



***WRAP Reasonable Progress Source
Identification and Analysis Protocol
For
Second 10-year Regional Haze
State Implementation Plans***

*WRAP Regional Haze Planning Work Group – Control Measures Subcommittee
February 27, 2019*

1. Overview:

The Control Measures Subcommittee (“Subcommittee”) of the Western Regional Air Partnership (WRAP) Regional Haze Planning Work Group has prepared this Reasonable Progress protocol document with the intent of providing consistency among the WRAP states for screening and identifying potential emission sources that may be impacting visibility at Class I areas and establishing a technical review process for developing a Regional Haze -Reasonable Progress four-factor analysis.

This WRAP Reasonable Progress Protocol is generally based on draft EPA Reasonable Progress guidance¹ (“EPA Guidance”), which is not binding or enforceable but does provide basic criteria and a potential framework for identifying and selecting anthropogenic sources or source categories that should be evaluated using a four-factor analysis.

This protocol document does not limit in any way the ability of a state from pursuing alternative approaches or methods for identifying and evaluating emission sources.

2. Emission Inventory and Sources:

The over-arching goal in assessing emissions is to ensure states identify anthropogenic sources that are most likely impacting the 20 percent most impaired days (MID) at one or more Class I areas (CIAs). For the second planning period, the draft EPA guidance recommends that each state should evaluate about 80 percent of emissions impact at each CIA from major and minor stationary sources along with area sources to ensure a reasonably large fraction of emissions impacting a CIA extinction on the 20 percent MID are assessed. The guidance acknowledges that the 80 percent recommendation may not be fully applicable when Q/d is used as a surrogate for visibility impacts. The Subcommittee observes that the 80 percent threshold for evaluating emissions seems to be a very ambitious goal that undoubtedly will be challenging to achieve if states pursue the Q/d approach.

The EPA guidance recommends that states not consider mobile source emissions, nor any associated measures states may have adopted beyond what is federally required in determining whether 80 percent of emissions are assessed for CIA extinction impacts. However, some western states have adopted mobile source controls because these emissions represent a relatively large portion of the emission inventory compared to non-mobile anthropogenic sources and natural sources. In recognition that some states may have significant mobile source impacts to CIA extinction; the Subcommittee recommends that states with mobile source control programs to include the associated mobile source emissions in the assessment of meeting the 80 percent threshold.

¹ “Draft Guidance on Progress Tracking Metrics, Long-term Strategies, Reasonable Progress Goals and Other Requirements for Regional Haze State Implementation Plans for the Second Implementation Period,” July 2016

3. Visibility Impairing Particulates and Emissions:

The EPA guidance recommends that excluded particulate matter (PM) species should not total more than 20 percent of current anthropogenic extinction for the 20 percent most impaired days at a Class I area. The guidance further states: *“If a PM species makes only a small absolute and relative contribution to overall anthropogenic light extinction at a Class I area on each of the 20 percent most impaired days, and if there is no reason for concern about degradation on the 20 percent most impaired or 20 percent clearest days due to future increases in that PM species, in general each contributing state may justify screening out sources of that PM species and its precursors for purposes of reasonable progress at that Class I area for the second implementation period”*

In the WRAP region, there are predominantly six particulate matter (PM) species that cause visibility impairment at most western CIAs: ammonium sulfate (Sulfate), ammonium nitrate (Nitrate), organic carbon (OC), elemental carbon (EC), fine soil and coarse PM. Sea salt only plays a noticeable, but not significant role at coastal sites and is considered a “natural” precursor.

Generally, sulfur emissions (SO₂ and SO₄) result from the combustion of sulfur containing fuels. Sulfate particulates are formed in gas-phase and aqueous-phase reactions from SO₂. The western states commonly inventory anthropogenic point, area and mobile sources of SO₂ and SO₄ emissions and the quality of the data is very good.

Nitrogen oxide (NO_x) emissions are generally produced from fuel combustion, such as natural gas, oil, coal and wood. NO_x emissions are a precursor to the formation of nitrate particulates. The western states commonly inventory anthropogenic point, area and mobile sources of NO_x emissions and the quality of the data is very good.

Particulate matter emissions can be directly emitted as a particulate or formed as a secondary particulate. The western states commonly inventory anthropogenic point, area and mobile sources of PM-10 emissions and some states also inventory anthropogenic PM-2.5 emissions. Generally, significant anthropogenic sources of particulate emissions are often dominated by fugitive emissions, which are typically estimated using generalized emission factors and level of activity. Consequently, PM-10 sources should be carefully scrutinized to ensure that fugitive and non-fugitive emission sources are evaluated for potential controls.

Most OC particulates are associated with fires or biogenic sources, but anthropogenic VOC emissions do form secondary OC particulates and past modeling suggests the anthropogenic VOC emission source contribution to OC is typically very small (~ 2 - 4%) and therefore not considered a significant contributor to visibility impairment at most western CIAs.

Elemental carbon particulates are directly emitted as a primary aerosol from sources including fossil fuel combustion (vehicles, boilers and other industrial processes),

wildfires and all other types of burning. For many western states where EC is not inventoried, a four-factor analysis of potential emission controls is not realistic or practical. However, for states that inventory EC sources, a technical review of potential emission controls may be necessary if sources are significantly impacting CIA extinction.

Fine soil emissions are comprised of fine particulates under 2.5 microns that are generated mostly by fugitive dust, windblown dust and area sources (fires or road dust). No state inventories soil emissions because the IMPROVE definition of fine soil is based on a reconstruction of elemental particulates – Aluminum, Silica, Calcium, Iron and Titanium. Accordingly, a four-factor analysis of potential emission controls is not possible.

Coarse mass emissions involve particulates with an aerodynamic diameter between 10 and 2.5 microns that are generated mostly by fugitive dust, windblown dust, point sources and road dust. CM is not typically inventoried by most western states, but PM-10 emissions could be used as a surrogate for screening point sources. Since PM-10 includes PM-2.5, it could also be used to screen fine particulate emissions.

Ammonia (NH₃) is a necessary precursor to the secondary formation of sulfate and nitrate particulates, but ammonia is not technically a regulated air pollutant for many western states. Thus, most state emission inventories account for secondary particulates formed from reaction with ammonia but not necessarily the direct ammonia emissions. In environments where the production of ammonia far exceeds NO_x or SO_x emissions, the formation of nitrates and sulfates depends on the rate-limiting availability of NO_x and SO_x. States should conduct an analysis to determine which precursor is rate-limiting and focus on controlling those emissions first.

Based on the above review of typical western state anthropogenic emission inventories, there are four visibility impairing pollutants (SO₂, SO₄, NO_x and PM-10) that are most closely associated with anthropogenic sources that can be reasonably evaluated in the emissions analysis. The accuracy of emission source estimates affect the resultant four-factor analysis, so it is important that the emission estimates are of sufficient quality to accurately characterize a source impact to a CIA.

Accordingly, the Subcommittee recommends that states should screen SO₂, SO₄, NO_x and non-fugitive PM-10 sources, unless there are unique circumstances associated with a particular CIA that suggest other pollutants should be evaluated.

4. Point Source Identification through Q/d Analysis:

The EPA guidance allows “a state to use a screening analysis that considers visibility impacts², or surrogates for such impacts, to select a subset of sources for full four-factor analysis and decision. However, the state should conduct its screening analysis for each Class I area that may be affected by sources within the state.” The surrogate “Q/d” is defined as annual emissions in tons divided by distance in kilometers between a source and the nearest Class I area. The EPA points out that the Q/d metric is only a rough indicator of actual visibility impact because it does not consider transport direction/pathway and dispersion and photochemical processes.

The process for identifying potential sources subject to the Q/d evaluation could involve screening stationary sources with SO₂, SO₄, NO_x or PM₁₀ emissions. Some states may inventory SO₄ separately, or it may be included with SO₂, or as a component of particulate matter. Thus, states should ensure that SO₄ emissions are not double-counted in the Q determination. Generally, in many western states the 100 ton per year threshold represents a potential preliminary screening level because most sources with emissions over 100 tons per year must obtain a Part 70 (title V) permit; consequently, the documentation and information on emissions is more detailed and complete. In these states, sources with emissions below 100 tons per year are addressed as minor sources that may or may not have detailed emissions information specified in a permit depending on the source category and level of emissions. Other states may have criteria pollutant non-attainment areas with classifications that require more stringent major source thresholds, perhaps as low as 25 tons per year. In recognition of the wide variation among western state stationary source permitting thresholds and emissions information for sources under 100 tons per year, the Subcommittee recommends that states screen sources with aggregated SO₂, SO₄, NO_x and PM₁₀ emissions exceeding 25 tons per year. A WRAP contractor will perform a Q/d screening analysis of point source emissions and distance from the nearest CIA for all the WRAP states.

For those stationary sources meeting the above criteria, the sum of the most recent annual SO₂, SO₄, NO_x or non-fugitive PM₁₀ emissions³ would provide the “Q” for the analysis. The distance (in kilometers) to the nearest CIA is determined by measuring the distance from the centroid of the point source to nearest boundary of the Class I area.

A reference Q/d screening threshold for consideration could be based on the Federal Land Managers’ Air Quality Related Values Work Group (FLAG) report that was issued

² Surrogate here refers to a quantitative metric that is correlated to some degree with visibility impacts (or benefits) as they would be estimated via air quality modeling. A simple surrogate is emissions in tons/year divided by distance to an affected Class I area in miles or kilometers, also known as Q/d. A more complicated surrogate could, for example, incorporate information from wind trajectories.

³ States generally should use the most recent actual annual emissions in tons per year if available but could use allowable emissions. A three-year average could be used if emissions are highly variable from year-to-year.

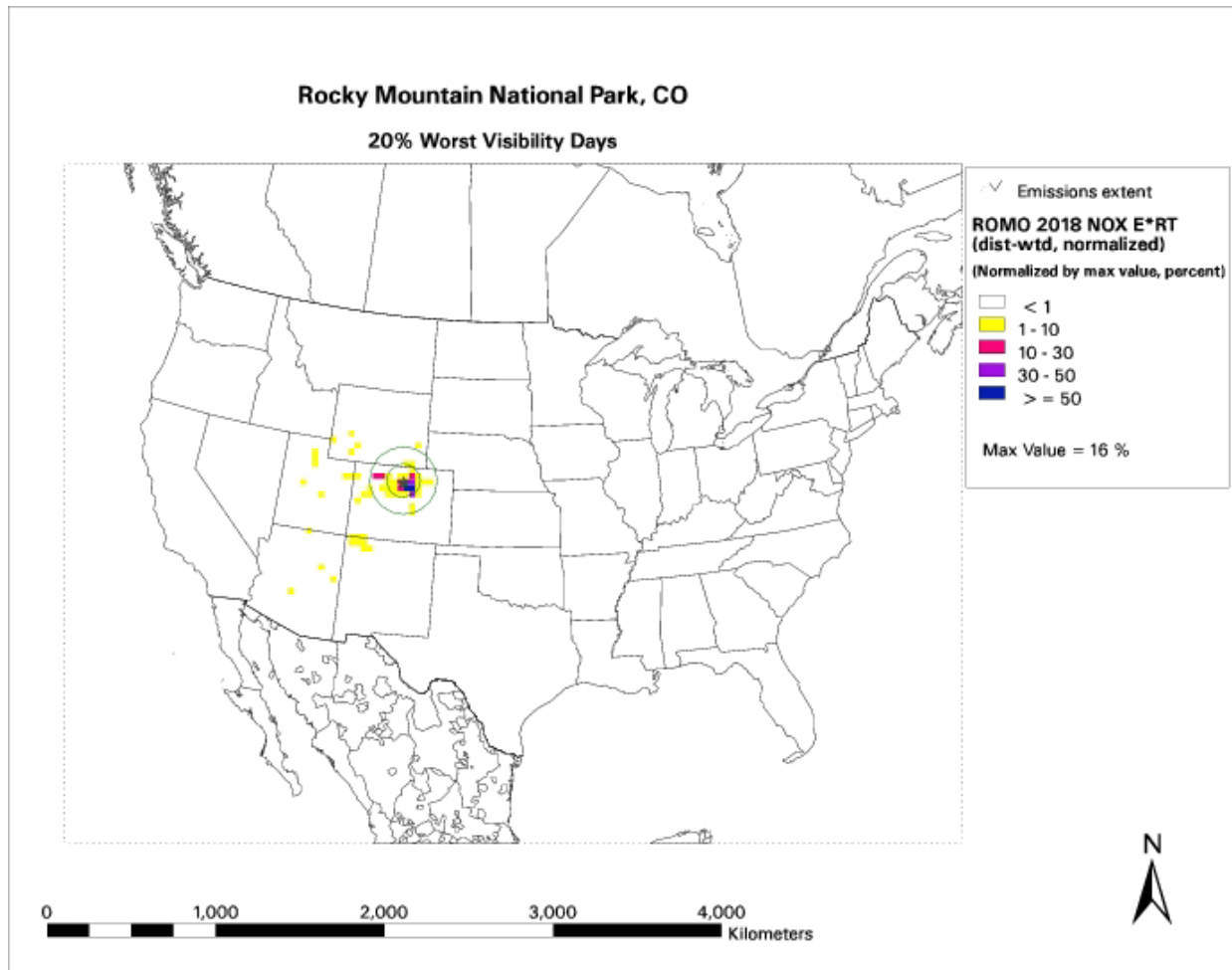
in October 2010⁴ that adopts similar criteria derived from EPA's 2005 Best Available Retrofit Technology (BART) guidelines for the Regional Haze Rule to screen out from air quality related values review those sources with relatively small amounts of emissions located a large distance from a Class I area (i.e., $Q/d \leq 10$, for sources located greater than 50 km away). The FLAG guidelines apply to new or modifying sources with the goal of prevention of significant deterioration (PSD) in CIA visibility. In contrast, the Regional Haze program applies to all existing manmade sources with the goal of improving CIA visibility for the most impaired days and maintaining visibility for the best days. Despite the underlying differences between PSD and RH, the FLAG guidelines offer a simple and quick method for identifying significant sources potentially impacting CIA visibility. Accordingly, consistent with the FLAG guidelines, the Subcommittee suggests that states should first screen sources at a $Q/d > 10$ level to determine if a reasonable number of sources are identified for further review. If no sources are identified, the Subcommittee recommends stepping down the Q/d screening level in increments of one until a reasonable number of sources are identified for further review.

If none or few stationary sources are identified by going down to a Q/d level of 1, then states may want to consider the inclusion of area sources that are identified as contributing a reasonably large fraction of the impact on CIA visibility on the 20 percent most impaired days. Alternatively, states may choose a different approach, but should explain how a different approach adequately captures the majority of sources contributing to CIA visibility impairment on the 20 percent most impaired days. The Subcommittee realizes that the number sources and level of emissions assessed by each state will vary, but the goal of the source screening process is to ensure a "reasonably large fraction" of emissions impacting extinction at each CIA are assessed. In the draft guidance, EPA considers 80% to be a reasonably large fraction.

In recognition of EPA's concerns with the Q/d analysis limitations, the Subcommittee recommends that a weighted emissions potential (WEP) analysis should be combined with the Q/d analysis to confirm whether a source impacts a particular CIA on the 20 percent most impaired days. The WEP essentially identifies grid cells with the highest emissions shown to impact a specific CIA through transport. The below 2018 NO_x WEP map for Rocky Mountain National Park is provided as an example (Figure 1).

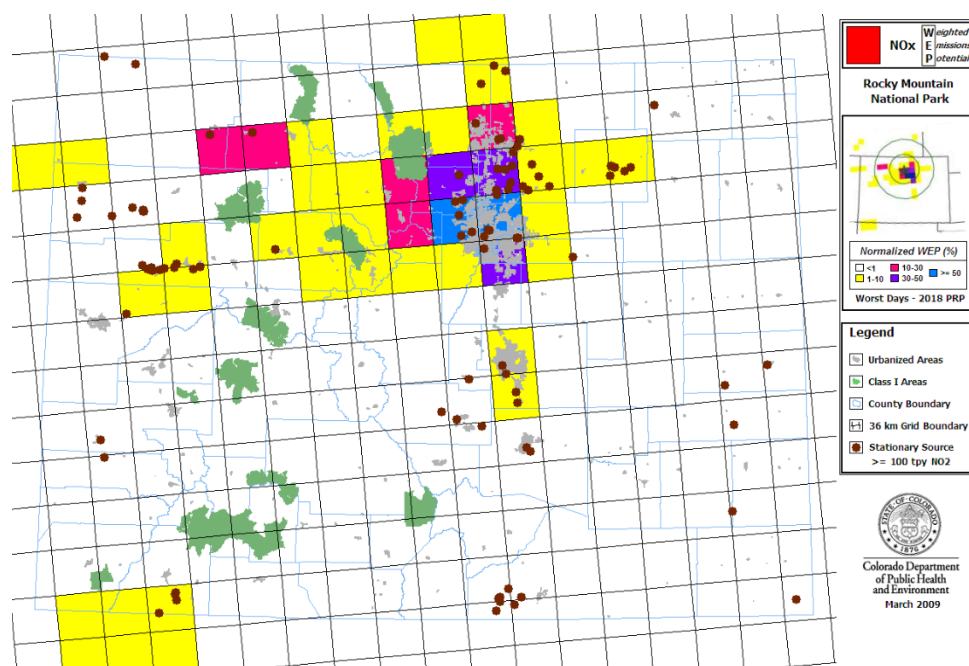
⁴ See Federal Land Managers' Air Quality Related Values Work Group (FLAG) Phase I Report – Revised (2010)

Figure 1: Rocky Mountain National Park – 2018 NOx Weighted Emissions Potential for the Worst Days



A more detailed zoom of the above RMNP 2018 NOx WEP combined with an overlay map showing the locations of major NOx point sources helps to identify potential candidate sources for additional review (Figure 2).

Figure 2: Rocky Mountain National Park – 2018 NO_x Weighted Emissions Potential Combined with Major NO_x Emission Sources for the Worst Days



Stationary sources identified by states as subject to the RP four factor review process will need time to prepare a detailed emission control cost analysis. Accordingly, the Subcommittee encourages states to finalize the determination of which sources are subject to the RP review process soon and notify these sources in early 2019. Unfortunately, the 2028 WEP modeling analysis will not be available until late spring 2019, thus unavailable to states for the initial identification of potential RP sources. However, the Subcommittee recognizes the value of the WEP analysis, which can be used to confirm identified RP sources later when the 2028 WEP becomes available.

Based on the above discussion, the Subcommittee recommends the following three-step process for screening sources: (1) identifying stationary sources with NO_x, SO₂, SO₄ and PM₁₀ over 25 tons/year⁵; (2) assessing the Q/d for those stationary sources to determine whether a source Q/d⁶ exceeds “10” for a specific CIA; (3) later when the 2028 WEP analysis is available, evaluating sources meeting the Q/d screening criteria from step 2 using the CIA specific WEP to confirm source impacts to the CIA for the 20% MID.

⁵ States have the option of choosing an emissions threshold below 25 tons/year.

⁶ For steps (2) and (3), states have the option of choosing a Q/d threshold below 10.

The goal of the above three-step screening process is to identify sources (stationary or potentially area) that are likely impacting CIA visibility⁷ and review these sources for potential emission controls through a four factor review process. The Subcommittee is not establishing a numerical standard for the number of sources that states may review because some states likely have a substantial number and other states may have very few. The Subcommittee recommends that the number of sources considered should involve enough sources to ensure a reasonably large fraction of emissions impacting a CIA extinction on the 20% MID are assessed.

Sources identified through the three-step screening process and refinements would be subject to the extensive four-factor review process, whereas, other sources not meeting the screening criteria would be excluded from the four-factor review. This method reduces the number of sources subject to extensive control measure analysis and focuses on the sources with a greater likelihood of offering a tangible decrease in anthropogenic impacts at CIAs.

⁷ Source visibility impacts could involve CIAs in a home state or CIAs in another state.

5. Consideration of Visibility (5th Factor) for Stationary Source Controls:

In the first 10-year planning period, the EPA allowed the use of the CALPUFF model⁸ for estimating long range BART source impacts to CIA visibility. Despite limitations on showing cumulative impacts to CIA visibility, the CALPUFF model enabled single-source evaluations of control scenarios for determining visibility improvement at various CIAs. For the second 10-year planning period, the draft EPA guidance proposes that photochemical grid models⁹ should be the generally preferred approach for estimating source impacts on secondary PM concentrations. In the proposed 2015 Guideline on Air Quality Models¹⁰, EPA recommended *“that the Guideline no longer contain language that requires the use of CALPUFF or another Lagrangian puff model for long-range transport assessments. Additionally, the EPA is proposing to remove the CALPUFF modeling system as an EPA-preferred model for long-range transport due to concerns about the management and maintenance of the model code given the frequent change in ownership of the model code since promulgation in the previous version of the Guideline.”*

In this planning period, the Subcommittee recognizes that some states see value in assessing source specific visibility impacts as part of the Reasonable Progress four-factor review process. However, other states have questioned the need for assessing single source visibility impacts and the FLMS suggest that the use of the visibility 5th factor would impede or prevent the ultimate goal of the Regional Haze program - reaching natural conditions. The Subcommittee relies on consensus among members before endorsing a particular technical approach. Therefore, the Subcommittee is not establishing a formal position on whether states should consider 5th factor visibility in the four-factor analysis process for this planning period. This Protocol document does not limit the ability of a state from pursuing alternative approaches, thus assessing 5th factor visibility is available for any state interested in pursuing this option.

The Subcommittee reviewed several source specific visibility modeling options that are discussed below for the benefit of states considering 5th factor visibility modeling. Generally, based on EPA identified issues with the CALPUFF model, states may want to consider other modeling options. Alternatively, some states that evaluated various source control options using the CALPUFF model in the first 10-year planning period may determine that existing modeling is sufficient for ranking CIA visibility impacts associated with various controls and may decide that further modeling is unnecessary. Other modeling options including photochemical grid model, AERMOD and SCICHEM were explored because some western states have an interest in assessing source specific visibility impacts.

⁸ See 70 FR 39170 - Regional Haze Regulations and Guidelines for Best Available Retrofit Technology (BART) Determinations – Final Rule, July 6, 2005

⁹ The Guidance references the July 29, 2015 proposed revisions to 40 CFR Part 51 Appendix W, Guideline on Air Quality Models.

¹⁰ See 80 FR 45349, July 29, 2015.

Photochemical Grid Models (CAMx or CMAQ)

The regional photochemical grid model will be used to estimate the visibility reasonable progress goals for each western CIA because these types of models are generally effective at producing a comprehensive assessment of CIA visibility impacts across a large geographic region. However, because of resource constraints and timing concerns, the regional model will not be used for quantifying visibility improvements from specific control options at a discrete source.

The three-step process of screening sources outlined in Section 4 above could be supplemented and refined with 2014 base and 2028 future year source apportionment modeling results if the WRAP agrees to pursue this option, which could become available in the spring of 2019. The source apportionment modeling could provide additional information regarding the impact of geographically limited source sectors (e.g., Nevada's non-EGU point sources, Idaho's area sources, or Utah's non-road mobile sources) at each Class I area.

Source sectors could be ranked by visibility impact at each Class I area both within and outside the host state. Then each source within the source sector could be ranked using the three-step process above, resulting in a source list ranked first by source sector visibility impact and then by the three-step process. States could balance the source apportionment results with the three-step process to develop a list of sources for control measures analysis tempering this list with the "controllability" of the source sector. Under this scheme, a source with a high Q/d from a source sector with significant visibility impacts would be subject to further control analysis, while a source with a high Q/d from a source sector with limited visibility impacts may not be considered for further control analysis.

PM source apportionment modeling using the PM Source apportionment technology (PSAT) module of the photochemical grid model is capable of assessing CIA visibility impacts for a limited number of source categories. Assessing visibility impacts from particular categories of sources within a state or over a region may prove invaluable for identifying source categories with the greatest visibility impact at a CIA. Accordingly, the Subcommittee recommends that the WRAP consider conducting PSAT modeling for anthropogenic categories such as EGUs, O&G point, O&G area and other significant source categories. If the PSAT modeling is approved, the WRAP anticipates apportionment analysis could be available around the spring of 2019.

AERMOD Model

Currently, States and entities with permit authority use AERMOD¹¹, the EPA preferred regulatory model, for determining stationary source impacts under the Prevention of Significant Deterioration (PSD) program¹². Unfortunately, AERMOD is limited to near-field dispersion (up to 50 kilometers) of source emissions, which limits the feasibility of modeling sources further away from CIAs. In the west, the distances between sources

¹¹ See 82 FR 5182, Revisions to the Guideline on Air Quality Models: Enhancements to the AERMOD Dispersion Modeling System and Incorporation of Approaches To Address Ozone and Fine Particulate Matter, January 17, 2017.

¹² See EPA website: <https://www.epa.gov/nsr/prevention-significant-deterioration-basic-information>

and CIAs often requires a model capable of long-range transport beyond 50 kilometers thus excluding AERMOD from consideration as a potential replacement for CALPUFF.

SCICHEM Model

Another potential option is the Second-order Closure Integrated puff model with CHEMistry (SCICHEM), which is a state-of-the-science reactive puff model that can be used to model the impact of single or multiple emission sources on primary and secondary pollutants. The EPA guidance on models¹³ lists SCICHEM as suitable for assessing single-source impacts to ozone and PM_{2.5}. SCICHEM is a Lagrangian photochemical puff model with different options for gas and aerosol chemistry schemes which are consistent with mechanisms found in photochemical grid models. SCICHEM is able to model dispersion of primary and secondary pollutants and can be used for near-source as well as long-range transport applications.

SCICHEM appears to be a potential candidate for states interested in assessing CIA visibility improvement associated with potential control options at a single source.

¹³ See EPA Guidance on the use of models for assessing the impacts of emissions from single sources on secondarily formed pollutants ozone and PM_{2.5}. USEPA-454/P-15-001. Office of Air Quality Planning and Standards: July 2015.

6. Four Factor Analysis Process:

Under 40 CFR 51.308(f)(2)(i), states must consider the four statutory factors to decide what emission control measures are necessary to make reasonable progress toward natural visibility conditions at Class I areas. This obligation applies equally to states with Class I areas and states with sources that contribute to impairment at Class I areas in other states.

The four statutory factors are¹⁴:

“1) The costs of compliance.

The first step in any cost analysis is to estimate the capital and annual operating and maintenance (O&M) costs of the control measure in light of the design parameters of the source. States should combine and annualize these costs over the expected life of the source or the control equipment, whichever is shorter.

States should calculate O&M costs for new emission controls on an incremental basis, i.e., by comparing them to current O&M costs. This will matter, for example, if the installation of a new control will involve the discontinuation of a current operating cost or an increase in the operating cost of existing equipment at the source.

In some instances, the installation of a new control may require the removal or discontinuation of existing emission controls for engineering reasons or business reasons. Such situations present special issues regarding the annualization of capital costs. States should consult with their EPA regional offices for advice.

2) The time necessary for compliance.

For stationary sources, the provisions of the BART Guidelines regarding this factor are relevant to reasonable progress analyses. Prior experiences with the planning and installation of new emission controls is the best guide to how much time a particular source will reasonably need for compliance. However, source-specific factors should also be considered. Sections 8.1 and 8.2 of the draft EPA Guidance discuss how a state should give consideration to the time necessary for compliance, once that time is determined.

3) The energy and non-air quality environmental impacts of compliance.

Energy impacts

For stationary sources, the provisions of the BART Guidelines regarding this factor are relevant to reasonable progress analyses. The energy impacts of an emission control measure are a matter of engineering, so prior experience at similar sources will be informative. The Control Cost Manual provides advice on estimating energy requirements or savings for some situations. States may consider energy impacts in terms of kilowatt-hours or mass of fuels used. States should focus their analysis

¹⁴ Includes excerpts from Draft EPA RH Guidance, dated July 2016

on direct energy consumption at the source rather than indirect energy inputs needed to produce raw materials for the construction of control equipment.

Non-air environmental impacts

For stationary sources, the provisions of the BART Guidelines regarding this factor are relevant to reasonable progress analyses. When there are significant potential non-air environmental impacts, characterizing those impacts will usually be very source-specific, so no general guidance is offered in this document. Other guidance intended for use in assessments under the National Environmental Policy Act may be relevant.

The EPA considers GHG emissions to be an air impact. Therefore, a state is not required to consider GHG emission impacts, or climate change effects, in the development of its Long-Term Strategy (LTS). However, we encourage states to consider GHG impacts. Some measures that would reduce emissions that contribute to visibility impairment will also reduce GHG emissions, such as measures that reduce the use of energy produced from combusting fossil fuels with relatively high GHG emissions. Where a measure necessary to make reasonable progress towards natural visibility conditions would increase GHG emissions, we encourage states to work to harmonize visibility and climate change objectives, such as by identifying GHG emission offsets that can be implemented as well.

- 4) *The remaining useful life of any potentially affected major or minor stationary source or group of sources.*

Stationary sources

For stationary sources, the provisions of the BART Guidelines regarding this factor are relevant to reasonable progress analyses. Generally, the remaining useful life of the source itself will be longer than the useful life of the emission control measure under consideration unless there is an enforceable requirement for the source to cease operation sooner. Thus, states should normally use the useful life of the control measure to calculate emission reductions, amortized costs and cost per ton. However, if there is an enforceable requirement for the source to cease operation by a date before the end of what would otherwise be the useful life of the control measure under consideration, then states should use the enforceable shutdown date to calculate remaining useful life.

The Control Cost Manual provides guidance on typical values for the useful life of various emission control systems used at stationary sources. The EPA recommends that states use these values rather than relying on the values used in the first implementation period. The EPA is reviewing these values as part of the update to the Control Cost Manual.

Engines

Some types of mobile and stationary internal combustion engines are typically replaced at specific intervals that depend on their type and application. For these sources, states may rely on a reasonable estimate of when the engine will be

replaced in the normal course of business (or personal use) instead of an enforceable requirement to cease operation. The shorter the remaining useful life of an engine, the higher the cost per ton of a control measure will be. However, some types of engines typically are rebuilt or reconditioned rather than being completely replaced. For such engines, states should take care when calculating the useful life of control measures. For some measures, such as exhaust after treatment systems that are not closely integrated with the engine, the useful life of the measure may extend beyond the next engine rebuild or reconditioning.”

The Subcommittee recommends that states conduct a four-factor analysis on each source identified under the above three-step screening process for stationary sources. Some states may have stationary sources or area source categories that were subject to a Best Available Retrofit Technology (BART) or Reasonable Progress (RP) control measure analysis in the first 10-year RH SIP. For sources that recently installed or already have top-tier NO_x, SO₂ or PM emission controls¹⁵, the review of controls could involve listing current controls, because no further control are possible for this planning period. For other BART or RP sources without top-tier NO_x, SO₂ or PM controls or no controls, the Subcommittee recommends that these sources should be reviewed for potential additional controls using a four factor review process. A state may choose to conduct a four-factor analysis on other anthropogenic source categories (major/minor point, mobile, or area) that can reasonably be concluded to collectively account for a reasonably large fraction¹⁶ of all the in-state emissions contributing to visibility impairment at a CIA.

A state must incorporate all emission control measures resulting from the four-factor analysis that are necessary to make reasonable progress into the Long-Term Strategy in enforceable form. Some states with greenhouse gas (GHG) requirements may also need to consider GHG impacts in the long-term strategy (LTS), but the Subcommittee recognizes that other states have discretion in deciding whether to consider GHG emission impacts or climate change effects. The LTS should also contain any reductions of visibility related pollutants resulting from attaining criteria pollutant standards, or reductions needed for meeting the requirements of any other program of the Clean Air Act. Once a state has developed its LTS, the state must use a regional photochemical air quality model to project the future visibility conditions at each of its Class I areas on the 20 percent most impaired days and 20 percent clearest days.

¹⁵ Generally, for most common source category – boilers; top tier controls include SCR for NO_x, wet scrubber or semi-dry FGD for SO₂ and baghouse for PM.

¹⁶ Any threshold value needs to be chosen with consideration of how many individual sources will be tested against it. If there are many sources with small impacts that add up to a “significant” impact, the threshold should not be so high that each small source is screened out.

7. Comparing RPGs to the URP:

The EPA Guidance states that:

“Under 40 CFR 51.308(f)(3)(ii)(A), states with Class I areas must compare their RPGs for the 20 percent most impaired days to the URP in 2028 (as described in section 10 of this document). The URP is the rate of progress necessary to reach natural visibility conditions at the Class I area by the end of 2064. States are not required to set RPGs that meet or exceed the URP, nor does meeting or exceeding the URP create a safe harbor that exempts states from the requirements of the Regional Haze Rule. If the 2028 RPG is above the URP line, however, the state must demonstrate that there are no additional emission reduction measures that would be reasonable to include in the LTS. To satisfy this requirement, states may need to consider sources that screened out of the four-factor analysis or take a second look at emission controls for sources that were selected for the four-factor analysis. If the state determines that no additional emission control measures are reasonable to bring the 2028 RPG at or below the URP line, the state must explain and document its reasoning. Under 40 CFR 51.308(f)(3)(ii)(B), upwind states that contribute to impairment at a Class I area for which the 2028 RPG is above the URP line have the same obligations, i.e., to take a second look at the LTS, determine whether additional control measures are reasonable, and provide adequate documentation.”

Based on the first 10-year RH Plans, many if not all western CIAs had 2018 modeled Reasonable Progress Goals (RPGs) were above the URP line for the 20% worst days. Similarly, the Subcommittee anticipates that using the 20% most impaired days metric will likely produce 2028 modeled RPGs that are above the URP line for many western CIAs. Although, we must wait for modeling results of the visibility projections for 2028 to determine the extent of CIAs with RPGs that fail to meet URP in the west.

In the event that some states have CIAs with modeled RPGs far above URP line, the Subcommittee acknowledges these states may incur a higher burden of proof with EPA on what is considered “reasonable progress” and whether all anthropogenic sources were considered in the four-factor analysis, including other states with identified contributions to a particular CIAs visibility impairment. The Subcommittee is not establishing a common understanding among the WRAP states on what is “reasonable” for purposes of establishing a CIA RPGs. Instead, the Subcommittee will rely on each state to establish the appropriate level of control based on the unique circumstances associated with the sources impacting a particular CIA.

Appendix A:

Excerpts of Regional Haze Regulatory Requirements¹⁷

(A) Long-term Strategy:

§51.308 (f)(2) *“Long-term Strategy for Regional Haze. Each State must submit a long-term strategy that addresses regional haze visibility impairment for each mandatory Class I Federal area within the State and for each mandatory Class I Federal area located outside the State that may be affected by emissions from the State. The long-term strategy must include the enforceable emissions limitations, compliance schedules, and other measures that are necessary to make reasonable progress, as determined pursuant to (f)(2)(i) through (iv). In establishing its long-term strategy for regional haze, the State must meet the following requirements:*

- (i) The State must evaluate and determine the emission reduction measures that are necessary to make reasonable progress by considering the costs of compliance, the time necessary for compliance, the energy and non-air quality environmental impacts of compliance, and the remaining useful life of any potentially affected anthropogenic source of visibility impairment. The State should consider evaluating major and minor stationary sources or groups of sources, mobile sources, and area sources. The State must include in its implementation plan a description of the criteria it used to determine which sources or groups of sources it evaluated and how the four factors were taken into consideration in selecting the measures for inclusion in its long-term strategy. In considering the time necessary for compliance, if the State concludes that a control measure cannot reasonably be installed and become operational until after the end of the implementation period, the State may not consider this fact in determining whether the measure is necessary to make reasonable progress.*
- (ii) The State must consult with those States that have emissions that are reasonably anticipated to contribute to visibility impairment in the mandatory Class I Federal area to develop coordinated emission management strategies containing the emission reductions necessary to make reasonable progress.*
 - (A) The State must demonstrate that it has included in its implementation plan all measures agreed to during state-to-state consultations or a regional planning process, or measures that will provide equivalent visibility improvement.*
 - (B) The State must consider the emission reduction measures identified by other States for their sources as being necessary to make reasonable progress in the mandatory Class I Federal area.*
 - (C) In any situation in which a State cannot agree with another State on the emission reduction measures necessary to make reasonable progress in a mandatory Class I Federal area, the State must describe the actions taken to resolve the disagreement. In reviewing the State’s implementation plan, the Administrator will take this information into account in determining whether the plan provides for reasonable progress at each mandatory Class I Federal area that is located in the State or that may be affected by emissions from the State. All substantive interstate consultations must be documented.*
- (iii) The State must document the technical basis, including modeling, monitoring, cost, engineering, and emissions information, on which the State is relying to determine the emission reduction measures that are necessary to make reasonable progress in each mandatory Class I Federal area it affects. The State may meet this requirement by relying on technical analyses developed by a regional planning process and approved by all State participants. The emissions information must include, but need not be*

¹⁷ See Final Regional Haze Rule (82 FR 3078) effective on January 10, 2017.

limited to, information on emissions in a year at least as recent as the most recent year for which the State has submitted emission inventory information to the Administrator in compliance with the triennial reporting requirements of subpart A of this part. However, if a State has made a submission for a new inventory year to meet the requirements of subpart A in the period 12 months prior to submission of the SIP, the State may use the inventory year of its prior submission.

(iv) The State must consider the following additional factors in developing its long-term strategy:

(A) Emission reductions due to ongoing air pollution control programs, including measures to address reasonably attributable visibility impairment;

(B) Measures to mitigate the impacts of construction activities;

(C) Source retirement and replacement schedules;

(D) Basic smoke management practices for prescribed fire used for agricultural and wildland vegetation management purposes and smoke management programs; and

(E) The anticipated net effect on visibility due to projected changes in point, area, and mobile source emissions over the period addressed by the long-term strategy.”

(B) Reasonable Progress Goals:

§51.308 (f)(3) *“Reasonable progress goals.*

(i) A state in which a mandatory Class I Federal area is located must establish reasonable progress goals (expressed in deciviews) that reflect the visibility conditions that are projected to be achieved by the end of the applicable implementation period as a result of those enforceable emissions limitations, compliance schedules, and other measures required under paragraph (f)(2) of this section that can be fully implemented by the end of the applicable implementation period, as well as the implementation of other requirements of the CAA. The long-term strategy and the reasonable progress goals must provide for an improvement in visibility for the most impaired days since the baseline period and ensure no degradation in visibility for the clearest days since the baseline period.”