)(3).

²⁸ 45 Fed. Reg. 52721 (Aug. 7, 1980).

²⁹ 42 U.S.C. §7475(a)(3).

³⁰ 40 C.F.R. §51.166(k)(2).

³¹ See, e.g., Colo. Reg. 3(B)(IV)(D)(3)(a)(ii)(B); FL 62-212.400(1)(b); 401 KAR 51:017(10)(2); 9 VAC 5-80-1810.

that have occurred at baseline sources and emissions from new minor and area sources since the baseline date.”³²

Some states have unambiguously recognized the cumulative impact analysis requirement directly in their regulations. North Dakota’s regulations state that the facility “shall demonstrate that allowable emission increases from the source or modification, in conjunction with all other applicable emissions increases or reductions (including secondary emissions) *from any other sources*, will not cause or contribute to” an increment violation.³³ And, as part of the source information required, a North Dakota facility *must* submit “[i]nformation on the air quality impacts and the nature and extent of general commercial, residential, industrial, and other growth which has occurred since the baseline date in the area the source or modification would affect.”³⁴ Oregon has similar requirements.³⁵

EPA proposed, but never finalized, a requirement that only sources that have the potential to have “significant” air quality impacts are to provide data to make the “cause or contribute” determination. The preamble to the 1996 proposed New Source Review rule recognizes/reaffirms that “[t]he significant impact levels would be used to determine whether a new major source or major modification, due to the predicted ambient concentration from its own emissions, would be required to conduct a comprehensive Class I increment analysis for a given pollutant.”³⁶ Despite the fact that the significant impact levels³⁷ were never finalized, most states use these levels as EPA proposed, and do not require proposed sources that would have impacts less than these levels to conduct cumulative impact analyses. Likewise, the FLM uses the levels as one of two conditions under which a CVIA is requested.³⁸

Even if the significant impact levels are not exceeded, the federal regulations require states to have the authority to request the facility “provide information on . . . [t]he air quality impacts and the nature and extent of any or all general commercial, residential, industrial, and other growth which has occurred since August 7, 1977, in the area the source or modification would affect.”³⁹ SIPs shall require that the source submit “all information necessary to perform any analysis . . . in accordance with” section 51.166.⁴⁰ Many states have explicitly adopted this or similar provisions.⁴¹ Virginia has specifically recognized that they have the “discretion to require a demonstration of multiple-source impacts in response to public concerns related to multiple

³² 45 Fed. Reg. 52718 (Aug. 7, 1980).

³³ N.D. Ch. 13-15-15(4)(e) (emphasis added).

³⁴ N.D. Ch. 13-15-15(4)(h)(5).

³⁵ OAR 340-225-0030(4).

³⁶ 61 Fed. Reg. 38250 (July 23, 1996).

³⁷ The significant impact levels for SO₂ were proposed as 1, 0.2, 0.1 µg/m³, for 3-hr., 24-hr. and annual averaging periods respectively.

³⁸ U.S. Forest Service Air Quality Program, National Park Service Air Resources Division, U.S. Fish and Wildlife Service Air Quality Branch (2000). *Federal Land Managers’ Air Quality Related Values Workgroup (FLAG): Phase I Report*. The other condition that would trigger a CVIA is if the source individually causes a 5% or greater light extinction in a Class I area.

³⁹ §51.166(n)(3)(ii).

⁴⁰ §51.166(n)(1).

⁴¹ See, e.g., 401 KAR 51:017(13)(2)(b); N.D. Ch. 13-15.15(4)(h)(5); OAR 340-225-0030(4) and OAR 340-225-0070(3)(a); UAR R307-405-6(2)(a)(i)(C); 9 VAC 5-80-1840(B)(2).

nearby proposals even if those proposals are individually insignificant.”⁴² Some states have explicit general authority to request any information needed to review an application in accordance with standards and rules.⁴³ These provisions apply to visibility analyses as well, as discussed below. States are required to have the authority to request cumulative impact analyses from any proposed source.

Also, if estimates from a proposed source show the Class I increments would be exceeded, the source may still get a permit upon certification from the FLM, or if that certification is denied, upon a waiver of the Governor as approved by the President, if he finds it to be in the national interest.⁴⁴ This waiver provision demonstrates Congress was quite serious about the maintenance and thus tracking of the increments.

State Tracking of Visibility Impairment

Under EPA’s visibility regulations, a reasonably attributable visibility SIP must include “a strategy for making reasonable progress toward the national goal” of preventing future and remedying existing visibility impairment in Class I areas.⁴⁵ Most significantly, “[t]he plan must provide for periodic review and revision, as appropriate . . . not less frequent than every three years. . . . This report must include an assessment of . . . any change in visibility since the last such report . . . (and) [a]dditional measures, including the need for SIP revisions, that may be necessary to assure reasonable progress toward the national visibility goal.”⁴⁶ EPA specifically intended the periodic assessment to address visibility impairment identified after the last revision of the plan.⁴⁷ Some state regulations mirror this three-year review requirement.⁴⁸ Periodic reviews for the purposes of tracking visibility changes necessitate cumulative impact analyses, and while monitoring data gives a good indication of current conditions, the only way to identify source contribution estimates so states may devise alternative strategies if necessary, is through modeling.

The Regional Haze rule has similar requirements. On the issue of tracking visibility, EPA is clear: “The EPA believes the tracking of actual visibility improvements is necessary to be responsive to the goals of the CAA.”⁴⁹ Specifically, states subject to the visibility regulations⁵⁰ must submit every five years reports for each Class I area evaluating progress towards the reasonable progress goal.⁵¹ The periodic plan updates must include, among other things, a determination of current conditions and revised emission inventories. A determination of current conditions necessitates identifying impacts from all sources, i.e., cumulative impacts. Furthermore, “[t]he EPA believes that States should take the cumulative emissions from minor

⁴² Air Resources Impact Work Group (Nov. 19, 2002). *Report to the Virginia Department of Environmental Quality (DEQ)*, p. 19. Available at <http://www.deq.state.va.us/info/airresources.html>.

⁴³ See, e.g., MT ARM 17.8.706(2)(j).

⁴⁴ 42 U.S.C. §7475(d)(2)(D)(ii) (implemented at 40 C.F.R. §51.166(p)(5) & (6)).

⁴⁵ 40 C.F.R. §51.305(a)(1).

⁴⁶ 40 C.F.R. §51.306(c)(3) & (4).

⁴⁷ 45 Fed. Reg. 80086 (Dec. 2, 1980).

⁴⁸ See, e.g., Colo. Reg. 3(B)(XI)(F)(1).

⁴⁹ 64 Fed. Reg. 35726 (July 1, 1999).

⁵⁰ 40 C.F.R. §51.300(b)(2).

⁵¹ 40 C.F.R. §51.308(g).

sources into account in developing their regional haze long-term strategies” in addition to mobile and area sources.⁵² Lastly, with regards to new source review and visibility assessments, a state “must ensure that the source’s emissions will be consistent with making reasonable progress toward the national visibility goal”⁵³ The only way to assess the cumulative impacts involving a new source is through modeling.

EPA, in the regional haze rule preamble, points out the authority for requiring periodic SIP revisions found at sections 110(a)(2)(F) and 110(a)(2)(H).⁵⁴

Source Tracking of Visibility Impairment

The source responsibility to perform cumulative visibility impact analyses is not clearly stated in the regulations, but EPA intent *is* clearly stated in preamble language. Also, states are required to have the authority to require CVIAs from proposed sources.

A variety of commenters to the proposed regulations for visibility new source review⁵⁵ recognized the need for a policy on reviewing cumulative impacts from new sources. The commenters were concerned that while any one source may not cause significant impairment to visibility, a combination of sources would, and the permitting authority would not be aware of this unless CVIA was required. EPA made clear that its 1980 visibility regulations require an assessment of cumulative impacts on visibility from existing and permitted but not yet constructed sources in addition to the new source:

*EPA has always regarded permitted sources as part of existing background. For instance, in assessing impacts on the national ambient air quality standards, permit applicants must account for the air quality impacts of permitted, as well as constructed, sources. This treatment should be the same for visibility assessment. The EPA does not believe that a change in the proposed language for new source review is necessary to effect this implementation. The EPA concludes that the proposed language on assessing whether a proposed source will cause an adverse impact on visibility requires the reviewing authority to review the new source’s impact in the context of background visibility impacts caused by both existing and previously permitted sources.*⁵⁶ (emphasis added).

Permit applicants, in assessing visibility impacts, must account for the impacts of existing sources.⁵⁷ EPA, as stated in the preamble language reproduced above, felt that this requirement did not need to be explicitly stated in the rule. As such, the regulation states that “the owner . . .

⁵² 64 Fed. Reg. 35735.

⁵³ 40 C.F.R. §51.307(c).

⁵⁴ 64 Fed. Reg. 35745 (July 1, 1999).

⁵⁵ 49 Fed. Reg. 42670 (Oct. 23, 1984).

⁵⁶ 50 Fed. Reg. 28548 (July 12, 1985).

⁵⁷ This language does not negate the intent that a new source’s impact on visibility is to be measured compared to natural background visibility. Visibility impairment is defined as “any humanly perceptible change in visibility . . . from that which would have existed under natural conditions” (40 C.F.R. §51.301). States “must ensure that (a) source’s emissions will be consistent with making reasonable progress toward the national visibility goal”(40 C.F.R. §51.307(c)). The visibility goal—natural conditions by 2064—has been codified in the Regional Haze Rule (40 C.F.R. §51.308(d)(1)(i)(B)), and that goal was upheld by the D.C. Circuit Court in 2002 (*American Corn Growers Assoc. v. EPA*, No. 99-1348 (D.C. Cir. May 24, 2002)).

shall provide an analysis of the impairment to visibility . . . that would occur as a result of the source or modification and general . . . growth associated with the source or modification.”⁵⁸ Most, but not all, states mirror this language.⁵⁹

As mentioned above, the federal regulations require states to have the authority to request the facility “provide information on . . . [t]he air quality impacts and the nature and extent of any or all general commercial, residential, industrial, and other growth which has occurred since August 7, 1977, in the area the source or modification would affect.”⁶⁰ And, SIPs shall require that the source submit “all information necessary to perform any analysis . . . in accordance with” section 51.166.⁶¹ States, therefore, may request cumulative visibility analyses from any proposed source. Some states explicitly reproduce this provision,⁶² but all states have the direction from EPA and the authority to do so.

Increment Violations and Adverse Effects on Visibility

Clearly, if states (or others) identify increment violations, the SIP must be revised to correct the problem. “If the State or the Administrator determines that . . . an applicable increment is being violated, the plan shall be revised to correct the inadequacy or the violation.”⁶³ EPA has stated that “increments should be treated in basically the same regulatory manner as the (NAAQS). . . . The legislative history is particularly clear . . . ‘If increments are exceeded, the State must revise the State implementation plan to insure that the increment is not exceeded.’ ”⁶⁴

States may have more specific requirements. Colorado’s regulations, for example, state:

Should . . . (there be) an increment violation . . . the Division shall review all sources affecting the area of increment violation and ensure that all such sources are in compliance with all applicable permit conditions and state and local regulations. Within 30 days after completing such a review, the Division shall recommend revisions, if necessary, to the Commission to correct the violation. . . .⁶⁵

Tennessee, in its rules, has a “growth policy,” under which permits for new sources or modifications will not be issued if an increment would be violated.⁶⁶ Similarly, if the periodic assessments for visibility show that the state is not achieving its reasonable progress goal for visibility or that visibility is actually degrading, the state would be required to analyze the cause

⁵⁸ 40 C.F.R. 51.166(o)(1).

⁵⁹ Montana, conversely, requires a demonstration that emissions from a source “will not cause or contribute to adverse impact on visibility” MT Admin. Rules 17.8.1106. North Dakota requires a facility to demonstrate that *actual* emissions “will not cause or contribute to adverse impact on visibility in any federal class I area.” ND Ch. 33-15-19-02(1).

⁶⁰ §51.166(n)(3)(ii).

⁶¹ §51.166(n)(1).

⁶² See, e.g., 401 KAR 51:017(13)(2)(b); 9 VAC 5-80-1840(B)(2); also New Mexico, Oregon (all growth since 1/1/78) and Utah.

⁶³ 40 C.F.R. §51.166(a)(3).

⁶⁴ 43 Fed. Reg. 26380 (June 19, 1978); and see 45 FR 52720 3rd col.

⁶⁵ Colo. Reg. 3(B)(VII)(A)(4)(c).

⁶⁶ TN Rule 1200-3-9-.01(5)(a).

of the shortfall and provide an updated strategy.⁶⁷ Again, states may be more specific. Kentucky specifies that permits shall only be issued “to those sources whose emissions will be consistent with making reasonable progress toward the national goal of preventing future, and remedying existing, impairment of visibility in Class I areas which impairment results from manmade air pollution.”⁶⁸

Current State Efforts

States are generally not doing periodic reviews of their PSD SIPs to assess increment consumption, and are generally not yet doing any kind of CVIAs. Most states, however, do require new sources to track increment consumption to varying degrees using the draft 1990 EPA guidance (“Puzzle book”), which directs regulators to model sources (for SO₂) to a point 50 km outside the 1 ug/m³ impact zone (50 km) to determine emissions using available increment (Class I and Class II). Many states do not require CVIAs of new source applicants. Specific state and regional efforts are briefly discussed in Appendix B. Some states, through the Western States Air Resources Council (WESTAR), have collectively discussed issues with the requirements for cumulative impacts analyses for increments, many of which are identified below.⁶⁹ Many of these issues apply to CVIAs as well.

Barriers to Cumulative Impact Analyses

- Increment tracking (and certainly CVIA) is a resource-intensive effort (staffing, staff training, hardware, software).
- Emission inventories are not consistent in time or scope (e.g., emission factors and which emissions are used—actuals, allowables or 90th percentile).
- Historical source information to establish baseline emissions is inadequate (e.g., which sources are in the baseline area, how to estimate area sources).
- Uncertainty regarding baseline area—how and when states can redesignate baseline areas?
- Historical meteorological data is inadequate.
- Delays in models gaining guideline status.⁷⁰
- Getting emission data from other states, local governments, and tribes (where other states are actually part of baseline area or otherwise affect analyzing state’s baseline area); states’ emission inventories are not consistent in time or scope.
- Inability of current models to resolve small concentration changes (i.e., significance levels used for Class I areas).
- Tracking emissions is a low management priority.

⁶⁷ 40 C.F.R. §51.306(c)(4); §51.308(h).

⁶⁸ 401 KAR 51:052(11)(5). But note that “[i]n making the decision to issue a permit the cabinet may take into account the overriding factors of the cost of compliance, the time necessary for compliance, the energy and nonair quality environmental impacts of compliance, and the useful life of the source.”

⁶⁹ Additional information can be found at: <http://www.westar.org/psd>.

⁷⁰ Since these comments were made, EPA has published a final rule identifying CALPUFF as the preferred technique for assessing long range transport of pollutants and their impacts on Class I areas. 68 Fed. Reg. 18440 (April 15, 2003).

Unresolved Questions Regarding Cumulative Impact Analyses

- Should modeling domain extend beyond the source impact area? If so, why?
- Are actual or potential emissions (or 90th percentile) required for increment consumption demonstrations? Use of actuals necessitates accurate and periodical emissions inventories while potential emissions may create a situation where sources “bank” potential emissions in hotspots to prevent competitive development.
- What to do when minor source permitting results in increment violations.
- How to estimate differences in mobile source emissions (model revisions; historical traffic data).
- How to address temporary sources that affect 24-hr PM increment.
- How to handle banked emission credits.
- How to address different minor source baseline dates.
- Which models are required; how much flexibility is there in choosing and implementing models?⁷¹
- How many years must be modeled?
- How much modeling, re-modeling, and refinement is enough?
- How is monitoring data used in this process?
- How should short term emission rates be determined?
- How should “normal operations” for baseline periods be determined?
- What to do if increment is found to be violated (how to apportion reductions in a SIP revision), or AQRVs determined to be adversely affected.

Conclusion

Planning in attainment areas has typically not been a priority for states, but it is still a requirement. It is easier to prevent harm than to try and reverse it. Once states start performing these analyses or requiring individual sources to do it, the resources required to do it will decrease (economies of scale) and the process will become less burdensome. If states are not tracking increment and performing CVIAs, however, reliance on source analyses alone is insufficient because 1) it does not occur on a regular basis and therefore may only identify increment violations after-the-fact, and 2) source analyses will not include minor, area and mobile sources.

In the permit application process, the FLMs can be of more assistance in guiding source analyses if given sufficient time. Regarding state-FLM consultation, EPA’s new source review regulations under the visibility program require a SIP to provide for notification to FLMs of new sources that may affect visibility in Class I areas, within 30 days of the receipt of an application, and the “notification must include an analysis of the anticipated impacts on visibility in any Federal Class I area.”⁷² In fact, “[S]tates are encouraged to include the FLM’s in preapplication meetings with permit applicants so exact monitoring requirements and impact analyses for the air quality related values can be determined prior to the application review.”⁷³

⁷¹ See note 68.

⁷² 40 C.F.R. §51.307(a)(1).

⁷³ 50 Fed. Reg. 28548 (July 12, 1985).

States are to track increment consumption to comply with PSD provisions, and visibility to assure national goals are being met. We would assume that cumulative analyses from new sources would greatly assist states in this effort. Furthermore, cumulative increment analyses and CVIA conducted by a proposed new sources may illustrate that the new source, in fact, would not be the problem but some older source is. If the state then used this information to address the older source, additional room for growth could be opened up.

“The passage of time has only increased the conviction that cumulative effects analysis is essential to effectively managing the consequences of human activities on the environment.”⁷⁴

⁷⁴ Council on Environmental Quality (1997). *Considering Cumulative Effects under the National Environmental Policy Act*. Available online at <http://ceq.eh.doe.gov/nepa/ccenepa/ccenepa.htm>.

Appendix A

State Constitutional Provisions Creating an Individual Right to a Healthy Environment

Alabama Constitutional Amendment No. 543 calls for the "acquisition, maintenance and protection of unique lands and water areas."

California Constitution Article I, section 7 references environmental protection as a compelling public interest.

Illinois Constitution Article XI, sections 1 and 2 require the state to provide and maintain a healthful environment and create an individual right to a healthful environment.

Louisiana Constitution Article IX, section 1 requires the state to implement laws to protect "the natural resources of the state, including air and water, and the healthful, scenic, historic, and esthetic quality of the environment."

Massachusetts Constitution Amendment Article 41 provides for taxation to ". . . conserve the forest resources, wildlife and other natural resources and the environmental benefits of recreational lands within the commonwealth." Article 49 states that "the people shall have the right to clean air and water, freedom from excessive and unnecessary noise, and the natural, scenic, historic, and esthetic qualities of their environment; and the protection of the people in their right to the conservation, development and utilization of the agricultural, mineral, forest, water, air and other natural resources is hereby declared to be a public purpose."

Montana's Constitution, Article IX, section 1 states:

- (1) The state and each person shall maintain and improve a clean and healthful environment in Montana for present and future generations.
- (2) The legislature shall provide for the administration and enforcement of this duty.
- (3) The legislature shall provide adequate remedies for the protection of the environmental life support system from degradation and provide adequate remedies to prevent unreasonable depletion and degradation of natural resources.

Section 4, *Cultural resources*, states that "The legislature shall provide for the identification, acquisition, restoration, enhancement, preservation, and administration of scenic, historic, archeologic, scientific, cultural, and recreational areas, sites, records and objects, and for their use and enjoyment by the people."

New Mexico Constitution Article 20, section 21 states "the protection of the state's beautiful and healthful environment is hereby declared to be of fundamental importance to the public interest, health, safety and the general welfare. The legislature shall provide for control of pollution and control of despoilment of the air, water and other natural resources of this state, consistent with the use and development of these resources for the maximum benefit of the people."

Pennsylvania Constitution Article I, section 27 states that "the people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the

environment. Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all people."

Rhode Island Constitution Article I, section 17 states that "it shall be the duty of the general assembly to provide for the conservation of the air, land, water, plant, animal, mineral and other natural resources of the state, and to adopt all means necessary and proper by law to protect the natural environment of the people of the state by providing adequate resource planning for the control and regulation of the use of the natural resources of the state and for the preservation, regeneration and restoration of the natural environment of the state."

Appendix B

Miscellaneous State and Regional Cumulative Impact Analysis Efforts

Note: this is not an exclusive list of all cumulative impact analysis efforts.

State Efforts

Colorado

Colorado has developed a guidance document called *PSD Increment Tracking System (Feb., 2001)*, the purposes of which are to explain the state's authority to require PSD increment consumption modeling for major and minor sources seeking construction permits, explain how the state tracks increment-related emissions data, explain how to use this data in dispersion modeling for new and modified sources, and explain the state's plans for conducting periodic increment consumption modeling studies required by the regulations. This, as well as a final report, *Periodic Assessment of Nitrogen Dioxide PSD Increment Consumption in Southwest Colorado – Phase I* are available at <http://apcd.state.co.us/permits/psdinc/index.html>.

Georgia

Georgia keeps a current list of major PSD increment consuming sources, including emission rates and stack parameters. See: <http://www.dnr.state.ga.us/dnr/environ/> (located under *Regulated Community – Air Quality Permits*).

North Dakota

The state has attempted to assess sulfur dioxide increment consumption.⁷⁵ EPA Region VIII, however, found that the analysis “has not been demonstrated to be more appropriate than the methodologies outlined in the Federal PSD program” and that the state's PSD SIP is inadequate.⁷⁶

New Mexico

The state conducts emission inventories in order to comply with state and federal regulations. The emission inventory is used to develop planning tools, incorporated into air dispersion modeling, and to establish baseline dates and increment consumption for the PSD program. It is used to measure progress in reducing emissions and to provide input for air quality management projects, including regional haze. The emission inventory is also used to track air quality trends, provide data for the air quality report, and correlate area, industry, source growth, and pollution.

⁷⁵ See, e.g., North Dakota Dept. of Health, (April, 2002). Prevention of Significant Deterioration Implementation Analysis and Sulfur Dioxide Increment Consumption Assessment Summary, on file with the Air Resources Division, National Park Service.

⁷⁶ U.S. E.P.A. letter to North Dakota: *EPA Comments on North Dakota Department of Health's Proposed Determination Regarding the Adequacy of the SIP to Protect PSD Increments for Sulfur Dioxide*. (May 24, 2002). Available at: <http://www.epa.gov/region8/foia/ndair/ndair.html>

For more information, see:

<http://www.nmenv.state.nm.us/aqb/modeling/modelingemissions.html>

Utah

A state document entitled *PSD Increment Modeling* describes the procedures that Utah follows to estimate the amount of PSD increment consumed by new or modified stationary sources.⁷⁷ The document states that “a cumulative impact analysis is also performed during routine periodic PSD increment modeling updates.” See also the *Utah Division of Air Quality Modeling Guidelines* (Aug. 17, 2000), available at <http://www.airquality.utah.gov/Planning/index.htm>.

Virginia

The state, in 2002, convened the Air Resources Impact Work Group to develop options for assessing and addressing combined air quality impacts from power plants and other permitted facilities. While the group did not reach consensus or identify preferred courses of action, they did develop six sets of options, including funding ideas, for addressing the issue. For additional information, see: <http://www.deq.state.va.us/info/airresources.html>
<http://www.deq.state.va.us/info/airresources.html>

Regional Efforts

Environmental Protection Agency (EPA) Region X

The Region has initiated the Joint Technical Advisory Committee to develop and maintain guidance and data for cumulative effects (both increment and AQRV) analyses in Class I areas in the Pacific Northwest. Planned activities, which will be coordinated with the Federal Land Managers and the states of Idaho, Oregon and Washington, include developing a generic modeling protocol, usable meteorology data sets and emissions inventories. Policy implications associated with modeling results will also be discussed. Contact Rob Wilson, EPA Region X, at wilson.rob@epa.gov.

Bonneville Power Administration (BPA)

Phase I of the BPA’s Regional Air Quality Modeling Study was completed in 2001. The study is for the purpose of examining the air quality impacts from the combined emissions of 45 proposed combustion-related generation projects in Idaho, Oregon and Washington. A modeling protocol was developed to address impacts of PM₁₀, NO_x and SO₂ emissions on the National Ambient Air Quality Standards and PSD Class I and Class II increments (although does not address total increment consumption, just the impact of the proposed power projects); visibility degradation in Class I areas; nitrogen and sulfur deposition in Class I areas; and estimated CO₂ emissions from the proposed projects. The potential for decreased visibility in the region’s most sensitive (Class I and Class II) areas was identified. Phase II of the study will evaluate each individual power plant’s effects on visibility. For information on the study, see <http://www.efw.bpa.gov/cgi-bin/>.

⁷⁷ On file with the Air Resources Division, National Park Service.

Mid-Atlantic Regional Air Management Association (MARAMA)

The Class I Area Modeling Workgroup formed in 2002 to develop a plan for modeling air quality impacts at Class I areas within the MARAMA region. Specifically, “the purpose of this initiative is to develop a unified system of input data for CALPUFF model runs. The system would consist of an inventory (actual emissions for operating facilities and permitted allowable emissions for proposed facilities), set modeling domains, and selected meteorological (met) data set(s). The current thinking would entail the use of four domains to cover the Class I areas in MARAMA Region, and updating the met data every 5 years.”⁷⁸ See <http://www.marama.org/class1/> for more information. MARAMA state and local government members are Delaware, the District of Columbia, Maryland, New Jersey, North Carolina, Pennsylvania, Virginia, West Virginia, Philadelphia, and Allegheny County, Pennsylvania.

⁷⁸ MARAMA Fact Sheet: MARAMA Class I Area Modeling Initiative. October 2002.