



# United States Department of the Interior

NATIONAL PARK SERVICE

Air Resources Division

P.O. Box 25287

Denver, CO 80225



IN REPLY REFER TO:

December 1, 2010

N3615 (2350)

Eric Massey, Director  
Division of Air Quality  
Department of Environmental Quality  
1110 West Washington Street  
Phoenix, Arizona 85007

Dear Mr. Massey:

On August 26, 2010, we received Arizona's draft Section 308 implementation plan to address regional haze. We appreciate the opportunity to work closely with the State through the initial evaluation, development, and review of this plan. Cooperative efforts such as these ensure that, together, we will continue to make progress toward the Clean Air Act's goal of natural visibility conditions at all of our most pristine National Parks and wilderness areas for future generations.

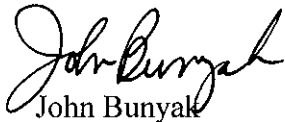
This letter acknowledges that the U.S. Department of the Interior, National Park Service (NPS), in consultation with the U.S. Fish and Wildlife Service (FWS) has received and conducted a substantive review of your revised proposed Regional Haze Rule implementation plan in fulfillment of your requirements under the federal regulations 40 CFR 51.308(i)(2). Please note, however, that only the U.S. Environmental Protection Agency (EPA) can make a final determination regarding the document's completeness and, therefore, ability to receive federal approval from EPA.

As outlined in a letter to each State dated August 1, 2006, our review focused on eight basic content areas. The content areas reflect priorities for the Federal Land Manager agencies, and we have enclosed comments associated with these priorities.

We look forward to your response, as per section 40 CFR 51.308(i)(3). For further information regarding our comments, please contact Pat Brewer of my staff at (303) 969-2153.

Again, we appreciate the opportunity to work closely with the State of Arizona to improve visibility in our Class I areas.

Sincerely,

A handwritten signature in black ink, appearing to read "John Bunyak". The signature is fluid and cursive, written over the printed name.

John Bunyak  
Acting Chief, Air Resources Division

Enclosure

cc:

Tom Webb  
U.S. EPA Region 9  
75 Hawthorne Street  
San Francisco, California 94105

National Park Service Comments  
Arizona Draft Section 308 Regional Haze State Implementation Plan  
November 29, 2010

**General Comments:**

The National Park Service, in consultation with the Fish and Wildlife Service, has completed review of Arizona's draft Section 308 regional haze State Implementation Plan (SIP). We appreciate the Arizona Department of Environmental Quality (ADEQ)'s long-term commitment to visibility improvement through the Grand Canyon Visibility Transport Commission, the Western Regional Air Partnership (WRAP), the Section 309 milestone process, and now the Section 308 SIP. We also appreciate the opportunity to discuss our initial comments with ADEQ on November 1, 2010.

ADEQ has provided a good summary of the WRAP technical analyses that address emissions, source contributions to visibility impairment at the Class I areas in Arizona, and projected benefits of emissions reductions under current federal and state requirements. Our major concerns are with ADEQ's determinations of Best Available Retrofit Technology (BART) and the lack of a substantive analysis of emissions controls under the reasonable progress analysis.

Arizona is projecting degradation of visibility on 20% Best days by 2018 at two IMPROVE monitors representing four Class I areas. The regional haze rule requires that states improve visibility on the 20% worst visibility days and prevent degradation of visibility on the 20% best days. The Arizona SIP as written does not support ADEQ's conclusion that the actions taken are sufficient to demonstrate reasonable progress in improving visibility in the Class I areas.

Our more detailed comments are presented below.

**Specific Comments:**

**Chapter 7 Visibility Impairment at Class I areas**

Organic Carbon (OC) is a dominant contributor to pollutants concentrations and visibility impairment at the Class I areas in Arizona. ADEQ attributes OC to fire, but the contributions are more complicated. We recommend that ADEQ address the relative contributions of natural and anthropogenic contributions to OC at the Class I areas. The WRAP Technical Support System provides daily time series of pollutant concentrations at the IMPROVE monitors (<http://vista.cira.colostate.edu/tss/Results/HazePlanning.aspxv>; Monitoring) and daily time series of natural versus anthropogenic contributions to carbon (<http://vista.cira.colostate.edu/tss/Results/HazePlanning.aspx>; Emissions and Source Apportionment; Organic Aerosol Tracer). These time series indicate that a few days at each site with elevated primary OC levels that are likely due to fire events, but also indicate important contributions from anthropogenic and secondary natural carbon that vary seasonally and spatially.

## **Chapter 8 Sources of Visibility Impairment**

Please address explicitly the assumptions used in the WRAP 2018 PRP18b emissions inventory for Arizona's BART sources and compare those modeling assumptions to the final emissions limits for sulfur dioxide (SO<sub>2</sub>) and nitrogen oxides (NO<sub>x</sub>) for the BART sources. If there are BART emissions reductions that were not included in the WRAP modeling inventory, these could be cited as evidence for greater than modeled visibility improvement.

The emissions table (Table 8.1) indicates that total SO<sub>2</sub> emissions from point sources will decrease by 2018. However, SO<sub>2</sub> emissions from the two copper smelters are projected to increase significantly (13,273 tons) by 2018. Please discuss Arizona's assumptions for future emissions from the smelters. These assumptions are critical to the source apportionment analyses in Chapter 9 that project that Arizona's contribution to sulfate (SO<sub>4</sub>) will increase at several Class I areas.

Table 8.2 indicates that NO<sub>x</sub> emissions from point sources will not change between 2002 and 2018. Is this consistent with ADEQ's final BART determinations?

Tables 8.3-8.5 indicate that natural fire is the major source category for Volatile Organic Carbon (VOC), Primary Organic Aerosols (POA), and Elemental Carbon (EC). Note that anthropogenic emissions from area sources, road dust, and fugitive dust are projected to increase.

## **Chapter 9 Visibility Modeling and Source Apportionment**

Please provide a brief summary of the model performance for the 2002 base year. Our confidence in the modeled responses to emissions changes is dependent on the model's skill in representing atmospheric chemistry and transport. In general, model performance is better for SO<sub>4</sub> and EC and less accurate for nitrate (NO<sub>3</sub>) and OC. Appendix C provides general references but does not give an overview of the model performance as is required in the SIP.

Please briefly describe relative reduction factors and cite the technical reference or summarize how the factors are calculated using model results and monitoring data.

Tables 9.3-9.21 indicate that soil (fine particulate matter) is projected to increase by 2018 at every Class I area and that organic carbon is projected to increase at Chiricahua (IMPROVE monitor represents 3 Class I areas), Saguaro, and Superstition. Since the natural sources are held constant, these increases are likely due to anthropogenic sources or influences from outside the U.S.

Section 9.3 discusses results of the Particulate Source Apportionment Tool (PSAT). One of the measures that we consider as part of reasonable progress is whether the PSAT modeling supports that Arizona's contribution to pollutant concentrations is decreasing. PSAT indicates that the contributions of Arizona's point sources to SO<sub>4</sub> concentrations will increase by 2018 at Chiricahua, Mazatzal, Petrified Forest, Saguaro, Superstition, Sierra Ancha, and Sycamore. Please discuss the basis for this increase. Projected increases in SO<sub>2</sub> emissions from the two copper smelters (assigned to Gila County) may explain the increases in SO<sub>4</sub> concentrations at the Class I areas. Note that in some instances (e.g., page 89-90 in the October 25 draft concerning

PSAT modeling for Mazatal) the narrative incorrectly refers to SO<sub>4</sub> emissions when SO<sub>2</sub> emissions were intended.

PSAT also projects that NO<sub>3</sub> concentrations due to NO<sub>x</sub> emissions from AZ point sources will increase by 2018. Increases in SO<sub>4</sub> and NO<sub>3</sub> contributions from Arizona point sources are not consistent with ADEQ's assertion that the state has made reasonable progress toward improving visibility in Class I areas in Arizona (e.g., section 11.3.2 on page 154 of Oct draft).

The Weighted Emissions Potential (WEP) projections indicate increases in Arizona's contributions to fine and coarse particulate matter and to organic carbon from area sources, road dust, fugitive dust, and windblown dust. Area sources, road dust, and fugitive dust are anthropogenic sources. Based on the WEP results, we recommend that ADEQ consider measures to reduce anthropogenic particulate matter (PM) in the reasonable progress analysis.

Section 9.4.5 (page 114 of October draft) incorrectly refers to Grand Canyon when the graphic and paragraph are addressing Petrified Forest.

## **Chapter 10 Best Available Retrofit Technology (BART)**

### ***BART Exemption Criteria***

During the development of the WRAP BART Modeling Protocol, the Federal Land Managers (FLM) recommended that the WRAP BART exemption modeling use surface and upper air meteorological observations as well as the MM5 meteorological model to initialize the CALMET meteorological model. WRAP used surface observations but did not use upper air observations. Thus the FLM recommended that states should use a conservative interpretation of the CALPUFF outputs. Specifically, the states should use either the maximum visibility impact with the annual average natural condition or the 98<sup>th</sup> percentile visibility impact with the 20% best natural conditions. ADEQ is reporting 98<sup>th</sup> percentile visibility impact with annual average natural conditions which is not consistent with good modeling practices as identified by 40 CFR 51 Appendix W or EPA's Model Clearing House memorandum. Use of a non-guideline modeling approach requires additional evaluation of performance and EPA Regional Office approval (Section 3.2, 40 CFR 51 Appendix W).

Most states have followed EPA staff guidance to interpret the 98<sup>th</sup> percentile impact as either the maximum 8<sup>th</sup> highest value in any single year or the 22<sup>nd</sup> highest value for three years combined, whichever is more conservative. A DEQ used the 8<sup>th</sup> highest value averaged over three years, which is a less conservative metric. Had ADEQ used the 8<sup>th</sup> highest value in a single year, Chemical Lime Nelson Plant would not have been exempted from BART. We request that ADEQ re-evaluate the BART determination and use the more rigorous criteria.

In the modeling to determine if a source is subject to BART, all emissions that are above the de minimus level are to be included, even if those emissions are less than 250 tons.

### ***Ammonia Modeling Assumptions***

We reviewed the BART modeling reports submitted by the three electric utilities. We do not agree with the assumptions used for ammonia by AECOM for Salt River Project's Coronado Generating Station and by CH2MHill for Arizona Public Service's Cholla Generating Station.

Both analyses use very low winter values for ammonia based on early monitoring in the region. More recent ammonia monitoring<sup>1,2</sup> indicates higher ammonia values commonly occur in the region. We support the ammonia values of 1 ppm recommended in the WRAP BART Modeling Protocol and used by CH2M Hill for Arizona Electric Power Cooperative's Apache Generating Station. We recommend that the same levels be used for Comanche and Cholla Generating Stations.

### ***BART Costs and Benefit Analyses***

We have developed a national data base of costs and effectiveness of control technology installations. As documented in our General BART Comments, based on national experience, it appears that ADEQ and the companies have underestimated the efficiency of Selective Catalytic Reduction (SCR) to reduce NO<sub>x</sub> emissions and have overestimated the costs of SCR installation and operation.

Please clarify how the costs were factored into the BART determinations. ADEQ at the public stakeholder meeting on October 19 indicated that a threshold of \$1500 to \$2000 per ton was used in the BART determinations. However, the BART Technical Support Document indicates that ADEQ selected the least cost control option (low NO<sub>x</sub> burners, existing PM and SO<sub>2</sub> controls) even when more effective controls were identified in the \$1500-2000 range.

ADEQ presents the visibility benefit in \$/dv for just the Class I area with the maximum impact. If the cumulative benefits of controls were considered for all the Class I areas within 300 km of a source, the \$/dv benefit would be much greater than reported. Please report the benefits of controls at all Class I areas, not just the benefit at the Class I area with maximum impact.

Please provide a summary of the BART controls and expected emission reduction in Chapter 10 in addition to Appendix D.

### ***BART Recommendations***

Our detailed comments on ADEQ's BART determinations and national evidence supporting our cost estimates are provided in the enclosed documents. Our BART recommendations are summarized here.

#### **Arizona Electric Power Cooperative (AEP) – Apache Generating Station Units 2 and 3**

For NO<sub>x</sub>, we recommend SCR for Apache Units 2 and 3 rather than Low NO<sub>x</sub> Burners with Over Fired Air as proposed by ADEQ. Our cost estimate for SCR is \$1,500 - \$1,700 per ton based on an annual average NO<sub>x</sub> emissions rate of 0.05 lb/mmBtu.

For SO<sub>2</sub>, we recommend that ADEQ require the existing scrubbers to achieve at least 90% SO<sub>2</sub> removal with an annual average SO<sub>2</sub> emissions limit not to exceed 0.12 lb/mmBtu. We concur with ADEQ's BART determination for PM.

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<sup>1</sup> Sather, M. E. et al., 2008, J of Environmental Monitoring 10, 1319-1325

<sup>2</sup> Tombach and Paine, 2010, Report to Salt River Project, "Measurements of Background Ammonia on the Colorado Plateau and Visibility Implications"

### **Arizona Public Service Cholla Units 2, 3, and 4**

For NO<sub>x</sub>, we recommend SCR for Cholla Units 2, 3, and 4 rather than Low NO<sub>x</sub> Burners with Separated Over Fired Air as proposed by ADEQ. Our cost estimate for SCR is \$1,700 - \$1,900 per ton based on an annual average NO<sub>x</sub> emissions rate of 0.05 lb/mmBtu.

For SO<sub>2</sub>, we recommend that ADEQ require the existing scrubbers to achieve at least 90% SO<sub>2</sub> removal with an annual average SO<sub>2</sub> emissions limit not to exceed 0.12 lb/mmBtu. We concur with ADEQ's BART determination for PM.

### **Salt River Project Coronado Generating Station Units 1 and 2**

The ammonia assumptions used to model visibility impacts are unacceptably low and therefore the visibility benefits of emissions controls were underestimated. The visibility modeling needs to be redone.

For NO<sub>x</sub>, we concur with ADEQ's estimated \$1,021/ton for combustion controls plus SCR. It is likely the corrected visibility benefits would support support SCR as BART.

For SO<sub>2</sub>, we concur with Wet Flue Gas Desulfurization for both units with an associated SO<sub>2</sub> emission rate of 0.08 lbs/MMBtu on 30-day rolling average basis.

For PM, ADEQ's conclusion that the proposed 0.03 lb/mmBtu BART limit "is already meeting or exceeding the stringency of the emissions limitation" "for similar emissions units with similar emissions controls" is not consistent with its Cholla BART analysis which concluded that replacement of the existing hot-side ESP with fabric filters at 0.015 lb/mmBtu is BART. We recommend the BART determination for Coronado be re-evaluated.

### **Catalyst Paper (Snowflake) Inc. (CPSI)**

The NO<sub>x</sub> emissions rate evaluated for control measures and proposed by ADEQ as BART is twice as high as the uncontrolled NO<sub>x</sub> emissions rate reported by CPSI and used in the cost estimates. The costs of control are overestimated by using a higher interest rate and shorter remaining useful life than recommended by the EPA Control Cost Manual. The visibility benefits to multiple Class I areas have not been included. The BART analysis for NO<sub>x</sub> is unacceptable and needs to be redone. The BART analysis for SO<sub>2</sub> is flawed with unsupported costs and underestimated benefits. The BART analysis for SO<sub>2</sub> is unacceptable and needs to be redone.

### **Arizona Public Service (APS) West Phoenix**

Please provide the revised air dispersion modeling analysis that was submitted on October 7, 2007 and was the basis for exempting the source from BART.

### **Arizona Portland Cement Company**

Until the retirement of kiln #4 is made federally enforceable, it will remain BART-eligible. We disagree with the exemption of the source because the exemption criteria were incorrectly applied. We request the visibility impacts be evaluated against the correct exemption criteria.

### **Chemical Lime Company – Nelson Lime Plant**

Please provide the September 21, 2007, letter from Chemical Lime Company (CLC) to ADEQ and the new modeling analysis by CLC. It appears that CLC did not include the 154 tpy of PM emissions modeled by WRAP into the company's modeling. All emissions, not just those greater than 250 tons need to be included in the modeling to determine if a source is subject to BART. The exemption criteria were incorrectly applied; please apply corrected as discussed above. We conclude that the Chemical Lime Company – Nelson Lime Plant is subject to BART.

### **Tucson Electric Power (TEP) – Irvington Generating Station**

The clear intent of EPA's BART Guidelines is to exempt a source that has gone through New Source Review (NSR) from a second review under BART. Because TEP Irvington Unit I4 did not go through NSR, the exemption does not apply. Our interpretation is that Unit I4 needs to be evaluated under BART.

### **ASARCO Hayden Smelter**

We agree with ADEQ's conclusion that the installation and operation of the double contact acid plant with the New Source Performance Standard of 650 ppm constitutes BART for SO<sub>2</sub>. We disagree with exempting the PM10 emissions from BART; in the BART guidelines the PM10 level for exemption is 15, not 250 tons per year.

### **Freeport-McMoRan Miami Smelter**

We agree with ADEQ's conclusion that the installation and operation of the double contact acid plant with the New Source Performance Standard of 650 ppm constitutes BART for SO<sub>2</sub>. We also agree that the NESHAP for Primary Copper Smelting constitutes BART for PM.

## **Chapter 11 Reasonable Progress Goal Demonstration**

Section 11.3.1 on page 153 of the October draft SIP incorrectly reports that visibility is maintained on the 20% best days for all the Class I areas in Arizona and in most cases are under the 2018 Uniform Rate of Progress. In fact, visibility on the 20% best days is projected to degrade at two IMPROVE monitors representing four Class I areas (Chiricahua National Monument, Chiricahua Wilderness, Galiuro Wilderness, and Saguaro National Park). Uniform Rate of Progress is not met at any Class I area in Arizona on the 20% worst days. These results do not support ADEQ's assertion that Arizona is doing all that is needed to demonstrate reasonable progress by 2018.

As additional weight of evidence that visibility on the 20% Best Days is being protected, ADEQ should include the trends from 2000-2008 at the Chiricahua and Saguaro monitors (<http://vista.cira.colostate.edu/dev/web/AnnualSummaryDev/Trends.aspx>).

Because Arizona will not meet the uniform rate of progress by 2018, the Regional Haze Rule requires ADEQ to project the year that natural background visibility will be achieved at the Arizona Class I areas under the lower rate of progress.

We agree that mobile sources do not need to be considered under reasonable progress because significant emissions reductions are expected under existing federal and state requirements. We



also agree that Arizona's Enhanced Smoke Management Program addresses emissions from forestry and agricultural burning and that these source categories do not need to be considered in the reasonable progress analysis.

We agree with ADEQ's conclusion to focus on SO<sub>2</sub> and NO<sub>x</sub> emissions in the reasonable progress analysis. We disagree with ADEQ's decision not to consider particulate matter and organic carbon emissions since anthropogenic emissions of these pollutants are projected to increase. We recommend that ADEQ consider what controls may be feasible to reduce anthropogenic emissions of dust, VOC, and PM<sub>10</sub> from area source categories such as agricultural and construction practices and residential wood smoke.

In Section 11.3.2, there appears to be a discrepancy between the text and Table 11.1 in the percentage contributions from Arizona sources to SO<sub>4</sub> and NO<sub>3</sub> at Class I areas in Arizona. The table indicates Arizona's contribution to SO<sub>4</sub> is 7-24% and to NO<sub>3</sub> is 7-53%.

ADEQ identifies major source categories for SO<sub>2</sub> and NO<sub>x</sub> emissions (Table 11.2). We disagree with ADEQ's assumption that visibility benefits from emissions reductions from these sources will be minimal. If the sources are located near Class I areas, the visibility benefits of controls could be substantial.

We noticed that between the September and October drafts of the SIP, ADEQ has removed the tables in Section 11.3.3 that identify specific sources and emissions that may be candidates for controls under reasonable progress. We found those tables very informative and encourage ADEQ to reinstate them.

The four-factor analyses reported in Section 11.3.3 are incomplete. We recommend that ADEQ use the Four Factor Analysis reported by the WRAP's contractor EC/R to support ADEQ's analyses. The EC/R report covers industrial boilers, cement manufacturing, lime kilns, and internal combustion engines that are major source categories identified by ADEQ.

We also recommend that point sources that were BART-eligible but determined not to be subject to BART should be considered for reasonable progress. It is appropriate to consider a lower visibility impact threshold than 0.5 dv in a reasonable progress analysis.

We recommend that ADEQ review the reasonable progress analysis completed by Colorado <http://www.cdphe.state.co.us/ap/regionalhaze.html> for an example of a strong analysis of potential emissions control costs and benefits.

In Section 11.3.4 ADEQ concludes that no controls on non-BART sources are reasonable at this time and indicates that ADEQ will develop guidance for a more comprehensive review of individual sources over the next five years to identify any additional emission reductions that could improve visibility in the Class I areas by 2018. We encourage ADEQ to make a more binding commitment to emissions controls to be implemented within the next five years.

Correction under Section 11.4.1, item 4: mobile sources are not the largest anthropogenic source of SO<sub>2</sub>.

ADEQ asserts that as yet undefined controls to be identified in the long term strategy will further improve visibility. There is no evidence presented in the long term strategy to support this statement.

## **Chapter 12 Long Term Strategy**

### **Section 4.3 Arizona Regional Haze Monitoring Commitments**

ADEQ needs to discuss its commitment to assuring continued visibility monitoring in the future.

In Section 12.3 we disagree with ADEQ's conclusion that OC, EC, PM fine and coarse do not need to be considered in the long term strategy. The anthropogenic sources of these pollutants (e.g., area sources, road dust, fugitive dust) are projected to increase with population and should be considered by ADEQ.

Section 12.3 provides a good discussion of Arizona impacts to Class I areas in neighboring states and neighboring states impacts to Class I areas in Arizona. What percentage contribution does Arizona have to Class I areas in Colorado?

We appreciate that in Section 12.6.1 ADEQ discusses Arizona's requirements for Prevention of Significant Deterioration and New Source Review to evaluate air quality related values and specifically visibility.

In Section 12.6, the discussion of measures to control dust and area sources in PM10 nonattainment areas is very helpful. Do the PM10 monitoring data demonstrate the effectiveness of these controls?

Section 12.6.3 refers to compliance schedules for BART sources that install controls or accept federally enforceable permit limitations. Which BART source(s) accepted permit limits to exempt from BART?

In Section 12.6.5 ADEQ discusses the Enhanced Smoke Management Plan. Please clarify if the Plan answers the three key questions for visibility protection in the Class I areas. If the Plan does not, is there a schedule to add these components to the plan?

- are the smoke management measures voluntary or mandatory?
- does the Plan specifically identify the Class I areas as sensitive receptors?
- specify that avoiding impacts to Class I areas be considered in the smoke management decisions?

Section 12.7 discusses federal requirements for renewable fuels. Does Arizona have state rules requiring implementation of renewable fuels? If so, it would be appropriate to mention in this section.

Section 12.7.3 is intended to describe the long term control strategies for BART facilities but is incomplete in the October 25 draft.

Section 12.8: It is not likely that WRAP will be able to fulfill the commitment to provide final regional modeling once the BART determinations are complete. We recommend deleting this commitment.

As evidence of reasonable progress beyond the existing WRAP modeling, it is important for ADEQ to identify any additional BART or other emissions reductions that were not included in the WRAP 2018 PRPb emissions inventory.

### **Chapter 13 Consultation**

Please correct references to Oregon.

### **Conclusion**

We appreciate the opportunity to work with ADEQ to improve visibility in our Class I areas. We are available to assist ADEQ to address our comments.