Appendix E

Public Process

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PUBLIC COMMENT AND HEARING NOTICE

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

PROPOSED REGIONAL HAZE STATE IMPLEMENTATION PLAN
as required by 40 Code of Federal Regulations 51.308

The Arizona Department of Environmental Quality (ADEQ) will open a public comment period and hold a public hearing to receive comments on Arizona's Proposed Regional Haze State Implementation Plan (SIP) to address visibility impairment at Arizona's Class I areas (e.g., national parks and wilderness areas). This SIP specifically addresses the requirements under the federal Regional Haze Rule, 40 CFR 51.308. The SIP will be available on ADEQ's Web site at: http://www.azdeq.gov/environ/air/haze/index.html

The public comment period will open on October 28, 2010. The public hearing on the proposed Regional Haze SIP will be held on December 2, 2010, at 3:00 p.m., ADEQ, Room 3175, 1110 W. Washington Street, Phoenix, Arizona. The public comment period for the proposed SIP will end upon the closure of this public hearing or at 5:00 p.m. on December 2, 2010.

All written comments must be received at ADEQ by 5:00 p.m. on December 2, 2010. Comments postmarked on or before that date will be accepted. Comments should be addressed, faxed, or e-mailed to:

Lisa Tomczak
Air Quality Planning Section
Arizona Department of Environmental Quality
1110 W. Washington Street, Mail Code 3415A
Phoenix, AZ 85007
FAX: (602) 771-2366
E-Mail: tomczak.lisa@azdeq.gov

The draft report is also available for review at the location below.

Arizona Department of Environmental Quality
Records Management Center
1110 W. Washington Street
Phoenix, Arizona 85007
(602) 771-4380

ADEQ
AIR QUALITY DIVISION
10 DEC -3 AM 11: 11

AFFIDAVIT OF PUBLICATION

THE ARIZONA REPUBLIC

PUBLIC COMMENT AND HEARING NOTICE ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY AIR QUALITY DIVISION PROPOSED REGIONAL HAZE STATE IMPLEMENTATION PLAN

as required by 40 Code of Federal Regulations 51.308 The Arizona Department of Environmental Quality (ADEQ) will open a public comment period and hold a public hearing to receive comments on Arizona's Proposed Regional Haze State Implementation Plan (SIP) to address visibility impairment at Arizona's Class I areas (e.g., national parks and wilderness areas). This SIP specifically addresses the requirements under the federal Regional Haze Rule 40 CFR 51.308. The SIP will be available on ADEQ's Web site at: http://www.azdeq.gov/environ/air/haze/index.html The public comment period will open on October 28, 2010. The public hearing on the Proposed Regional Haze SIP will be held on December 2, 2010, at 3:00 p.m., ADEQ, Room 3175, 1110 W. Washington Street, Phoenix, Arizona. The public comment period for the proposed SIP will end upon the closure of this public hearing or at 5:00 p.m. on December 2, 2010. All written comments must be received at ADEQ by 5:00 p.m. on December 2, 2010. Comments postmarked on or before that date will be accepted. Comments should be addressed, faxed, or e-mailed to:

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Arizona Department of Environmental Quality
1110 W. Washington Street, Mail Code 3415A
Phoenix, AZ 85007
FAX: (602) 771-2366
E-Mail: tomczak.lisa@azdeq.gov

The proposed SIP is also available for review at the location below:

Arizona Department of Environmental Quality
Records Management Center
1110 W. Washington Street
Phoenix, Arizona 85007

STATE OF ARIZONA
COUNTY OF MARICOPA } SS.

Mark Gilmore, being first duly sworn, upon oath deposes and says: That he is a legal advertising representative of the Arizona Business Gazette, a newspaper of general circulation in the county of Maricopa, State of Arizona, published at Phoenix, Arizona, by Phoenix Newspapers Inc., which also publishes The Arizona Republic, and that the copy hereto attached is a true copy of the advertisement published in the said paper on the dates as indicated.

The Arizona Republic

October 28, 29, 2010

Sworn to before me this
1TH day of
December A.D. 2010

BRIAN BILLINGS
Notary Public - Arizona
Maricopa County
My Comm. Expires Jul 25, 2014

Notary Public

ADEQ Arizona Department of Environmental Quality

Meeting Agenda

AIR QUALITY DIVISION

Proposed Regional Haze State Implementation Plan
Under Section 308 of the Federal Regional Haze Rule
Thursday, December 2, 3:00 p.m.
Room 3175, Arizona Department of Environmental Quality
1110 West Washington Street, Phoenix, Arizona

Pursuant to A.R.S. § 38-431.02, notice is hereby given that the above-referenced meeting is open to the public. Materials distributed for the meeting are available for viewing in the Arizona Department of Environmental Quality Library, 1110 West Washington Street, Phoenix, Arizona.

1. Welcome and Introductions
2. Purposes of the Public Hearing
3. Procedure for Making Public Comment
4. Brief Overview of the Proposed Regional Haze State Implementation Plan
5. Question and Answer Period
6. Oral Comment Period
7. Adjournment of the Public Hearing

Additional information is available on the ADEQ website at http://www.azdeq.gov/environ/air/haze/index.html, or call Lisa Tomczak, ADEQ Air Quality Division, at (602) 771-4450 or 1-800-234-5677, Ext. 771-4450.

Persons with a disability may request a reasonable accommodation, such as a sign language interpreter, by contacting Dan Flukas at (602) 771-4795 or 1-800-234-5677, Ext. 771-4795. Requests should be made as early as possible to allow sufficient time to make the arrangements for the accommodation. This document is available in alternative formats by contacting ADEQ TDD phone number at (602) 771-4829.

ADEQ Arizona Department of Environmental Quality

Air Quality Division Sign-In Sheet

Please Sign In

SUBJECT: Public Hearing – Proposed Regional Haze State Implementation Plan Under Sec 308 DATE: December 2, 2010

	NAME	ORGANIZATION	PHONE	FAX	E-MAIL
1.	Shannon Reed	NPS / citizen	928-638-7611		Shannon_Reed@nps.gov
2.	Gary Crane		602 808-2004		gkcrane@SouthwesternPower.com
3.	Chris West	Freeport - McMoRan	928-473-7149		CHRISTOPHER_WEST@FMI.com
4.	Rusty VanLeuven	Az Dept. of Ag.	602-542-3484		RVANLEUVEN@Azda.gov
5.	Carmella Ajk	Stevens & Stevens	602 741 4129		susie@stevensandstevenslaw.com
6.	Chas Spell	APS	602-250-5430		charles.spell@aps.com
7.	Lisa Tomczak	ADEQ			
8.	Corky Martinovich	ADEQ			

9.	Grant Smedley	SRP	602-236-2928	grant.smedley@srpnet.com
10.	Matt Poppen	MAG	602-452-5096	mpoppen@azmag.gov
11.	Mark Hajduk	APS	602-250-3394	mark.hajduk@aps.com
12.	Ron Sherron	USFS	602-771-2277	rsherron@fs.fed.us
13.	JEANNETTE FISH	MCFB	602-437-1330	mcfb@qwestoffice.net
14.	Rebecca Hudson	AZ Chamber	~~602~~	rhudson@azchamber.com
15.	Aaron Lopez	TONEPO	520-229-1554	Aaron.lopez@tonation-nsn.gov
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Proposed Arizona Regional Haze State Implementation Plan
Under Section 308 of the Federal Regional Haze Rule

Oral Proceeding
Hearing Officer Script

December 2, 2010

Mark Lewandowski: Good afternoon. We are ready to get started here. Welcome to this Arizona Department of Environmental Quality hearing on the proposed Regional Haze State Implementation Plan under Section 308 of the Federal Regional Haze rule. I now open this public hearing to receive comments on the Proposed Regional Haze SIP (from this point on, I will just refer to it as the Regional Haze SIP).

It is now Thursday, December 2. It's about 3:05 p.m. We are in room 3175, at the Arizona Department of Environmental Quality, 1110 West Washington in Phoenix, Arizona. My name is Mark Lewandowski. I have been appointed by the Director of the ADEQ to preside at this proceeding.

The purposes of this proceeding are to provide the public an opportunity to:
hear about the substance of the proposed Regional Haze SIP. That's the first thing. The second thing is to ask questions regarding the proposed Regional Haze SIP, and (3) if necessary, to present oral argument or data, and views regarding the proposed Regional Haze SIP in the form of formal comments on the record.

Lisa Tomczak, to my right, is here representing the ADEQ. She is from the Air Quality Planning Section. Also out in the audience are other people from ADEQ, including Trevor Baggiore and Corky Martinkovic, who's just walking in.

The Proposed Regional Haze SIP, which I noticed was on the back table, several hundred pages (?), was released for public comment on October 28, 2010, and public notices appeared in the *Arizona Republic* and on the ADEQ Web site regarding the proposed SIP.

The procedure for making a public comment on the record is pretty straightforward. If you want to comment, you should fill out a speaker slip, which is available on the back table, and give it to me. Using speaker slips allows everyone an opportunity to be heard and allows us to match the name on the official record with the comments and to spell your name right.

You may also submit written comments to me or to Lisa today. Please note, the comment period on the Proposed Regional Haze SIP closes at the completion of this public hearing or at 5:00 p.m. today, whichever is later.

The agenda for this hearing is simple. First, Lisa will present a brief overview of the Proposed Regional Haze SIP

After she's done with her brief overview, I will conduct a question and answer period. The purpose of the question and answer period is to provide information that may help you in making comments on the Proposed Regional Haze SIP.

After the question and answer period, we will actually go into the formal oral comment period. At that time, I will begin to call speakers in the order that I have received speaker slips. If I haven't received any at that time, I will ask if anybody still wants to speak.

Please be aware that any comments you make at today's hearing that you want the Department to formally consider must be given either in writing or on the record during the oral comment period of this proceeding. So you can do either oral comments or written comments today by close of comment.

* * * * *

At this time, Lisa Tomczak will give a brief overview of the Proposed Regional Haze SIP.

Lisa Tomczak: Under Section 308 of the Federal Regional Haze Rule in 40 CFR Part 51, states are required to submit state implementation plans or SIPs that address visibility impairment at Federal Class I areas. The plan must provide current visibility conditions, analysis of haze impairing pollutants, a demonstration of reasonable progress towards the goal at the end of the first planning period, and a long-term strategy describing how Arizona will improve visibility at its Class I areas.

The visibility impairing pollutants required to be analyzed are sulfate, nitrate, organic carbon, elemental carbon, fine soil, coarse material, and sea salt. The primary pollutants that impair visibility at Arizona's Class I areas are sulfate, organic carbon, and coarse material, and not necessarily in that order, either. All of the pollutants, however, do impair visibility at varying degrees depending on the location of the Class I area, location of sources, geography, and meteorology. The pollutants are both natural and anthropogenic in nature and are found to come from a variety of sources from within Arizona, neighboring states, and also internationally.

For this planning period, which ends in 2018, Arizona, like many other states, will not meet the uniform rate of progress, also known as the URP, towards achieving natural visibility conditions on 20% worst visibility days at Class I areas; however, visibility will improve through many regulations, both "on-the-books" and "on-the-way." Reductions in anthropogenic pollutants, such as sulfur dioxide and nitrogen oxides, will occur through implementation of best available retrofit technology (also known as BART) on those sources that required a BART analysis. BART applies to emission units, at one of 26 listed source categories, that began operation after August 7, 1962, and were in existence prior to August 7, 1977, and potential emissions from all BART-eligible units exceed 250 tons per year for any visibility impairing pollutant, and also have the capacity to cause or contribute to visibility impairment at a designated Class I area. Dispersion modeling analyses were used to determine the extent of visibility impairment at the Class I areas. In Arizona, Catalyst Paper, SRP Coronado, APS Cholla, Arizona Electric Power Cooperative (in Benson), Freeport McMoRan Miami Smelter, and the Asarco Hayden Smelter were identified as subject to BART. Arizona used the following steps to make its BART determinations:

- Identify existing controls already in use
- Identify all available retrofit control options
- Eliminate technically infeasible control options
- Evaluate control effectiveness for control options
- Evaluate energy and non-air quality environmental impacts of each option (which includes cost)
- Evaluate visibility impacts (which are benefits), and eventually
- Select BART

Reduction in visibility impairment caused by anthropogenic pollutants and anthropogenic activities will also occur through many on-going pollution control programs such as Prevention of Significant Deterioration, New Source Review, statewide rules regarding Reasonably Attributable Visibility Impairment, state and federal regulations regarding mobile sources, and also control programs to meet the National Standards for particulate matter. Visibility impairment resulting from activities such as prescribed burning and open burning are also addressed through Arizona's Enhanced Smoke Management Program as well as a statewide permit program regarding open burning.

ADEQ asserts that the modeled 2018 projections demonstrate reasonable progress towards achieving natural visibility conditions for the following reasons: the analyses conducted are representative of the best available data, the level of analysis used is appropriate for this planning period, natural sources have a significant impact on visibility at Class I areas and affect the ability to meet the URP. There are major reductions in anthropogenic pollutants, and there is significant contribution to visibility impairment from international and global sources, which ADEQ does not have the authority or the ability to control.

Mr. Lewandowski: We just finished the explanation period of this proceeding on the Proposed Regional Haze SIP. For anyone who came in after we began, this is basically the beginning of this hearing. We had an introduction and this explanation period, and now we are moving to a question and answer period, so you didn't really miss much.

* * * * *

So the question and answer period: any questions before we move on to oral comments?

Again, the close of comment is today at 5 p.m. or after this hearing, whichever is later, and you can submit written comments if you want, instead of or in addition to oral comments.

* * * * *

Okay. We now move to the oral comment period for formal oral comments. Does anybody wish to speak or turn in a speaker slip?

That was a world-record, fast oral comment period.

* * * * *

Thank you for your interest. I imagine people will stick around for a little bit afterwards if you want to have some informal questions and answers.

If you have not already submitted written comments, you may submit them to us at this time.

It is now 3:15 on December 2nd. Thank you for attending, and the oral proceeding is closed.

ADEQ
Arizona Department
of Environmental Quality

Air Quality Division

Public Hearing Presiding Officer Certification

I, Mark Lewandowski, the designated Presiding Officer, do hereby certify that the public hearing held by the Arizona Department of Environmental Quality was conducted on December 2, 2010, at the Arizona Department of Environmental Quality, Conference Room 3175, 1110 West Washington Street, Phoenix, Arizona, in accordance with public notice requirements by publication in *The Arizona Republic* beginning October 28, 2010. Furthermore, I do hereby certify that the public hearing was recorded from the opening of the public record through concluding remarks and adjournment, and the transcript provided contains a full, true, and correct record of the above-referenced public hearing.

Dated this 2 day of December 2010.

Mark Lewandowski

State of Arizona)
) ss.
County of Maricopa)

Subscribed and sworn to before me on this 2 day of December 2010

OFFICIAL SEAL
LAURA McFARLAND
NOTARY PUBLIC - State of Arizona
MARICOPA COUNTY
My Comm. Expires April 2, 2012

Laura McFarland
Notary Public

My commission expires: 4/2/2012

CTS 25195 1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

December 2, 2010

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

Dear Mr. Massey:

The purpose of this letter is to provide EPA Region 9's comments on the proposed Arizona State Implementation Plan for Regional Haze dated December 2010. While the plan is well organized and represents a considerable amount of work, we are concerned that it does not provide a sufficient level of information and analysis to support its conclusions.

Our comments below focus on two sections of the report pertaining to Best Available Retrofit Technology (BART) and Reasonable Progress. Based on recent discussions with representatives from your office, we understand there is a commitment to include additional data and provide more detailed analyses. We encourage the Arizona Department of Environmental Quality to reconsider whether emission reductions from sources within the State are warranted under the Rule's requirements for BART and Reasonable Progress.

BART Determinations

- BART determinations should identify the compliance methods or the averaging times for proposed control limits. EPA recommends the use of continuous emissions monitors for NOx and SO2, and no longer than a 30-day rolling average for an emission limit.

- To determine the feasibility of emission controls, the analysis must rely on dollars per ton ($/ton) as the primary metric for a BART determination. One may use dollars per deciview ($/dv) as a supplementary metric. However, one should apply the $/dv metric to visibility improvement in all Class I areas within a 300 km radius of the source.

- The analysis must clearly state how each factor is weighed in arriving at a conclusion on BART. For example, both $/ton and $/dv appear reasonable for the most stringent controls at APECO (Units 2 and 3) and at APS Cholla (Units 2, 3 and 4), but lesser controls were selected as BART.

- In analyzing sources that burn various coal types with different levels of SO2, an efficiency limit is a more effective control.

- The analysis of the two smelters should clarify the fugitive emissions numbers, fugitive emission control techniques, and the basis for the SO2 BART decision.

Reasonable Progress

- There is not a sufficient level of information and analysis to demonstrate whether additional controls are needed on non-BART sources in order to achieve reasonable progress. It would be helpful to know whether there are specific sources near Class I areas with emissions that may significantly affect visibility.

- The plan must explain what is causing projected degradation on the best days at two Class I areas: Chiricahua/Galiuro and Saguaro East. In Saguaro East, Arizona's projected share of nitrates in 2018 is 53.57 percent. Ensuring there is no degradation on best days is a statutory requirement.

- The plan must include an assessment of the number of years it would take to reach natural conditions if visibility improvement continues at the rate of progress that the state selected as reasonable.

We are sensitive to the fact that with 12 Class I areas, including the Grand Canyon, one of our premier national parks, addressing regional haze is a tremendous technical challenge, requiring considerable resources. Please continue to coordinate your efforts with our office to ensure that the final plan meets all the requirements.

Sincerely,

Colleen

Colleen McKaughan
Associate Director

CTS 249887

United States Department of the Interior
NATIONAL PARK SERVICE
Air Resources Division
P.O. Box 25287
Denver, CO 80225

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:

December 1, 2010

N3615 (2350)

ADEQ AIR QUALITY DIVISION
10 DEC 13 AM 10:23

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,

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 Initial 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 dominate 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_2) and nitrogen oxides (NO_x) 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_2 emissions from point sources will decrease by 2018. However, SO_2 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_4) will increase at several Class I areas.

Table 8.2 indicates that NO_x 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_4 and EC and less accurate for nitrate (NO_3) 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_4 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_2 emissions from the two copper smelters (assigned to Gila County) may explain the increases in SO_4 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_4 emissions when SO_2 emissions were intended.

PSAT also projects that NO_3 concentrations due to NO_x emissions from AZ point sources will increase by 2018. Increases in SO_4 and NO_3 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 98th percentile visibility impact with the 20% best natural conditions. ADEQ is reporting 98th 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 98th percentile impact as either the maximum 8th highest value in any single year or the 22nd highest value for three years combined, whichever is more conservative. ADEQ used the 8th highest value averaged over three years, which is a less conservative metric. Had ADEQ used the 8th 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[1,2] 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 CH2MHill 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 under estimated the efficiency of Selective Catalytic Reduction (SCR) to reduce NO_x 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_x burners, existing PM and SO_2 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 (AEPCO) – Apache Generating Station Units 2 and 3

For NO_x, we recommend SCR for Apache Units 2 and 3 rather than Low NOx 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_x emissions rate of 0.05 lb/mmBtu.

For SO_2, we recommend that ADEQ require the existing scrubbers to achieve at least 90% SO_2 removal with an annual average SO_2 emissions limit not to exceed 0.12 lb/mmBtu. We concur with ADEQ's BART determination for PM.

[1] Sather, M. E. et al., 2008, J of Environmental Monitoring 10, 1319-1325

[2] 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_x, we recommend SCR for Cholla Units 2, 3, and 4 rather than Low NOx 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_x emissions rate of 0.05 lb/mmBtu.

For SO_2, we recommend that ADEQ require the existing scrubbers to achieve at least 90% SO_2 removal with an annual average SO_2 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_x, 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 SO2, we concur with Wet Flue Gas Desulfurization for both units with an associated SO_2 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_x emissions rate evaluated for control measures and proposed by ADEQ as BART is twice as high as the uncontrolled NO_x emissions rate reported by CPSI and used in the cost estimates. The costs of control are over estimated 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_x is unacceptable and needs to be redone. The BART analysis for SO_2 is flawed with unsupported costs and under estimated benefits. The BART analysis for SO_2 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_2. 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_2. 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_2 and NO_x 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 POA 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_4 and NO_3 at Class I areas in Arizona. The table indicates Arizona's contribution to SO_4 is 7-24% and to NO_3 is 7-53%.

ADEQ identifies major source categories for SO_2 and NO_x 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_2.

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.

Section12.3 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 Section12.6.1 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 are 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.

NPS General BART Comments on ADEQ BART Analyses
November 29, 2010

As with any new program, much has been learned, and much is left to learn by all parties involved, and we are pleased to share the information we have obtained from our reviews of BART proposals across the nation. Following are our general comments on the five-step BART analyses conducted by ADEQ.

Step 1: "Identify All Available Technologies" and Step 2: "Eliminate Technically Infeasible Options" were generally comprehensive and well supported.

Step 3: Evaluate Control Effectiveness of Each Remaining Technology

Effectiveness of Selective Catalytic Reduction (SCR)

A common problem was an underestimation of the effectiveness of SCR to reduce emissions. SCR is different from many other control technologies in that its efficiency is not highly dependent upon the concentration of the pollutant to be controlled.[1] Instead, SCR efficiency is primarily influenced by the design of the catalyst reactor, that is, the volume of the catalyst, its cross-sectional area, number of layers, and measures to prevent blinding and deactivation, as well as replacement schedule. If it is necessary to achieve a high degree of removal efficiency on an inlet stream with a low concentration, more catalyst can be included in the design. It is generally understood that NO_X reductions of approximately 90% or more may be achieved with SCR systems.[2] And, according to the June 13, 2009 "Power" magazine article "Air Quality Compliance: Latest Costs for SO_2 and NO_X Removal (effective coal clean-up has a higher–but known–price tag)" *by* Robert Peltier, "An excellent example of the significant investment many utilities have made over the past decade is American Electric Power (AEP), one of the largest public utilities in the U.S. with 39,000 MW of installed capacity with 69% of that capacity coal-fired. AEP is under a New Source Review (NSR) consent decree signed in 2007 that requires the utility install air quality control systems to reduce NO_X by 90%..."

[1] ADEQ has included this statement taken from the company BART analysis:

> SCR can achieve NO_x control efficiencies as high as 90% with inlet concentrations in the range of 300 to 400 ppmvd. If inlet NO_x concentrations are less than 250 ppmvd, SCR can achieve NO_x control efficiencies ranging from 70% to 80%.

This assertion is contrary to our understanding of SCR performance factors. We suspect that ADEQ may have misunderstood because SCRs on lower concentration gas streams may have been designed to achieve lower removal efficiencies. Our understanding is that SCR performance is primarily a function of catalyst temperature, volume, type, and area. However, as noted below in an excerpt from the EPA Control Cost manual, at very low inlet concentrations, removal efficiency may be lower:

> In general, higher uncontrolled NOx inlet concentrations result in higher NOx removal efficiencies due to reaction kinetics. However, NOx levels higher than approximately 150 parts per million (ppm), generally do not result in increased performance. Low NOx inlet levels result in decreased NOx removal efficiencies because the reaction rates are slower, particularly in the last layer of catalyst.

We request that ADEQ provide support for its contention.

[2] According to the Institute of Clean Air Companies white paper titled "Selective Catalytic Reduction (SCR) Control of NO_x Emissions from Fossil Fuel-Fired Electric Power Plants" (published in May 2009), "By proper catalyst selection and system design, NO_X removal efficiencies exceeding 90 percent may be achieved."

We are aware of vendor guarantees of 0.05 lb/mmBtu,[3] and understand that major vendors are designing SCR systems to achieve 0.02 lb/mmBtu[4] on coal-fired boilers.

Operational evidence from SCR retrofits on eastern EGUs (see Appendix EGUs less than 0.06 lb/mmBtu in 2009) clearly indicates that SCR can achieve 0.05 lb/mmBtu or lower on an annual basis. For example, we found 12 tangentially-fired boilers operating at or below 0.05 lb/mmBtu in 2009.

ADEQ has assumed that 24-hour and 30-day rolling average SCR emissions would be the same as the corresponding annual average emission rate. However, we looked at monthly data for 28 EGUs with SCR's operating at or below 0.05 lb/mmBtu on an annual average (see Appendix 2009 monthly emissions) and found that, of the 228 months of data, 214 were at or below 0.06 lb/mmBtu. For tangentially-fired EGUs, we found that 84 of 89 were at or below 0.06 lb/mmBtu. We conclude that SCR can achieve 0.05 lb/mmBtu on an annual basis and 0.06 lb/mmBtu on a 30-day rolling average basis.

Step 4: Evaluate Impacts and Document Results

Non-Air Quality Environmental Impacts

ADEQ: SNCR and SCR installation could impact the salability and disposal of fly ash due to ammonia levels. Other environmental impacts involve the potential public and employee safety hazard associated with the storage of ammonia, especially anhydrous ammonia, and the transportation of the ammonia to the power plant site.

NPS: According to the Institute for Clean Air Companies, ammonia can be handled safely.[5] Our discussions with SNCR vendors indicate that the concern about ash salability is likely unfounded.

Cost of Compliance

SCR Costs

Although there are several methods for estimating SCR costs, our experience leads us to believe that no one method is perfect and that the costing methods need to be tempered by real-world

[3] Minnesota Power Taconite Harbor BART analysis.
[4] Babcock & Wilcox presentation to Minnesota Pollution Control Agency.
[5] "Concern over the handling of ammonia was initially raised as a problem with SCR technology applications due to the transportation and storage of a hazardous gas under pressure. However, large quantities of ammonia already are used for a variety of applications with an excellent overall safety record. (In 2006, 17 billion pounds of ammonia were produced in the U.S.) These applications include the manufacture of fertilizers and a variety of other chemicals, as well as refrigeration. With the proper controls, ammonia use is safe and routine." WHITE PAPER SELECTIVE CATALYTIC REDUCTION (SCR) CONTROL OF NO_X EMISSIONS FROM FOSSIL FUEL-FIRED ELECTRIC POWER PLANTS PREPARED BY: NOx CONTROL TECHNICAL DIVISION INSTITUTE OF CLEAN AIR COMPANIES, INC. May 2009 Copyright

data. Both OAQPS and EPA Region 8 have advised against the use of CUECost. Instead, the BART Guidelines recommend use of the OAQPS Control Cost Manual:

> The basis for equipment cost estimates also should be documented, either with data supplied by an equipment vendor (i.e., budget estimates or bids) or by a referenced source (such as the OAQPS Control Cost Manual, Fifth Edition, February 1996, 453/B-96-001). In order to maintain and improve consistency, cost estimates should be based on the OAQPS Control Cost Manual, where possible. The Control Cost Manual addresses most control technologies in sufficient detail for a BART analysis. The cost analysis should also take into account any site-specific design or other conditions identified above that affect the cost of a particular BART technology option.

EPA's belief that the Control Cost Manual should be preferred over CUECost for developing cost analyses that are transparent and consistent across the nation and provide a common means for assessing costs is further supported by this November 7, 2007, statement from EPA Region 8 to the North Dakota Department of Health:

> The SO_2 and PM cost analyses were completed using the CUECost model. According to the BART Guidelines, in order to maintain and improve consistency, cost estimates should be based on the OAQPS Control Cost Manual. Therefore, these analyses should be revised to adhere to the Cost Manual methodology.

Larry Sorrels, an economist at EPA's Office of Air Quality Planning and Standards (OAQPS) wrote the following to Aaron Worstell of EPA Region 8 on September 8, 2010:

> the way that CUECost estimates total capital cost and O&M cost is different from the Control Cost Manual. In particular, the total capital cost estimate from CUECost is the same as the total capital requirement (TCR), an estimate that is part of the levelized cost methodology devised by EPRI. A TCR estimate includes Allowance for Funds Used During Construction (AFUDC), an estimate that is not included in the total capital cost according to the Control Cost Manual method. Also, O&M costs are calculated differently, with fixed and variable components being included in the O&M costs, a distinction at odds with the Cost Manual method.

Cost Escalation

Mr. Sorrels also commented[6] upon PSCo's use of Present Value of Revenue Requirements (PVRR) model to calculate the levelized cost of each technology.

> The PVRR model really can't be complementary to the EPA air pollution control cost methodology. The PVRR model is designed to generate nominal, levelized costs that incorporate a return to the equity and debt incurred by the utility that purchases the control equipment. The EPA air pollution control cost methodology generates real (inflation-adjusted), equivalent annual costs over the life of control equipment without consideration of return on equity or debt. Any presentation of PVRR results should state clearly that the pollution control investment is treated just like any other capital investment for a regulated entity - the utility still receives its expected rate of return on its investment and really loses no profit as a result of installation and operation of this NOx control equipment.
>
> This would not be the case for any non-regulated utility or non-utility firm.
>
> The discount rate of 7.88% is a nominal rate, not a real one (consistent with the comment I made above).
>
> Estimating real annual costs means no use of escalation factors, something that is utilized in the PVRR model.

[6] E-mail dated September 7, 2010 to Don Shepherd of NPS.

> There needs to be more detail on what the capital and O&M estimation methodologies include. There are some allusions to what is contained in these estimates as prepared by GAAR, but no detail. I suppose this detail is in the reports that Xcel will send to the State of Colorado at their request.

In summation, it is not appropriate to use the CUECost model, nor is it appropriate to escalate costs into the future and compare them against current cost thresholds.

Mr. Sorrels also provided[7] insight on matters pertaining to **inflation** and the **Allowance for Funds During Construction** (AFUDC):

> On cost indexes, I prefer the CEPCI for escalating/deescalating costs for chemical plant and utility processes since this index specifically covers cost items that's pertinent to pollution control equipment (materials, construction labor, structural support, engineering & supervision, etc.). The Marshall & Swift cost index is useful for industry-level cost estimation, but is not as accurate at a disaggregated level when compared to the CEPCI. Thus, I recommend use of the CEPCI as a cost index where possible.
>
> I agree with including AFUDC in a capital cost estimate if this is already included in the base case as per a utility commission decision. Otherwise, I do not agree with its inclusion.

Evidence that ADEQ has overestimated its SCR costs can be found in a June 2009 article in "Power" magazine:[8]

"One more current data set is the historic capital costs reported by AEP averaged over several years and dozens of completed projects. For example, AEP reports that their historic average capital costs for SCR systems are $162/kW for 85% to 93% NO_X removal..."
"…historical data finds the installed cost of an SCR system of the 700MW-class as approximately $125/kW over 22 units with a maximum reported cost of $221/kW in 2004 dollars. This data was reported prior to the dramatic increase in commodity prices of 14% per year average experienced from 2004 to 2006 (from the FGD survey results). Applying those annual increases to the 2004 estimates for three years (from the date of the survey to the end of 2007) produces an average SCR system installed cost of $185/kW…"

"Overall, costs were reported to be in the $100 to $200/kW range for the majority of the systems, with only three reported installations exceeding $200/kW."

Five industry studies conducted between 2002 and 2007 have reported the installed unit capital cost of SCRs, or the costs actually incurred by owners, expressed in dollars per kilowatt. These actual costs are generally lower than estimated by ADEQ.

The first study evaluated the installed costs of more than 20 SCR retrofits from 1999 to 2001. The installed capital cost ranged from $106 to $213/kW, converted to 2007 dollars.[9] Costs are escalated through using the CEPCI.

[7] 7/21/10 e-mail to Don Shepherd

The second survey of 40 installations at 24 stations reported a cost range of $76 to $242/kW, converted to 2007 dollars.[10]

The third study, by the Electric Utility Cost Group, surveyed 72 units totaling 41 GW, or 39% of installed SCR systems in the U.S. This study reported a cost range of $118/kW to $261/kW, converted to 2007 dollars.[11]

A fourth study, presented in a course at PowerGen 2005, reported an upper bound range of $180/kW to $202/kW, converted to 2007 dollars.[12]

A fifth summary study, focused on recent applications that become operational in 2006 or were scheduled to start up in 2007 or 2008, reported costs in excess of $200/kW on a routine basis, with the highest application slated for startup in 2009 at $300/kW.[13]

EPA's Region 8 Office has compiled a graphic presentation of SCR capital costs adjusted to 2009 dollars—please see **Appendix**. The EPA data confirm that SCR capital costs range from $73 – $243/kW.

Thus, the overall range for these industry studies is $50/kW to $300/kW. The upper end of this range is for highly complex retrofits with severe space constraints, such as Belews Creek, reported to cost $265/kW,[14] or Cinergy's Gibson Units 2-4. Gibson, a highly complex, space-constrained retrofit in which the SCR was built 230 feet above the power station using the largest crane in the world,[15] only cost $251/kW in 2007 dollars.[16]

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8 June 13, 2009 "Power" magazine article "Air Quality Compliance: Latest Costs for SO2 and NOx Removal (effective coal clean-up has a higher–but known–price tag)" *by* Robert Peltier. http://www.masterresource.org/2009/06/air-quality-compliance-latest-costs-for-so2-and-nox-removal-effective-coal-clean-up-has-a-higher-but-known-price-tag/

9 Bill Hoskins, Uniqueness of SCR Retrofits Translates into Broad Cost Variations, Power Engineering, May 2003. Ex. 2. The reported range of $80 to $160/kW $123 - $246/kW was converted to 2008 dollars ($116 - $233/kW) using the ratio of CEPCI in 2008 to 2002: 575.4/395.6.

10 J. Edward Cichanowicz, Why are SCR Costs Still Rising?, Power, April 2004, Ex. 3; Jerry Burkett, Readers Talk Back, Power, August 2004, Ex. 4. The reported range of $56/kW - $185/kW was converted to 2008 dollars ($83 - $265/kw)using the ratio of CEPCI for 2008 to 1999 (575.4/.390.6) for lower end of the range and 2008 to 2003 (575.4/401.7) for upper end of range, based on Figure 3.

11 M. Marano, Estimating SCR Installation Costs, Power, January/February 2006. Ex. 5. The reported range of $100 - $221/kW was converted to 2008 dollars ($130 - $286/kW) using the ratio of CEPCI for 2008 to 2004: 575.4/444,2. http://findarticles.com/p/articles/mi_qa5392/is_200602/ai_n21409717/print?tag=artBody;col1

12 PowerGen 2005, Selective Catalytic Reduction: From Planning to Operation, Competitive Power College, by Babcock Power, Inc. and LG&E Energy, December 2005, Ex. 6. The reported range of $160 - $180/kW) was converted to 2008 dollars ($197 - $221/kW) using the ratio of CEPCI for 2008 to 2005 (575.4/468.2).

13 J. Edward Cichanowicz, Current Capital Cost and Cost-Effectiveness of Power Plant Emissions Control Technologies, June 2007, pp. 28-29, Figure 7-1 (Ex. 1).

14 Steve Blankinship, SCR = Supremely Complex Retrofit, Power Engineering, November 2002, Ex. 7. The unit cost: ($325,000,000/1,120,000 kW)(608.8/395.6) = $290/kW. http://pepei.pennnet.com/display_article/162367/6/ARTCL/none/none/1/SCR-=-Supremely-Complex-Retrofit/

15 Standing on the Shoulder of Giants, Modern Power Systems, July 2002, Ex. 8.

We have been working with an Excel workbook we derived from the SCR cost estimation method presented by EPA's Office of Air Quality Planning and Standards Control Cost Manual (Cost Manual). We now believe that the Cost Manual method tends to underestimate the Direct Capital Cost (DCC) component of the SCR cost estimate. Because the Total Capital Investment (TCI) component is directly proportional to the DCC, a straightforward application of the Cost Manual usually results in TCI costs lower than what we would expect from the real-world industry data presented above, we have been trying to find a way to modify the Cost Manual method to provide TCI estimates more consistent with industry data. First, we adjust the DCC from the 1998 baseline to current cost using the Chemical Engineering Plant Cost Index (CEPCI) to adjust costs for inflation using the CEPCI. Our current approach is to use the DCC presented by the source and apply the Cost Manual ratios for Indirect Installation and Contingency costs to the DCC to estimate TCI. If the resulting TCI, expressed in $/kW is within the expected range, we carry that estimate through the remainder of the cost estimation process. If this TCI estimate is outside the expected range, we can override the TCI calculation by inserting our best estimate based upon the size of the EGU and the degree of retrofit difficulty.

The Direct Annual Cost (DAC) component of the process is also important because it represents a significant portion of the Total Annual Cost. The methods presented by the Cost Manual for estimating DAC appear to be straight-forward and should accurately represent annual costs with no need for adjustment. However, we note in our review of the BART analyses resented by the sources that there appears to be a consistent significant overestimation of DAC.

Step 5: Evaluate Visibility Results

We believe that it is appropriate to consider both the degree of visibility improvement in a given Class I area as well as the cumulative effects of improving visibility across all of the Class I areas affected. It simply does not make sense to use the same metric to evaluate the effects of reducing emissions from a BART source that impacts only one Class I area as for a BART source that impacts multiple Class I areas. And, it does not make sense to evaluate impacts at one Class I area, while ignoring others that are similarly significantly impaired. If we look at only the most-impacted Class I area, we ignore that the other Class I areas are all suffering from impairment to visibility "caused" by the BART source. It follows that, if emission from the BART source are reduced, the benefits will be spread well beyond only the most impacted Class I area, and this must be accounted for.[17]

The BART Guidelines represent an attempt to create a workable approach to estimating visibility impairment. As such, they require several assumptions, simplifications, and shortcuts about when visibility is impaired in a Class I area, and how much impairment is occurring. The Guidelines do not attempt to address the geographic extent of the impairment, but assume that all Class I areas are created equal, and that there is no difference between widespread impacts in a

[16] McIlvaine, NOX Market Update, August 2004, Ex. 9. SCR was retrofit on Gibson Units 2-4 in 2002 and 2003 at $179/kW. Assuming 2002 dollars, this escalates to ($179/kW)(608.8/395.6) = $275.5/kW. http://www.mcilvainecompany.com/sampleupdates/NoxMarketUpdateSample.htm

[17] For example, the cumulative benefits have been a factor in the BART determinations by NM, OR, and WY, as well as EPA in its proposals for the Navajo Generating Station and the Four Corners Power Plant.

large Class I area and isolated impacts in a small Class I area. To address the problem of geographic extent, we have been looking at the cumulative impacts of a source on all Class I areas affected, as well as the cumulative benefits from reducing emissions. While there are certainly more sophisticated approaches to this problem, we believe that this is the most practical, especially when considering the modeling techniques and information available.

Step 6: Select BART Control

Cost-Effectiveness Metrics

BART is not necessarily the most cost-effective solution. Instead, it represents a broad consideration of technical, economic, energy, and environmental (including visibility improvement) factors. For example, Oregon DEQ has established a cost/ton threshold of $7,300 based upon the premise that improving visibility in multiple Class I areas warrants a higher cost/ton than where only one Class I area is affected. In their BART proposal for the San Juan Generating Station, New Mexico used a range from $5,946/ton to $7,398/ton, and Wisconsin is using $7,000 - $10,000/ton as its BART threshold.[18]

One of the options suggested by the BART Guidelines to evaluate cost-effectiveness is cost/deciview. We believe that visibility improvement must be a critical factor in any program designed to improve visibility. Compared to the typical control cost analysis in which estimates fall into the range of $2,000 - $10,000 per ton of pollutant removed, spending millions of dollars per deciview (dv) to improve visibility may appear extraordinarily expensive. However, our compilation[19] of BART analyses across the U.S. reveals that the **average cost per dv proposed by either a state or a BART source is $14 - $18 million**,[20] with a maximum of $51 million per dv proposed by South Dakota at the Big Stone power plant. We note that OR DEQ has chosen $10 million/dv as a cost criterion, which is somewhat below the national average.

[18] "The Department used cost-per-ton reduced as the primary metric for determining the BART level of control. The upper limit for this metric was $7,000 to $10,000 per ton, which reflects historical low-end costs for controls required under BACT." BEST AVAILABLE RETROFIT TECHNOLOGY AT NON-EGU FACILITIES April 19, 2010, WISCONSIN DEPARTMENT OF NATURAL RESOURCES

[19] http://www.wrapair.org/forums/ssjf/bart.html

[20] For example, PacifiCorp has stated in its BART analysis for its Bridger Unit #2 that "The incremental cost effectiveness for Scenario 1 compared with the baseline for the Bridger WA, for example, is reasonable at $580,000 per day and $18.5 million per deciview."

NPS Comments
Arizona Electric Power Cooperative (AEPCO) – Apache Generating Station BART Analysis and Determination

November 29, 2010

Process Description

The Apache Generating Station consists of seven electric generating units (two coal/natural gas-fired steam electric units, a natural gas/fuel oil-fired steam electric, combined cycle unit, and four natural gas/fuel oil-fired turbines) with a total generating capacity of 560 megawatts (MW). The power plant is located approximately three miles southeast of the town of Cochise in Cochise County. Apache Generating Station Units 1, 2, and 3 are potentially subject-to-BART. Of 1,228 plants, EPA Clean Air Markets (CAM) data for 2008 rank the Apache facility #352 for SO_2 and #141 for NO_X.

Steam Unit 1 (ST1)

Apache Steam Unit 1 is a wall-fired steam-electric generating unit that can burn natural gas and numbers 2 through 6 fuel oils. The unit is permitted to produce up to a maximum capacity of 85 MW of electricity. Since 2000, SO_2 emissions have not exceeded one ton per year (tpy), and NO_X emissions have averaged 0.14 lb/mmBtu and declined to 30 – 60 tpy.

NO_x BART Analysis

Step 1: Identify the Existing Control Technologies in Use at the Source

There is no NO_x emissions control equipment installed on ST1.

Step 2: Identify All Available Retrofit Control Options

The second step of the BART process is to evaluate NO_x control technologies with practical potential for application to ST1, including those control technologies identified as BACT or LAER by permitting agencies across the United States. ST1 NO_x emissions are currently controlled through the use of good combustion practices.

The following potential NO_x control technology options were considered:

- New LNBs with Cver-Fire Air (OFA)
- Flue Gas Recirculation (FGR)
- Rotating Opposed Fire Air (ROFA)
- LNBs with selective non-catalytic reduction system (SNCR and Rotamix)
- LNBs with selective catalytic reduction system (SCR)
- Neural Net Controls

Step 3: Eliminate All Technically Infeasible Control Options

ADEQ has determined that all of the identified control technologies are technically feasible.

Step 4: Evaluate Control Effectiveness of Remaining Technologies
ADEQ has estimated the installation of LNB with FGR can achieve a NO_x emissions limit of 0.056 lb/MMBtu when burning PNG, and 0.06 lb/MMBtu when burning No. 2 fuel oil.

Step 5: Evaluate the Energy and Non-Air Quality Environmental Impacts and Document Results--Economic Impacts

ADEQ has estimated that LNB with FGR will have a Total Capital Investment of $1.2 million, a Total Annual Cost of $0.552 million/yr, and cost-effectiveness of $1,856/ton.

Step 6: Evaluate Visibility Impacts
ADEQ estimates the total deciview reduction for Chiricahua Wilderness Area and National Monument at 0.194 dv.

Step 7: BART Determination

ADEQ has determined that, for Unit 1, BART for NO_x is the installation of LNB with FGR with a NO_x emissions limit of 0.056 lb/MMBtu when burning PNG, and 0.06 lb/MMBtu when burning No. 2 fuel oil. The cost-effectiveness is $2.8 million/dv.

PM_{10} BART Analysis

The PM_{10} BART analysis is only completed for the case when ST1 burns 100 percent No. 6 fuel oil. This was done for comparison only, as AEPCO has never combusted No. 6 fuel oil in the unit).

SO_2 BART Analysis

Emissions indicate that BART analysis is not required when ST1 burns PNG or fuel oil No. 2. ADEQ has determined that, for Unit 1, BART for SO_2 is the use of PNG or No. 2 fuel oil with an SO_2 emissions limit of 0.00064 lb/MMBtu when burning PNG, and 0.051 lb/MMBtu when burning No. 2 fuel oil.

Steam Units 2 and 3

Steam Units 2 and 3 are similar 195 MW natural gas and coal-fired steam electric generating units equipped with dry-bottom turbo-fired coal boilers. Of 3,558 EGUs, 2008 CAM data rank Units 2 and 3 at #909 and #823, respectively for SO_2, and #344 and #261, respectively for NO_X. ADEQ modeling data show that Apache Units 2 and 3 have a combined maximum impact at Chiricahua Wilderness Area and National Monument of 4.84 dv. The cumulative impacts of

Apache Units 2 and 3 across the nine Class I areas modeled is 20.5 dv, which ranks these units among the highest[1] of any facility we have evaluated under the BART program.

NO_x BART Analysis

Step 1: Identify the Existing Control Technologies in Use at the Source
Both Units 2 and 3 currently use OFA and under-fired air systems to control NO_x emissions.

Step 2: Identify All Available Retrofit Control Options
ADEQ: The Units are dry turbo-fired boilers, with 12 Riley directional flame burners. The following potential NO_x control technology options were considered:

- New/modified state-of-the-art LNBs with advanced OFA
- Rotating opposed fire air (ROFA)
- Selective non-catalytic reduction system (Rotamix and SNCR)
- Selective catalytic reduction (SCR) system
- Neural Network Controls/Boiler Combustion Controls (Neural Net)

NPS: ADEQ also considered combinations of control options such as LNB+OFA+SCR

Step 3: Eliminate All Technically Infeasible Control Options
ADEQ has determined that all of the identified control technologies are technically feasible.

Step 4: Evaluate Control Effectiveness of Remaining Technologies
NPS: ADEQ selected LNB+OFA as BART at 0.31 lb/mmBtu with an estimated reduction of 34% and 28% for Units #2 & #3, respectively.

For its cost-effectiveness analysis, ADEQ has estimated that LNB+OFA+SCR can achieve 0.07 lb/mmBtu on an annual basis,[2] which represents a 77% reduction by SCR from the emission rate to be achieved by LNB+OFA alone. It is generally assumed that SCR can achieve at least 90% NO_X reduction, and we have presented evidence in our General BART Comments demonstrating that SCR can achieve 0.05 lb/mmBtu (or lower) on similar tangentially-fired boilers.

We conclude that ADEQ has underestimated the ability of a modern SCR retrofit to reduce NO_X emissions. Because such an underestimate adversely affects the cost-benefit analysis, we conducted our analysis as discussed in our General BART Comments and below.

[1] The highest are Cholla Generating Station, Coronado Generating Station, Four Corners Power Plant, Navajo Generating Station, Centralia, PGE Boardman, San Juan Generating Station.

[2] ADEQ appears to have assumed that SCR would achieve 0.07 lb/mmBtu regardless of averaging time. While we agree that 0.07 lb/mmBtu is a reasonable estimate for input into a visibility model that requires a 24-hour emission rate, it is always the case that average emission rates decrease as the averaging period increases. The data we present in our General BART Comments indicate that, if SCR can achieve 0.07 lb/mmBtu on a 24-hour basis, it is likely that that same SCR is achieving 0.06 lb/mmBtu (or lower) on a 30-day average basis and 0.05 lb/mmBtu (or lower) on an annual average.

Step 5: Evaluate the Energy and Non-Air Quality Environmental Impacts and Document Results

Non-Air Quality Environmental Impacts

ADEQ: SNCR and SCR installation could impact the salability and disposal of fly ash due to ammonia levels. Other environmental impacts involve the potential public and employee safety hazard associated with the storage of ammonia, especially anhydrous ammonia, and the transportation of the ammonia to the power plant site.

NPS: Please see our General BART Comments.

Economic Impacts

NPS: Although a 90% reduction from the emission rate to be achieved by LNB+OFA would lead to an annual average emission rate of 0.03 lb/mmBtu in this case, as a conservative estimate, we have assumed that SCR would achieve 0.05 lb/mmBtu (84% reduction) on an annual average basis.

In generating our SCR cost estimate, we note the following differences between our analysis and that provided by AEPCO:
Our review of 2000 – 2009 CAM data (Please see the "Unit emissions" tab of the workbooks in **Appendix**.) found that actual annual average hourly heat input rates exceed the maximum heat input rates used by AEPCO. Maximum actual total annual heat input was also greater than estimated by AEPCO, as were maximum actual annual emissions.

In our analyses, we used the maximum actual operating hours, maximum actual annual heat input, and maximum actual annual average hourly heat input. However, we also used the 2000 – 2009 average annual NO_X emission rate (in lb/mmBtu), which was lower than used by AEPCO, to estimate annual NO_X emissions. In effect, we assumed that the units would operate at their historic maxima for operating hours and heat input, but emit at their historic average rate. The result was an annual NO_X emission rate (Please see cell E31 on the "Boiler Calcs" tab.) that was greater than average and estimated by AEPCO, but less than the maximum actual annual emissions. As such, we based our estimates upon a greater gas flow that would be generated which would require a larger catalyst reactor, and more reagent would be required to treat the greater quantity of NO_X emissions and the costs associated with reducing them.

We used ADEQ's estimates for costs associated with LNB+OFA, and AEPCO's unit costs for catalyst, reagent, and electricity.

A critical cost element is the Total Capital Investment (TCI) upon which much of the EPA Cost Manual method is based. As discussed in our General BART Comments, SCR costs can be expected to fall between $50 and $300/kW, with the recent average at slightly below $200/kW. However, a rigid application of the Cost manual tends to produce TCI that fall toward the lower end of the expected range, and company cost estimates typically substantially exceed the upper end of the range. In this case, the Cost Manual method yields $90/kW (Please see cell L18 in the "ICC" tab.), which appears too low for EGUs this size and thus prompted us to over-ride the

Cost manual's TCI calculation. On the other hand, the AEPCO estimate of $226/kW (cell P18) is more expensive than average, and no reason has been provided to justify any exceptional costs, further evaluation is warranted.

We have developed a hybrid approach that combines the Direct Capital Cost (DCC) provided by the source and the ratios applied by the Cost Manual to the DCC to generate the TCI. The Cost Manual assumes that the TCI for SCR will be 141% (cell N17) of the DCC (cell L4), and that the costs that comprise the TCI will also be ratios of the DCC. Instead, the AEPCO $44 million TCI estimate is 161% (cells P17 and Q17 on the "ICC" tab) of its $27 million DCC estimate, and includes a $3 million Allowance for Funds During Construction (AFUDC) which may not be justified (Please see our General BART Comments on AFUDC.)

Our next step assumed that the AEPCO estimate for DCC is reasonable, and applied the Cost Manual 141% ratio to estimate a new TCI. In this case, the result is a TCI of $38 million @ $197/kW (cells N20 and N21 on the "ICC" tab). Because this new TCI falls very near the expected $200 average, it will be used for further estimates and is fed back to cell C7 of the "Given/Assume" tab and to cell F5 on the "Ann Cost" tab.

Annual Cost estimates are generated by a direct application of the Cost Manual method to the new TCI and other interim values. We found that AEPCO's Direct Annual Cost estimates were usually higher than the Cost Manual estimates. The most significant differences were between the Indirect Annual Cost (due to the different estimates of TCI) and the amount of NO_X removed (due to our assumed higher SCR efficiency).

A summary of our analysis can be found on the far-right tab of our workbook. We believe that our estimation method is more transparent and truer to the EPA Cost Manual approach than that provided by AEPCO, and that our $1500 - $1700/ton results are better supported by real-world industry experience.

Step 6: Evaluate Visibility Impacts

ADEQ estimates the deciview reduction from each EGU provided by its BART proposal to be 0.21 – 0.27 dv for the most-impacted Class I, the Chiricahua Wilderness Area and National Monument. The results provided by AEPCO show a cumulative improvement of 0.56 – 0.73 dv across the four Class I areas for which results were provided.

ADEQ estimates the deciview reduction from each EGU provided by SCR to be 0.63 – 0.68 dv for the Chiricahua Wilderness Area and National Monument. The results provided by AEPCO show a cumulative improvement of 1.68 – 1.82 dv across the four Class I areas for which results were provided.

Step 7: BART Selection

ADEQ: After reviewing the company's BART analysis, and based upon the information above, ADEQ has determined that, for Units 2 and 3 BART for NO_x is new LNBs with OFA system with a NO_x emissions limit of 0.31 lb/MMBtu for both Units 2 and 3.

NPS: ADEQ estimates that all of the options it evaluated would cost less than $2,200/ton and $10 million/dv to implement, which is well below the $14 - $18 million/dv average of BART proposals across the nation. BART, like BACT, is not necessarily the most-cost-effective option. Instead, it is typically chosen based upon a comparison to options selected by other regulatory agencies in similar situations. For example, Oregon DEQ has established a cost/ton threshold of $7,300 based upon the premise that improving visibility in multiple Class I areas warrants a higher cost/ton than where only one Class I area is affected. In their BART proposal for the San Juan Generating Station, New Mexico used a range from $5,946/ton to $7,398/ton, Colorado is using $5,000/ton as a non-binding "guidepost," and Wisconsin is using $7,000 - $10,000/ton as its BART threshold.[3] Because BART is the best option that meets the selection criteria, SCR should be selected as BART due to the reasonable cost/ton, the lower-than-average cost/deciview, and the benefits to several Class I areas.

PM_{10} BART Analysis

Step 1: Identify the Existing Control Technologies in Use at the Source

Both Steam Units 2 and 3 are currently equipped with hot-side Electrostatic Precipitators (ESPs).

Step 2: Identify All Available Retrofit Control Options

ADEQ: Steam Units 2 and 3 are currently equipped with hot-side ESPs. Historically, outlet ESP particulate emissions on Units 2 and 3 have ranged from approximately 0.007 to 0.045 lb/MMBtu. This wide range in outlet emissions can in part be attributed to the hot-side operation, as well as the wide variety of coals being burned in the boilers. Hot-side ESP effectiveness may also be impacted by sodium content in the ash.

Three retrofit control technologies have been identified for additional particulate matter control:

- Performance upgrades to existing hot-side ESP
- Replace current ESP with a fabric filter unit
- Install a polishing fabric filter after ESP

Step 3: Eliminate All Technically Infeasible Control Options

ADEQ has determined that all of the identified control technologies are technically feasible.

Step 4: Evaluate Control Effectiveness of Remaining Technologies

ADEQ Table 12 lists the various control technologies and estimated emissions rates.

Table 12: Control Technology and Respective Emission Rates

[3] "The Department used cost-per-ton reduced as the primary metric for determining the BART level of control. The upper limit for this metric was $7,000 to $10,000 per ton, which reflects historical low-end costs for controls required under BACT." BEST AVAILABLE RETROFIT TECHNOLOGY AT NON-EGU FACILITIES April 19, 2010, WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Control Technology	Expected PM_{10} Emission Rate
ESP Upgrades	0.03 lb/MMBtu
Full size fabric filter	0.015 lb/MMBtu
Polishing Fabric Filter	0.015 lb/MMBtu

Step 5: Evaluate the Energy and Non-Air Quality Environmental Impacts and Document Results Economic Impacts

Specific costs for the precipitator upgrades were not evaluated as AEPCO has yet to evaluate the upgrades that may be applicable to Units 2 and 3.

Step 6: Evaluate Visibility Impacts

Visibility improvements for the precipitator upgrades were not evaluated.

Step 7: BART Selection

ADEQ: Based upon its review of the analysis provided by AEPCO, and the information provided above, ADEQ has determined that BART for PM_{10} emissions is upgrades to the existing ESP and a PM_{10} emissions limit of 0.03 lb/MMBtu for both Units 2 and 3. The upgrades to the existing ESP will involve a possible installation of a flue gas conditioning system, improvements to the scrubber bypass damper system, and implementing programming optimization measures for ESP automatic voltage controls.

NPS: We concur.

SO_2 BART Analysis

Step 1: Identify the Existing Control Technologies in Use at the Source

Units 2 and 3 currently operate wet limestone scrubbers for SO_2 removal, with current emissions of 0.184 lb/MMBtu and 0.151 lb/MMBtu respectively.

Step 2: Identify All Available Retrofit Control Options

Enhancement of current wet limestone scrubber or SDAS was the only SO_2 control technology option considered

The EPA BART guidelines state that for existing units with SO_2 controls achieving at least 50 percent SO_2 removal, cost-effective scrubber upgrades should be considered. EPA has recommended consideration of the following potential upgrades:

- Elimination of bypass reheat
- Installation of liquid distribution rings
- Installation of perforated trays
- Use of organic acid additives
- Improve or upgrade scrubber auxiliary system equipment

- Redesign spray header or nozzle

Step 3: Eliminate All Technically Infeasible Control Options

ADEQ has determined that all of the identified control technology upgrades are technically feasible.

Step 4: Evaluate Control Effectiveness of Remaining Technologies

ADEQ: When evaluating the control effectiveness of SO_2 reduction technologies, each option can be compared against benchmarks of performance. In its BART analysis, AEPCO chose to compare its proposed technology upgrades to EPA's presumptive BART emission limitations. According to EPA's BART guidance documents, the presumptive limit for SO_2 on a BART-eligible coal-burning unit, used here as a point of reference, is 95 percent removal, or 0.15 lb/MMBtu.

NPS: ADEQ must evaluate the potential of the scrubber upgrades to achieve emission rates lower than the presumptive rate. The AEPCO reports indicate:

- For Unit #2, uncontrolled SO_2 emissions are 0.69 lb/mmBtu, and current controls reduce SO_2 emissions by 73% down to 0.18 lb/mmBtu.
- For Unit #3, uncontrolled SO_2 emissions are 0.69 lb/mmBtu, and current controls reduce SO_2 emissions by 78% down to 0.15 lb/mmBtu.

For example, Minnesota is requiring that Xcel Energy upgrade the existing scrubbers at it King and Sherburne County plants to meet 0.12 lb/mmBtu.

According to the Colorado Department of Public Health & Environment, "Colorado Ute Electric Association, which owned Craig before TriState, installed wet limestone FGD systems, on Craig Units 1 and 2 when the units began operations in 1980 and 1979, respectively. TriState upgraded these FGD systems in the 2003 – 2004 timeframe. The current Operating Permit also requires that 100% of the flue gas in the FGD be treated and that the Craig Unit 1 and 2 FGDs be designed to meet at least a 97.3% removal rate."

In the late 1990s, Public Service of New Mexico (PSNM) replaced its existing SO_2 controls with new limestone forced-oxidation scrubbers. In 2005 PSNM agreed to upgrade the scrubbers by 2009 such that the annual rolling average SO_2 percentage reduction for San Juan Units 1, 2, 3, and 4 shall not be less than 90% for each unit (based upon measurements upstream and downstream of scrubbers).

It is clear that existing scrubbers can be upgraded to achieve better removal efficiency and lower emission rates than the 78% and 0.15 lb/mmBtu proposed by ADEQ. ADEQ must evaluate those options.

Step 5: Evaluate the Energy and Non-Air Quality Environmental Impacts and Document Results

Over the past several years AEPCO has completed several scrubber upgrades to improve performance, including the following:

- Elimination of flue gas bypass
- Splitting the limestone feed to both the absorber feed tank and tower sump
- Upgrade of the mist eliminator system
- Installation of suction screens at pump intakes
- Automation of pump drain valves
- Replacement of scrubber packing with perforated stainless steel trays

Dibasic acid additive was tested; however results did not show significantly higher SO_2 removal.

Energy Impacts

Upgraded operation of the existing wet limestone scrubber or SDAS system is not expected to result in any additional power consumption.

Environmental Impacts

There will be incremental additions to scrubber waste disposal and makeup water requirements and a reduction of the stack gas temperature if there is elimination of flue gas bypass.

Economic Impacts

There are no anticipated cost impacts attributable to upgraded scrubber operation.

Step 6: Evaluate Visibility Impacts

A Visibility Impact Analysis was not performed for SO_2 since the existing scrubbers are proposed as BART.

Step 7: BART Selection

ADEQ: After reviewing the company's BART analysis, and based upon the information above, ADEQ has determined that BART for SO_2 emissions is no new controls and an emission limit of 0.15 lb/MMBtu.

NPS: Neither AEPCO nor ADEQ has conducted a proper BART analysis of upgrading the existing scrubbers. We suggest that ADEQ require that Apache Units 2 and 3 achieve at least 90% SO_2 removal across the scrubbers, not to exceed 0.12 lb/mmBtu.

NPS Comments
APS Cholla Generating Station BART Analysis and Determination

November 29, 2010

Process Description

The Arizona Public Service (APS) Cholla Generating Station (Cholla) is located approximately two miles east of Joseph City along Interstate 40 in Navajo County, Arizona, and consists of the following four electric generating units with a total generating capacity of 1,150 megawatts (MW).

Unit 1: 125 MW
Unit 2: 300 MW
Unit 3: 300 MW
Unit 4: 425 MW

Each unit is a coal-fired steam-generating unit equipped with a tangentially-fired, dry-bottom boiler and burns bituminous or sub-bituminous coal purchased from the Lee Ranch and El Segundo mines. Of 1,228 plants, EPA Clean Air Markets (CAM) data for 2008 rank the Cholla facility #143 for SO_2 and #88 for NO_X.

Cholla Units 2, 3 and 4 are subject-to-BART, and presumptive BART limits apply at this facility with a total capacity greater than 750 MW. Of 3,558 EGUs, 2008 CAM data rank Cholla Units 2, 3, and 4 at #821, #230, and #527, respectively for SO_2, and #302, #241, and #335, respectively for NO_X.

Despite the improper modeling methods applied by APS and the resulting underestimations of impacts, the cumulative impacts of Cholla Units 2, 3, and 4 across the 13 Class I areas modeled rank among highest of any facility we have evaluated under the BART program.

Nitrogen Oxides (NO_x) BART Analysis and Determination for Units 2, 3 and 4

Step 1: Identify the Existing Control Technologies in Use at the Source

The Cholla BART Analysis was completed in late 2007. At that time, the Units were equipped with Close-coupled Overfire Air (COFA). Overfire air is used to reduce NO_x by reducing excess air in the combustion zone. Low NO_x Burner (LNBs) and Separated Overfire Air (SOFA) were installed on Units 2, 3 and 4 in March 2008, May 2009 and May 2008, respectively. LNBs and SOFAs are utilized for increased NO_x reduction.

Step 2: Identify All Available Retrofit Control Options

APS has identified the following available retrofit control technologies for NO_x control in Units 2, 3 and 4.

- LNB with Separate Overfire Air (SOFA) System
- LNB with SOFA and Selective Non-Catalytic Reduction (SNCR) System
- Rotating Opposed Flow Air system (ROFAs)
- ROFA with Rotary Mixing of Additives (Rotamix)
- LNB with SOFA and Selective Catalytic Reduction (SCR)

NPS: We agree with the suite of options.

Step 3: Eliminate All Technically Infeasible Control Options

ADEQ has determined that all of the options identified above are technically feasible.

Step 4: Evaluate Control Effectiveness of Remaining Technologies

NPS: ADEQ selected LNB+SOFA as BART at 0.22 lb/mmBtu with an estimated reduction of 46% - 56%.

For its cost-effectiveness analysis, ADEQ has estimated that LNB+OFA+SCR can achieve 0.07 lb/mmBtu on an annual basis,[1] which represents a 68% reduction by SCR from the emission rate to be achieved by LNB+OFA alone. It is generally assumed that SCR can achieve at least 90% NO_X reduction, and we have presented evidence in our General BART Comments demonstrating that SCR can achieve 0.05 lb/mmBtu (or lower) on similar tangentially-fired boilers.

We conclude that ADEQ has underestimated the ability of a modern SCR retrofit to reduce NO_X emissions. Because such an underestimate adversely affects the cost-benefit analysis, we conducted our analysis as discussed in our General BART Comments and below.

Step 5: Evaluate the Energy and Non-Air Quality Environmental Impacts and Document Results

Non-Air Quality Environmental Impacts

ADEQ: SNCR and SCR installation could impact the salability and disposal of fly ash due to ammonia levels. Other environmental impacts involve the potential public and employee safety hazard associated with the storage of ammonia, especially anhydrous ammonia, and the transportation of the ammonia to the power plant site.

NPS: Please see our General BART Comments.

Economic Impacts

NPS: Although a 90% reduction from the emission rate to be achieved by LNB+OFA would lead to an annual average emission rate of 0.02 lb/mmBtu in this case, as a conservative estimate, we have assumed that SCR would achieve 0.05 lb/mmBtu (77% reduction) on an annual average basis.

In generating our SCR cost estimate, we note the following differences between our analysis and that provided by APS:

[1] ADEQ appears to have assumed that SCR would achieve 0.07 lb/mmBtu regardless of averaging time. While we agree that 0.07 lb/mmBtu is a reasonable estimate for input into a visibility model that requires a 24-hour emission rate, it is always the case that average emission rates decrease as the averaging period increases. The data we present in our General BART Comments indicate that, if SCR can achieve 0.07 lb/mmBtu on a 24-hour basis, it is likely that that same SCR is achieving 0.06 lb/mmBtu (or lower) on a 30-day average basis and 0.05 lb/mmBtu (or lower) on an annual average.

Our review of pre-modification 2000 – 2007 CAM data (Please see the "Unit emissions" tab of the workbooks in **Appendix**.) found that APS' estimates were higher than maximum actual annual emissions.

In our analyses, we used the maximum actual operating hours, maximum actual annual heat input, and APS' estimate for actual maximum hourly heat input. However, we also used the 2000 – 2007 average annual NO_X emission rate (in lb/mmBtu), which was lower than used by APS, to estimate annual NO_X emissions. In effect, we assumed that the units would operate at their historic maxima for operating hours and heat input, but emit at their historic average rate. The result was an annual NO_X emission rate (Please see cell E31 on the "Boiler Calcs" tab.) that was greater than average, but less than the maximum annual emissions estimated by APS. As such, based on our estimates, less reagent would be required to treat the lesser quantity of NO_X emissions and the costs associated with reducing them would be lower.

We used ADEQ's estimates for costs associated with LNB+OFA, and APS' unit costs for catalyst, reagent, and electricity.

A critical cost element is the Total Capital Investment (TCI) upon which much of the EPA Cost Manual method is based. As discussed in our General BART Comments, SCR costs can be expected to fall between $50 and $300/kW, with the recent average at slightly below $200/kW. However, a rigid application of the Cost Manual tends to produce TCI costs that fall toward the lower end of the expected range, and company cost estimates typically substantially exceed the upper end of the range. In this case, the Cost Manual method yields $67 - $74/kW (Please see the "ICC" tab cell L18.), which appears too low for EGUs this size and thus prompted us to over-ride the Cost manual's TCI calculation. On the other hand, the APS estimate of $249 - $258/kW (Please see the "ICC" tab cell P18.) is more expensive than average, and no reason has been provided to justify any exceptional costs, so further evaluation is warranted.

We have developed a hybrid approach that combines the Direct Capital Cost (DCC) provided by the source and the ratios applied by the Cost Manual to the DCC to generate the TCI. The Cost Manual assumes that the TCI for SCR will be 141% (cell N17) of the DCC (cell L4), and that the costs that comprise the TCI will also be ratios of the DCC. Instead, the APS $77 - $106 million TCI estimates are 258% (cells P17 and Q17 on the "ICC" tab) of their corresponding DCC estimates, and include a $3 - $5 million Allowance for Funds During Construction (AFUDC) which may not be justified (Please see our General BART Comments on AFUDC.)

Our next step assumed that the APS estimate for DCC is reasonable, and applied the Cost Manual 141% ratio to estimate a new TCI (cells N20 and N21 on the "ICC" tab). Because this new $136 - $141/kW TCI falls within the expected values for EGUs of this size, it will be used for further estimates and is fed back to cell C7 of the "Given/Assume" tab and to cell F5 on the "Ann Cost" tab.

Annual Cost estimates (Please see the "Ann Cost" tab.) are generated by a direct application of the Cost Manual method to the new TCI and other interim values. We found that APS' Direct Annual Cost estimates were usually higher than the Cost Manual estimates. The most significant

differences were between the Indirect Annual Cost (due to the different estimates of TCI) and the amount of NO_X removed. We believe that our estimation method is more transparent and truer to the EPA Cost Manual approach than that provided by APS, and that our $1700 - $1900/ton results are better supported by real-world industry experience.

Step 6: Evaluate Visibility Impacts

ADEQ: CALPUFF modeling was performed at 13 Class I areas that are located within 300 kilometers of Cholla Power Plant. The impacts are modeled for different NO_x control scenarios, combined with SO_2 and PM_{10} technologies at Petrified Forest National Park

NPS: Because APS used background ammonia levels that are unacceptably low (Section 4.4.1 of the company report), the visibility benefits are under-estimated and the Evaluation of Visibility Impacts step is unacceptable.

Step 7: BART Selection

ADEQ: According to the Regional Haze Rule, only dV changes in excess of 1.0 dV are perceptible.

A review of the data presented in Tables 3, 4, and 5 indicates that CALPUFF model-predicted visibility improvements (delta dV) for all five NO_x control scenarios are less than 0.5 dV. For example, in the case of Unit 3, the dV changes range from 0.126 dV for the LNB with SOFA (Scenario 1) to 0.230 dV for LNB with SOFA and SCR (Scenario 5). The change in dV between the least expensive and most expensive NO_x control technologies (the two noted above) is only 0.104 dV. The corresponding capital costs are $5.4 million for LNB/SOFA and $82.8 million for LNB/SOFA with SCR.

Based on these facts and the five-factor analysis discussed above, ADEQ has concluded that LNB with SOFA constitute BART for NO_x emissions for Cholla Units 2, 3, and 4.

NPS: EPA has explicitly rejected the premise that visibility improvement must be perceptible to qualify as BART. Because of the improper visibility modeling analysis noted above, ADEQ has not conducted a valid five-factor BART analysis.

ADEQ estimates that all of the options it evaluated would cost less than $2,600/ton to implement. BART, like BACT, is not necessarily the most-cost-effective option. Instead, it is typically chosen based upon a comparison to options selected by other regulatory agencies in similar situations. For example, Oregon DEQ has established a cost/ton threshold of $7,300 based upon the premise that improving visibility in multiple Class I areas warrants a higher cost/ton than where only one Class I area is affected. In their BART proposal for the San Juan Generating Station, New Mexico used a range from $5,946/ton to $7,398/ton, Colorado is using $5,000/ton as a non-binding "guidepost," and Wisconsin is using $7,000 - $10,000/ton as its BART threshold.[2] Because BART is the best option that meets the selection criteria, SCR should be selected as BART due to the reasonable cost/ton and the benefits to multiple Class I areas.

[2] "The Department used cost-per-ton reduced as the primary metric for determining the BART level of control. The upper limit for this metric was $7,000 to $10,000 per ton, which reflects historical low-end costs for controls

PM_{10} BART Analysis

Step 1: Identify the Existing Control Technologies in Use at the Source

Unit 2 currently has a mechanical dust collector for control of PM_{10} emissions. Additional particulate matter control is provided by a Venturi scrubber. Cholla 2 is currently able to achieve emission rate of 0.020 lb/MMBtu.

Unit 3 was previously equipped with a hot-side ESP and was able to achieve an emission rate of 0.015 lb/MMBtu of PM_{10}. The facility completed installation of a fabric filter in May 2009. With the installation of the fabric filter, the facility expects to consistently achieve an emission rate of 0.015 lb/MMBtu for PM_{10}.

Unit 4 was previously equipped with a hot-side ESP and was able to achieve an emission rate of 0.024 lb/MMBtu of PM_{10}. The facility completed installation of a fabric filter in May 2008. With the installation of the fabric filter, the facility expects to consistently achieve an emission rate of 0.015 lb/MMBtu for PM_{10}.

Step 2: Identify All Available Retrofit Control Options

Since Units 3 and 4 will be equipped with fabric filters, and fabric filters are considered the top control technology for reducing PM emissions. As a result, no other technology is considered for these two Units. The following retrofit technologies are considered for Unit 2:

- Electrostatic Precipitators
- Fabric Filters

Step 3: Eliminate All Technically Infeasible Control Options

ADEQ has determined that all of the identified control technologies are technically feasible.

Step 4: Evaluate Control Effectiveness of Remaining Technologies

Fabric filters are proven to be highly effective and provide a consistent particulate matter reduction. The emissions at the outlet of fabric filter are expected to be less than 0.015 lb/MMBtu.

Step 5: Evaluate the Energy and Non-Air Quality Environmental Impacts and Document Results Economic Impacts

APS has chosen to install a new fabric filter at an annual cost of $9.4 million to remove 58 tons per year. The cost-effectiveness of this strategy is $160,747/ton.

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required under BACT." BEST AVAILABLE RETROFIT TECHNOLOGY AT NON-EGU FACILITIES April 19, 2010, WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Step 6: Evaluate Visibility Impacts

The installation of a fabric filter is the only option considered for BART for all the 3 units.

Step 7: BART Selection

Based upon its review of the company's BART analysis and the information provided above, the Department has determined that, fabric filter with an associated emission limit of 0.015 lb/MMBtu is the BART for control of PM_{10} for Units 2, 3 and 4.

NPS: We concur.

SO_2 BART Analysis

Step 1: Identify the Existing Control Technologies in Use at the Source

According to ADEQ:

Unit 2. This unit is equipped with four Venturi flooded disc scrubbers/absorber with lime reagent for SO_2 control. Currently, APS Cholla is able to achieve 0.14 lb/MMBtu to 0.25 lb/MMBtu of SO_2 on Unit 2.

Unit 3. This unit did not have any SO_2 control technology when the BART analysis was completed in late 2007. The facility installed a new wet lime scrubber in May 2009 to capture and treat all flue gases. This will result in Unit 3 consistently meeting an emission limit of 0.15 lb/MMBtu.

Unit 4. This Unit was previously operating with 36% flue gas scrubbing with emission rate of 0.734 lb/MMBtu. The facility installed a new wet lime scrubber in May 2008 to capture and treat all flue gases. This will result in Unit 4 consistently meeting an emission limit of 0.15 lb/MMBtu.

Step 2: Identify All Available Retrofit Control Options

Unit 2. The facility plans to remove the Venturi section of the scrubber and considered a wet lime scrubber section for possible operational upgrades. Installation of bag filter as a part of BART will improve the performance of scrubber due to decreased plugging of scrubber. The facility expects to achieve 0.15 lb/MMBtu consistently with these operational upgrades.

Unit 3. In late 2007, APS Cholla identified the following available retrofit control technologies for SO_2 control in Unit 3:

- Dry Flue Gas Desulfurization (FGD) System
- Dry Sodium Sorbent Injection
- Wet Lime Scrubber

Subsequently, Cholla installed a new Wet Lime Scrubber on Unit 3 in May 2009. Therefore, the new wet lime scrubber, as described above, is the only retrofit control technology considered for this unit.

Unit 4. The wet lime scrubber, as described above, is the only retrofit control technology considered for this unit.

Step 3: Eliminate All Technically Infeasible Control Options

ADEQ has determined that all of the identified control technology upgrades are technically feasible.

Step 4: Evaluate Control Effectiveness of Remaining Technologies

NPS: ADEQ must evaluate the potential of the scrubbers and possible upgrades to achieve emission rates lower than the presumptive rate. The APS reports indicate that uncontrolled SO_2 emissions are 1.00 lb/mmBtu, and the ADEQ proposal would reduce SO_2 emissions by 85% down to 0.15 lb/mmBtu.

For example, Minnesota is requiring that Xcel Energy upgrade the existing scrubbers at it King and Sherburne County plants to meet 0.12 lb/mmBtu.

According to the Colorado Department of Public Health & Environment, "Colorado Ute Electric Association, which owned Craig before TriState, installed wet limestone FGD systems, on Craig Units 1 and 2 when the units began operations in 1980 and 1979, respectively. TriState upgraded these FGD systems in the 2003 – 2004 timeframe. The current Operating Permit also requires that 100% of the flue gas in the FGD be treated and that the Craig Unit 1 and 2 FGDs be designed to meet at least a 97.3% removal rate."

In the late 1990s, Public Service of New Mexico (PSNM) replaced its existing SO_2 controls with new limestone forced-oxidation scrubbers. In 2005 PSNM agreed to upgrade the scrubbers by 2009 such that the annual rolling average SO_2 percentage reduction for San Juan Units 1, 2, 3, and 4 shall not be less than 90% for each unit (based upon measurements upstream and downstream of scrubbers).

It is clear that existing scrubbers can achieve better removal efficiency and lower emission rates than the 85% and 0.15 lb/mmBtu proposed by ADEQ. ADEQ must evaluate those options.

Step 5: Evaluate the Energy and Non-Air Quality Environmental Impacts and Document Results

Economic Impacts for Unit 3

Control	Emission Rate (lb/ MMbtu)	Total Emssn (Tons/ Yr)	Total Emssn Rdctn (Tons)	Annlzd Cost (Million$)	Cost/ Ton ($)	Incrmntl Cost/ton ($/ton)
Baseline (no control)	1.00	11,033	-	-	-	-

Wet Lime scrubber	0.15	1,655	9,378	$8.80	936	$936

Step 6: Evaluate Visibility Impacts

A Visibility Impact Analysis was not performed for SO_2 since the existing scrubbers are proposed as BART.

Step 7: BART Selection

ADEQ: Based upon its review of the BART analysis provided by the company, and the information provided above, the Department has determined that wet lime scrubbers with an associated emission limit of 0.15 lb/MMBtu is the BART for control of SO_2 for Units 2, 3 and 4.

NPS: Neither APS nor ADEQ has conducted a proper BART analysis of upgrading the existing scrubbers. We suggest that ADEQ require that Cholla Units 2, 3, and 4 achieve at least 90% SO_2 removal across the scrubbers, not to exceed 0.12 lb/mmBtu.

NPS Comments
Salt River Project (SRP)'s Coronado Generating Station BART Analysis and Determination

November 29, 2010

Process Description

Salt River Project (SRP) Coronado Generating Station (CGS) is located near St. Johns in Apache County and is comprised of two dry-turbo-fired Units 1 and 2 with a net rated output of 395 MW and 390 MW, respectively. Presumptive BART applies to these two units with total capacity greater than 750 MW. Of 1,228 plants, EPA Clean Air Markets (CAM) data for 2008 rank the Coronado facility #146 for SO_2 and #59 for NO_X. Of 3,558 EGUs, 2008 CAM data rank Coronado Units 1 and 2 at #298 and #300, respectively for SO_2, and #76 and #85 respectively for NO_X.

Despite the improper modeling methods applied by SRP and the resulting underestimations of impacts, the cumulative impacts of Coronado Units 1 and 2 across the 17 Class I areas modeled rank among highest of any facility we have evaluated under the BART program.

Consent Decree

On December 22, 2008, SRP and EPA entered into a Consent Decree which requires the implementation of the following pollution control projects for SO_2 and NO_x at SRP's CGS facility.

- Addition of Low-NO_X Burners (LNB) to Units 1 and 2 to reduce NO_x emissions to 0.32 lb/mmBtu by June 2011. Coupled with the burner additions, the furnace combustion air system on each Unit (ACC) will be modified.
- Addition of a Selective Catalytic Reduction (SCR) to Unit 2 by June 2014. The SCR will further reduce NO_x emissions from Unit 2 to 0.08 lb/mmBtu.
- Replacement of the existing wet limestone Flue Gas Desulfurization (WFGD) systems on Unit 1 and Unit 2 with new WFGD systems by January 2012 to reduce SO_2 emissions by 95% or to 0.08 lb/mmBtu.

BART for NO_x

Step 1: Identify the Existing Control Technologies in Use at the Source
ADEQ: NO_x emissions from both Units 1 and 2 are currently controlled by good combustion practices and overfire air. The resulting emission rate ranges from 0.45 to 0.50 lbs/MMBtu.

NPS: 2000 – 2008 CAM data show Units 1 and 2 averaged 0.41 & 0.44 lb/mmBtu, respectively.

Step 2: Identify All Available Retrofit Control Options
ADEQ: The alternative NO_x control technologies for limiting NO_x emissions from Unit 1 and Unit 2 are listed as follows:

- Advanced Combustion Control-Low NO_x burners (LNB) and over fire air (OFA)
- Selective non-catalytic reduction (SNCR)
- Selective catalytic reduction (SCR)

NPS: We agree with the suite of options.

Step 3: Eliminate All Technically Infeasible Control Options

ADEQ has determined that all of the above control technologies are feasible options for BART at CGS.

Step 4: Evaluate Control Effectiveness of Remaining Technologies

NPS: ADEQ selected LNB+OFA as BART at 0.32 lb/mmBtu with an estimated reduction of 26% for Unit 1.

ADEQ has included this statement (copied from the company BART analysis):

> SCR can achieve NO_x control efficiencies as high as 90% with inlet concentrations in the range of 300 to 400 ppmvd. If inlet NO_x concentrations are less than 250 ppmvd, SCR can achieve NO_x control efficiencies ranging from 70% to 80%.

This assertion is contrary to our understanding of SCR performance factors. (Please see our General BART Comments.) We suspect that ADEQ may have misunderstood because SCRs on lower concentration gas streams may have been designed to achieve lower removal efficiencies.[1] Our understanding is that SCR performance is primarily a function of catalyst temperature, volume, type, and area. It is unlikely that the NO_X concentration proposed as BART by ADEQ would present such a low concentration as to significantly reduce SCR removal efficiency. We request that ADEQ provide support for its contention.

Because SCR will be applied to Unit 2 as a result of the Consent Decree, we will confine the remainder of our comments to Unit 1.

For its cost-effectiveness analysis, ADEQ has estimated that LNB+OFA+SCR can achieve 0.08 lb/mmBtu on an annual basis,[2] which represents a 75% reduction by SCR from the emission rate to be achieved by LNB+OFA alone. It is generally assumed that SCR can achieve at least 90% NO_X reduction, and we conclude that ADEQ has underestimated the ability of a modern SCR retrofit to reduce NO_X emissions. Because such an underestimate adversely affects the cost-benefit analysis, we conducted our analysis as discussed in our General BART Comments and below.

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[1] However, as noted below in an excerpt from the EPA Control Cost manual, at very low inlet concentrations, removal efficiency may be lower:

> In general, higher uncontrolled NOx inlet concentrations result in higher NOx removal efficiencies due to reaction kinetics. However, NOx levels higher than approximately 150 parts per million (ppm), generally do not result in increased performance. Low NOx inlet levels result in decreased NOx removal efficiencies because the reaction rates are slower, particularly in the last layer of catalyst.

[2] ADEQ appears to have assumed that SCR would achieve 0.07 lb/mmBtu regardless of averaging time. While we agree that 0.07 lb/mmBtu is a reasonable estimate for input into a visibility model that requires a 24-hour emission rate, it is always the case that average emission rates decrease as the averaging period increases. The data we present in our General BART Comments indicate that, if SCR can achieve 0.08 lb/mmBtu on a 24-hour basis, it is likely that that same SCR is achieving 0.06 lb/mmBtu (or lower) on a 30-day average basis and 0.05 lb/mmBtu (or lower) on an annual average.

Step 5: Evaluate the Energy and Non-Air Quality Environmental Impacts and Document Results

Non-Air Quality Environmental Impacts

ADEQ: SNCR and SCR installation could impact the salability and disposal of fly ash due to ammonia levels. Other environmental impacts involve the potential public and employee safety hazard associated with the storage of ammonia, especially anhydrous ammonia, and the transportation of the ammonia to the power plant site.

NPS: Please see our General BART Comments.

Economic Impacts

NPS: A critical cost element is the Total Capital Investment (TCI) upon which much of the EPA Cost Manual method is based. As discussed in our General BART Comments, SCR costs can be expected to fall between $50 and $300/kW, with the recent average at slightly below $200/kW. In this context, the SRP estimate of $167/kW appears reasonable.

Annual Cost estimates are generated by a direct application of the Cost Manual method to the new TCI and other interim values. We applied the Cost Manual method and found that SRP's Annual Cost estimates are also reasonable.

We concur with ADEQ's estimated $1,021/ton for combustion controls plus SCR.

Step 6: Evaluate Visibility Impacts

NPS: Because SRP used background ammonia levels that are unacceptably low (Appendix A Table A-2 of the company report), the visibility benefits are under-estimated and the Evaluation of Visibility Impacts step is unacceptable.

Step 7: Select BART

ADEQ: After reviewing the BART analysis provided by the company, and based upon the information above, ADEQ has determined that BART control at CGS for NO_x is ACC (Low NO_x burners with OFA) with an associated NO_x emission rate of 0.32 lbs/MMBtu on 30-day rolling average basis.

NPS: Because of the improper visibility modeling analysis noted above, ADEQ has not conducted a valid five-factor BART analysis. However, based upon the relatively low cost/ton for SCR and the magnitude and extent of the visibility impacts, it is likely that a proper evaluation of costs and visibility benefits across the 17 impacted Class I areas would conclude that SCR is BART.

ADEQ estimates that SCR would cost less than $1,100/ton, which is less than EPA assumed for presumptive BART costs. BART, like BACT, is not necessarily the most-cost-effective option. Instead, it is typically chosen based upon a comparison to options selected by other regulatory

agencies in similar situations. For example, Oregon DEQ has established a cost/ton threshold of $7,300 based upon the premise that improving visibility in multiple Class I areas warrants a higher cost/ton than where only one Class I area is affected. In their BART proposal for the San Juan Generating Station, New Mexico used a range from $5,946/ton to $7,398/ton, Colorado is using $5,000/ton as a non-binding "guidepost," and Wisconsin is using $7,000 - $10,000/ton as its BART threshold.[3] Because BART is the best option that meets the selection criteria, SCR should be selected as BART due to the reasonable cost/ton and lower-than-average cost/deciview.

PM_{10} BART

Step 1: Identify the Existing Control Technologies in Use at the Source

PM_{10} emissions from the facility are currently controlled through the use of a hot-side ESP.

Steps 2-6: Streamlined Review

ADEQ: SRP's BART analysis for PM_{10} was limited to a statement that the current emission levels associated with the existing controls at the Coronado Generating Station range from 0.01 to 0.03 lb/MMBtu. As noted in Section X, PM_{10} BART for similar emissions units with similar emissions controls was determined to be 0.03 lb/MMBtu. Since SRP's CGS is already meeting or exceeding the stringency of the emissions limitation, further analysis was determined to be unnecessary.

NPS: ADEQ's contention that its 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 ESPs with fabric filters at 0.015 lb/mmBtu is BART.

Step 7: Select BART

ADEQ: After reviewing the analysis provided by SRP, and the information presented above, ADEQ has determined that BART for PM_{10} from Units 1 and 2 is no further control, and an emissions limitation of 0.03 lb/MMBtu.

NPS: ADEQ did not conduct the necessary five-step BART anaysis.

SO_2 BART

Step 1: Identify the Existing Control Technologies in Use at the Source

[3] "The Department used cost-per-ton reduced as the primary metric for determining the BART level of control. The upper limit for this metric was $7,000 to $10,000 per ton, which reflects historical low-end costs for controls required under BACT." BEST AVAILABLE RETROFIT TECHNOLOGY AT NON-EGU FACILITIES April 19, 2010, WISCONSIN DEPARTMENT OF NATURAL RESOURCES

SO_2 emissions are currently controlled with the use of low-sulfur coal and partial wet flue gas desulfurization. The resulting emission rate ranges from 0.6 to 0.7 lbs/MMBtu.

Step 2: Identify All Available Retrofit Control Options

Following control options are available for control of SO_2.

- Wet Flue Gas Desulfurization
- Spray Dryer Absorber
- Dry Sorbent Injection

Step 3: Eliminate All Technically Infeasible Control Options

ADEQ has determined that all of the referenced control technologies are technically feasible.

Step 4: Evaluate Control Effectiveness of Remaining Technologies

ADEQ: SRP and EPA's consent decree stipulates the installation of WFGDs for both the units. WFGD is the most effective control technology available for controlling SO_2 emissions. Since SRP is committing to the WFGD technology, other control technologies are not evaluated from this point forward in the BART analysis.

Step 5: Evaluate the Energy and Non-Air Quality Environmental Impacts and Document Results

Costs of Compliance

ADEQ: Based on the vendor data on the capital cost and operation & maintenance cost for different control options, Table 9 provides the information on the annual costs associated with each of the control options.

Table 9: Total Capital and Annual Costs associated with SO_2 Controls

Control Option	Control Technology	Total Capital Cost	Fixed Capital Cost	Annual O&M	Total Annualized Cost
1	Baseline- Partial FGD	--	--	--	--
2	WFGD	$347,000,000	$32,753,330	$11,600,000	$44,353,330

* Fixed capital cost calculation is based on a Capital Recovery Factor (CRF) of 0.09439, assuming an interest rate of 7%, and amortization period of 20 years.

Table 10 provides annual estimated emission numbers for SO_2 and cost figures relating to the implementation of WFGDs.

Table 10: Total Annual Emissions of SO_2 and cost of reduction with WFGD

	Baseline, Option 1	Option 2, WFGD
Unit 1	14,556 tpy	1,909 tpy
Unit 2	14,828 tpy	1,722 tpy

Total (Both Units)	29,384 tpy	3,631 tpy
Reduction from Baseline	-	25,753 tpy
Annualized Cost	-	$ 44,353,330
Cost of reduction ($ per ton)	-	$1,722

Step 6: Evaluate Visibility Impacts

ADEQ: The new WFGD control scenario was modeled for each meteorological year (2001-2003) and for all 17 Class I areas within 300 km. The modeling result indicates that the installation of a WFGD will provide for significant visibility benefit. The highest visibility improvement will occur at the Petrified National Forest where an improvement of 1.38 Δdv is expected.

Table 11 provides information on annualized cost and the cost in dollars per deciview average improvement in visibility achieved by implementing the control option.

Table 11: Summary for SO_2 BART

	Option 1, Baseline	**Option 2, WFGD**
Reduction in Emission (tpy)	-	25,753
Annualized Cost	-	$44,353,330
Visibility index (dv)	2.66	1.28
Improvement in Visibility Index (dv)	-	1.38
Incremental Cost Effectiveness ($ per dv)	-	$32,140,094

NPS: Because SRP used background ammonia levels that are unacceptably low (Appendix A Table A-2 of the company report), the visibility benefits are under-estimated and the Evaluation of Visibility Impacts step is unacceptable.

Step 7: Select BART

ADEQ: Based on its review of the company's analysis and the information above, the Department accepts SRP's recommended BART control of WFGDs for both units with an associated SO_2 emission rate of 0.08 lbs/MMBtu on 30-day rolling average basis.

NPS: We concur and note that ADEQ has accepted the WFGD option at $1,722/ton and $32.1 million/dv.

NPS comments on the Catalyst Paper (Snowflake) Inc. BART Analysis and Determination
December 2, 2010

Process Description

Abitibi Consolidated was purchased by Catalyst Paper Snowflake Inc (CPSI) in April of 2008. CPSI operates a recycled paper mill near Snowflake, Arizona, which produces newsprint and newsprint-like grades at a capacity of approximately 1,460 tons per day. A Powerhouse consisting of 3 boilers provides steam and electricity for use at the mill. Power Boiler #2 is rated at 1,132 million British thermal units (MMBtu) per hour and is the primary boiler.

Description of Emissions Units Subject to Best Available Retrofit Technology (BART)

ADEQ: Power Boiler #2 is a coal-fired boiler installed in 1975. CALPUFF modeling performed by CPSI demonstrated that the boiler has a visibility extinction of 0.739 deciviews on the Sierra Ancha Wilderness Area and 0.523 deciviews on the Superstition Wilderness Area. Therefore, the unit contributes to the impairment of visibility at a Class I area and is subject-to-BART for NO_x and SO_2.

NPS: Agreed.

NO_x BART Analysis and Determination

Step 1: Identify the Existing Control Technologies in Use at the Source

CPSI currently does not operate any NO_x control technology on Power Boiler #2 although there is a permit limit of 0.7 lb/MMBtu. There is an existing over fire air system (OFA) that has never been operated.

Step 2: Identify All Available Retrofit Control Options

CPSI has identified seven control options:

- Operate the existing OFA
- Install Low NO_x Burners (LNB)
- Install LNB with new OFA
- Install LNB, new OFA, and a selective non-catalytic reduction system (SNCR)
- Install a Rotating Over Fire Air (ROFA) system
- Install a ROFA with SNCR
- Install LNB, new OFA, and a selective catalytic reduction system (SCR)

NPS: ADEQ has chosen a reasonable suite of options.

Step 3: Eliminate All Technically Infeasible Control Options

ADEQ has determined that all of the control options identified above are technically feasible.

Step 4: Evaluate Control Effectiveness of Remaining Technologies

According to the analysis performed by Catalyst Paper, the technically feasible control options were identified as being able to achieve the following emissions rates:

Table 4: Control Effectiveness of Control Options

Control Option	Achievable Emissions Rate (lb/MMBtu)
OFA	0.525
LNB	0.370
ROFA	0.348
ROFA with SNCR	0.291
LNB with new OFA	0.265
LNB, OFA, and SNCR	0.194
LNB,OFA, and SCR	0.070

NPS: In its SNCR cost analyses, CPSI has assumed a boiler uncontrolled NO_x emission rate of 0.192 lb/mmBtu and a desired outlet emission rate of 0.148 lb/mmBtu. Because the uncontrolled emission rate is lower than the "Achievable Emission Rates" evaluated by ADEQ, the ADEQ analyses are invalid.

In its SCR cost analyses, CPSI has assumed a boiler outlet NOx emission rate of 0.265 lb/mmBtu. We have shown in our General BART Comments that SCR can reduce emissions by at least 90%, which corresponds to the 0.03 lb/mmBtu, less than half of the rate evaluated by CPSI.

ADEQ must reconcile the wide disparity between the values in its Table 4 and the emission rates used by CPSI to generate its cost data below.

Step 5: Evaluate the Energy and Non-Air Quality Environmental Impacts and Document Results

Cost of Compliance

ADEQ: During the course of Catalyst Paper's review of the technically feasible control options, the company identified the expected amount of emissions reduced by the application of each control option, as well as the annualized cost, and the average cost effectiveness of the controls. That information is summarized in Table 5 below.

Table 5: Cost of Compliance of Control Options

Control Option	Expected emissions reduction (tpy)	Annualized Cost	Average Cost Effectiveness ($/ton NO_x)
OFA	868	$3,221,359[2]	$3,711
LNB	1,636	$3,400,185	$2,078
ROFA	1,745	$4,262,553	$2,443
ROFA with SNCR	2,028	$4,903,534	$2,418
LNB with new OFA	2,157	$3,509,992	$1,627
LNB, OFA, and SNCR	2,509	$3,968,779	$1,582
LNB,OFA, and SCR	3,124	$7,181,536	$2,299

1. This analysis assumes the facility is current emitting NO_x at the permit limit of 0.7 lb/MMBtu. That is the rate at which CPSI modeled visibility impacts and therefore must be held constant for any analysis based on emission rates.
2. There is a large annualized cost to this existing equipment because it has been assumed that its operation would make the fly ash from the boiler unsellable.

ADEQ: From Table 5 it can be seen that ROFA and ROFA with SNCR are inferior options because there is an option (LNB with new OFA) that provides greater annual reduction at a lower annualized cost. ADEQ has eliminated those control options from consideration and the incremental cost effectiveness associated with the remaining control options is as follows:

NPS: Despite ADEQ's assertion that the cost analysis must be based upon the 0.7 lb/mmBtu permit limit, the analyses submitted by CPSI and used by ADEQ were actually based upon the lower NO_x emission rates we noted above. Furthermore, the CPSI BART analysis used a 10.5% interest rate instead of the 7% interest rate recommended by the Cost manual. As a result, the ADEQ costs are overestimated and its analyses are invalid.

As explained by ADEQ in footnote #2 to its Table #5, "There is a large annualized cost to this existing equipment because it has been assumed that its operation would make the fly ash from the boiler unsellable." Neither CPSI nor ADEQ have provided any concrete justification to support its speculation. On the contrary, our conversations with SNCR vendors indicate that this claim is probably invalid.

Energy Impacts

ADEQ: According to the analysis provided by CPSI, there are adverse energy impacts that require consideration for several of the technically feasible control options. Specifically, CPSI reported that the OFA would require 224 kW of power, the SNCR would require 10 kW, and the SCR would require 377 kW. ADEQ notes that the LNB would require no additional power.

NPS: These energy costs are included in the overall cost analysis.

Non Air-Quality Environmental Impacts

ADEQ: According to CPSI's analysis, non-air quality impacts may result due to the application of several technically feasible control technologies. Specifically, CPSI stated that due to the potential increase in the amount of unburnt carbon, the installation of LNB and OFA may have the potential of rendering the fly ash unsellable. If the fly ash were rendered unsellable, the fly ash would increase the amount of solid waste generated at the facility, ultimately increasing the amount sent to the landfill.

In addition to the LNB and OFA technologies, SCR and SNCR have the potential to impact the sellability of the fly ash. As noted above, both technologies rely on the injection of ammonia to reduce the formation of NO_x. Most SCR and SNCR vendors recommend that the operator inject more than the stoichiometric amount of ammonia to drive NOx formation to a minimum. This practice results in emissions of ammonia (called ammonia slip). Since the ammonia has an affinity for the fly ash, its presence in the exhaust stream could result the spoiling of the fly ash, leading to increased solid waste from the facility.

NPS: The concerns raised by CPSI and ADEQ are speculative and unsupported.

Remaining Useful Life

ADEQ: None of the documentation submitted by CPSI has indicated that the facility will be shut down in the near future. For the purposes of its analyses, CPSI assumed a typical equipment life of 15 years for calculating the annualized cost of control options. As a result, ADEQ has determined that the remaining useful life of the mill has no effect on this BART analysis.

NPS: CPSI incorrectly assumed a 15-year life for SNCR and SCR. The Cost Manual recommends a 20-year life. As a result, ADEQ has overestimated the annual costs of SNCR and SCR.

Step 6: Evaluate Visibility Impacts

ADEQ: As part of its analysis of potential BART options, CPSI estimated the total visibility improvement that is projected to occur should one of the technically-feasible and cost-effective control options be applied. Based upon that information, ADEQ was also able to calculate the average cost effectiveness in terms of dollars per deciview of visibility improvement. CPSI's results are summarized in Table 7 below.

Table 7: Visibility Impacts of Remaining Control Options

Control Option	Deciview Improvement*	Cost Effectiveness* ($/Deciview)
OFA	0.076	$42.4 million
LNB	0.164	$20.7 million
LNB with new OFA	0.207	$17.0 million
LNB, OFA, and SNCR	0.252	$15.7 million
LNB,OFA, and SCR	0.309	$23.2 million

*Based on visibility effects at most impacted Class I area – Sierra Ancha WA

NPS: ADEQ must also consider the benefits to the other Class I areas.

Step 7: Select BART

ADEQ: Based upon its review of CPSI's analysis, and in particular the marginal visibility impact from the current facility operations and the magnitude of the dollar per deciview costs in Table 7, ADEQ has determined that BART for control of NO_x from Power Boiler #2 is the current emission limit of 0.7 lb/MMBtu.

NPS: ADEQ is proposing that BART be an emission rate more than double that used by CPSI in its analyses. Even though the cost estimates relied upon by ADEQ are inflated, the $/dv values estimated by ADEQ for Sierra Ancha WA for LNB with new OFA and LNB, OFA, and SNCR fall within the range of average $/dv costs proposed or accepted by other sources and states. ADEQ has incorrectly evaluated the effectiveness and cost of the control options, and ignored the visibility benefits to multiple Class I areas. ADEQ's BART analysis for Catalyst Paper is not acceptable.

SO_x BART Analysis and Determination

Step 1: Identify the Existing Control Technologies in Use at the Source

ADEQ: Power Boiler #2 has a SO_2 permit limit of 0.8 lb/MMBtu and is controlled with a wet sodium flue gas desulfurization system tray tower scrubber.

Step 2: Identify All Available Retrofit Control Options

ADEQ: CPSI has identified two control options as potentially being BART:

- Upgrade the existing scrubber
- Add a second scrubber

In 2008, CPSI was forced to switch to Lee Ranch Mine coal due to the closure of the McKinley Mine. The coal now available to CPSI has an average sulfur content of 2.3 lb/MMBtu and the facility has been forced to complete much of the upgraded scrubber project in order to maintain compliance with the 0.8 lb/MMBtu emission limit in its operating permit. As it now represents baseline control, it is no longer appropriate to consider upgrading the scrubber to be an additional control option.

Add a second scrubber. A second scrubber could be added in order to capture 100% of the flue gas at an efficiency of 98%. This would increase the overall control efficiency from 63.9% to 98% control.

Step 3: Eliminate All Technically Infeasible Control Options

ADEQ has determined that both control options identified above are technically feasible.

Step 4: Evaluate Control Effectiveness of Remaining Technologies.

According to the analysis performed by CPSI, the technologically feasible controls are capable of achieving the following emissions rates:

Table 8: Control Effectiveness of Control Options

Control Option	Achievable Emissions Rate (lb/MMBtu)
Upgrade Current Scrubber / Baseline Control	0.80
Add Second Scrubber	0.044

Step 5: Evaluate the Energy and Non-Air Quality Environmental Impacts and Document Results

Cost of Compliance

During the course of CPSI's review of the technically feasible control options, the company identified the expected amount of emissions reduced by the application of each control option, as well as the annualized cost and the average cost effectiveness. That information is summarized in Table 9 below.

Table 9: Cost of Compliance of Control Options

Control Option	Expected emissions reduction (tpy)	Annualized Cost	Average Cost Effectiveness ($/ton SO_2)
Upgrade Current Scrubber / Baseline Control	0	0	N/A
Add second scrubber	3,743	$4,769,365	$1,274

1. This analysis assumes the facility is current emitting SO_2 at the permit limit of 0.8 lb/MMBtu. That is the rate at which CPSI modeled visibility impacts and therefore must be held constant for any analysis based on emission rates.

NPS: The ADEQ data presented above does not match the data provided by CPSI in its 1/17/08 BART analysis. For example, CPSI Tables 3-4 and in its Appendix A show that addition of a second wet scrubber would reduce SO_2 emissions by 10,764 tpy at $901/ton at the same annual cost that ADEQ assumes to remove 3,743 tpy and $1,274/ton. The Alstom Power 10/21/06 Budgetary Proposal quoted a turnkey price for the new scrubber at $11,500,000. However, the CPSI BART analysis increased this cost to $15 million in its Appendix A. It is therefore not possible to evaluate the ADEQ analysis without any supporting information. It appears that change to higher sulfur coal that occurred after the CPSI BART analysis was conducted has invalidated that analysis.

Non Air-Quality Environmental Impacts

CPSI has stated that the addition of a second scrubber will result in the generation of an additional 8,000 tpy of solid scrubber waste and the additional use of 38 million gallons of water per year.

Step 6: Evaluate Visibility Impacts

As part of its analysis of potential BART option, CPSI estimated the total visibility improvement that is projected to occur should one of the technically-feasible and cost-effective control options be applied. Based upon that information, ADEQ was also able to calculate the average cost effectiveness in terms of dollars per deciview of visibility improvement. CPSI's results are summarized in Table 10 below.

Table 10: Visibility Impacts of Control Options

Control Option	Deciview Improvement*	Cost Effectiveness* ($/Deciview)
Add 2nd Scrubber	0.20	$23.8 million

1. Based on visibility effects at most impacted Class I area – Sierra Ancha WA

NPS: ADEQ must also consider the benefits to the other Class I areas.

Step 7: Select BART

ADEQ: Based upon its review of CPSI's analysis, and the all of the considerations listed above, ADEQ has determined that BART for control of SO_2 from Power Boiler #2 is the current upgraded scrubber, as defined in Step #2, with an emission limit of 0.80 lb/MMBtu.

NPS: ADEQ has incorrectly evaluated the cost of the control options, and ignored the visibility benefits to multiple Class I areas. ADEQ's BART analysis for Catalyst Paper is not acceptable.

NPS Comments on ADEQ BART Exemptions
December 1, 2010

Arizona Public Service (APS) West Phoenix

ADEQ states: On October 7, 2007, APS West Phoenix submitted a second letter to ADEQ. In that letter, APS West Phoenix explained that it agreed with ADEQ's assessment that the Combined Cycle Units CC1, CC2 and CC3 were BART-eligible. APS West Phoenix stated, however, that after correcting the air dispersion modeling analysis using the assumptions identified above, the 98th percentile visibility impacts that ADEQ had predicted in the Superstition Wilderness and the Mazatzal Wildernerss areas dropped from 0.69 dv and 0.64 dv, to 0.24 dv and 0.31dv respectively.

Based on the revised air dispersion modeling analysis that was submitted on October 7, 2007, APS West Phoenix stated that it did not cause or contribute to regional haze in a Class I area, and therefore was not subject-to-BART. Based upon its review of the information that has been submitted, and a review of the conditions in Maricopa County Air Quality Permit V95-006, ADEQ concurs that this facility is not subject-to-BART.

NPS: Please provide the revised air dispersion modeling analysis that was submitted on October 7, 2007 and was the basis for exemption.

Arizona Portland Cement Company

ADEQ states: In 2003, during its review of a proposed Title V permit that would have provided APCC with the flexibility to choose between three operating scenarios, including the construction of Kiln 5, EPA identified an error in APCC's fugitive dust emissions calculations. According to EPA's calculations, the modifications that were completed in 1998 should have gone through New Source Review. As a result, EPA issued a Notice of Violation to APCC, alleging that the company avoided New Source Review when completing modifications to Kiln 4 in 1998. EPA also objected to the issuance of the proposed Title V permit, but later lifted its objection after ADEQ removed the alternative operating scenarios that would have allowed for further modification of the facility. A consent decree is being finalized between APCC and EPA to resolve the issue.

In 2008, ADEQ issued a new permit to APCC which would have allowed the facility to stop operations at all four existing kilns and construct and operate a new Kiln 6. The 18 month construction window ended in June 2010 and APCC has since reapplied for a permit for the Kiln 6 expansion.

Based upon the consideration of the history of this facility, and the maximum 98th percentile three-year average impact from all pollutants is less than 0.5. dv, ADEQ concurs that APCC is not subject-to-BART.

NPS: We disagree with the exemption based on "the maximum 98th percentile three-year average impact from all pollutants is less than 0.5 dv". The BART exemption criteria should be that any 98th percentile impact from all pollutants in any of the three modeled years is less than 0.5 dv. Further, as discussed in our technical comments, because the WRAP modeling did not use the upper air observations, the FLM recommended that the WRAP states use the maximum impact value with the annual average natural background conditions rather than the 8th highest impact value. In this case, the maximum impact exceeded 0.5 dv at Saguaro NM, Galiuro WA, Superstition WA, and Mazatzal WA.

With regard to the "history of this facility," until the retirement of kiln #4 is made federally enforceable, it will remain BART-eligible, and, as explained above, subject to BART.

Chemical Lime Company – Nelson Lime Plant

ADEQ states: On September 21, 2007, CLC submitted a letter to ADEQ along with a new modeling analysis indicating that "…the 3-year average of the 8th highest visibility change is less than 0.5 dv in all Class I areas." Based upon its review of the new modeling analysis, Chemical Lime concluded that the Nelson facility did not cause or contribute to visibility impairment in any Class I area, and that the emissions units were, therefore, not subject-to-BART.

Based upon its refined visibility change analysis, CLC determined that the visibility change attributable to the Nelson facility is below 0.5 dv, and it concluded that the facility does not significantly contribute to visibility impairment within the Grand Canyon National Park. As a result, CLC determined that the results of the analysis indicated that the 3-year average of the 8th highest visibility change was less than 0.5 dv in all Class I areas within 300 km of the facility, and concluded that its Nelson facility was not-subject-to-BART.

The company also recognized, however, that the predicted impacts within the Grand Canyon were marginally below 0.5 dv. As a result, the company stated that "[a]lthough the maximum visibility change obtained in the screening modeling analysis is not equal to or greater than the 0.5 dv contribution threshold, a refined analysis was performed in which light extinction in the Grand Canyon National Park was calculated using the CALPOST-IMPROVE implementation of the revised light extinction algorithm…" Based upon the refined analysis, the 98th percentile (8th highest) Visibility Change in the Grand Canyon was calculated to be as follows:

Class I Area	**98th Percentile (8th highest) Visibility Change (dv)**			
	2001	**2002**	**2003**	**Average**
Grand Canyon NP	0.417	0.375	0.585	0.46

Based upon the consideration of the analysis performed for this facility, CLC's conservative approach for estimating emissions impacts during the meteorological period, and the maximum 98th percentile three-year average impact from all pollutants is less than 0.5. dv, ADEQ concurs that the Chemical Lime Company's Nelson Lime Plant is not subject-to-BART.

NPS: Please provide the September 21, 2007, CLC letter 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:

Emissions Unit	SO_2 emissions (lb/hr)	NO_X emissions (lb/hr)
Kiln 1	215.59	122.14
Kiln 2	484.27	182.78

Why were the PM emissions not included? All emissions are to be included in the BART exemption modeling.

ADEQ incorrectly exempted the CLC Nelson Plant. The correct criteria for BART exemption is to determine whether any 98th percentile impact from all pollutants in any year is greater than 0.5. dv. The 98th percentile impact at Grand Canyon NP in 2003 exceeded 0.5 dv. Further, the FLM recommended that because the WRAP modeling did not use upper air observations, the maximum impact, rather than the 98th percentile impact, should be used with the annual average natural background visibility conditions.

We conclude that the Chemical Lime Company – Nelson Lime Plant is subject to BART.

TEP – Irvington Generating Station

ADEQ states: Regarding Unit I4, TEP stated that during the 1980s, Unit I4 was converted to burn coal in accordance with a prohibition order that was issued pursuant to Section 301(c) of the Power Plant and Industrial Fuel Use Act of 1978. The Final Prohibition Order became effective on September 21, 1981, as noted in Federal Register Vol. 46, p. 37960. In its January 2, 2007, letter, TEP stated that compliance with the Final Prohibition Order required TEP to reconstruct Unit I4. According to 40 CFR 51.301, *Reconstruction* is defined as follows:

Reconstruction will be presumed to have taken place where the fixed capital cost of the new component exceeds 50 percent of the fixed capital cost of a comparable entirely new source. Any final decision as to whether reconstruction has occurred must be made in accordance with the provisions of § 60.15(f)(1) through (3) of this title.

TEP stated that because Unit I4 was reconstructed after August 7, 1977, the Unit was not "in existence" before August 7, 1977, and, therefore, must be considered "not BART-eligible".

ADEQ concurs that the cost of modifying TEP Irvington's Unit I4 is greater than 50 percent of the fixed capital cost of a comparable, entirely new source, and that Unit I4 was reconstructed in the 1980s.

In Federal Register, Vol. 70, No. 128, Wednesday, July 6, 2005, pages 39110-39112, EPA discusses Step 2 in determining whether a facility is BART-eligible. According to the background statement in the guidance:

"Step 2 also addresses the treatment of 'reconstruction' and 'modifications.' Under the definition of BART-eligible facility, sources which were in operation before 1962 but reconstructed during the 1962 to 1977 time period are treated as new sources as of the time of reconstruction."

The footnote attached to this statement goes on to state:

"However, sources reconstructed after 1977, which reconstruction had gone through NSR/PSD permitting, are not BART-eligible."

ADEQ has reviewed 40 CFR Part 51 Appendix Y, Section II.A.2 and has determined that EPA has addressed this issue:

"What is a 'reconstructed source?'

1. Under a number of CAA programs, an existing source which is completely or substantially rebuilt is treated as a new source. **Such 'reconstructed' sources are treated as new sources as of the time of the reconstruction.** Consistent with this overall approach to reconstruction, the definition of BART-eligible facility (reflected in detail in the definition of 'existing stationary facility') includes consideration of sources that were in operation before August 7, 1962, but were reconstructed during the August 7, 1962 to August 7, 1977 time period.

2. …

3. …

4. The 'in-operation' and 'in existence' tests apply to reconstructed sources. If an emissions unit was reconstructed and began actual operation before August 7, 1962, it is not BART-eligible. Similarly, any emissions unit for which a reconstruction 'commenced' after August 7, 1977, is not BART-eligible." (emphasis added)

ADEQ has determined that EPA's guidance does not specifically address situations where a facility was reconstructed after August 7, 1977, but was exempted from PSD review at the time that reconstruction occurred. ADEQ concludes, however, that the plain reading of EPA's guidance is most appropriate, and has determined that it is appropriate to treat reconstructed sources as new sources as of the time of the reconstruction. As a result, ADEQ concurs that the reconstructed Unit I4 at TEP's Irvington Generating Station was not "in existence" prior to August 7, 1977. Therefore, ADEQ has determined that there are no BART-eligible emissions units at TEP's Irvington Generating Station.

NPS: The clear intent of EPA's BART Guidelines is to exempt a source that has gone through New Source Review (NSR) from a "second hit" by going through BART. Because TEP Unit I4 did not go through NSR, that exemption does not apply.

ASARCO Hayden Smelter

For SO_2, we participated in the WRAP group that reported that "[a] double contact acid plant is considered the appropriate retrofit control equipment" and 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_2.

For PM10, ADEQ concluded that the PM10 emissions from the BART-eligible units are less than 250 tons per year. On this basis ADEQ determined that the smelter units are not BART-eligible for PM10. However the BART Guidelines do not allow exception of a PM10 source if its emissions exceed 15 tpy:

(ii) A determination of BART for each BART-eligible source in the State that emits any air pollutant which may reasonably be anticipated to cause or contribute to any impairment of visibility in any mandatory Class I Federal area. All such sources are subject to BART.

(C) *Exception.* A State is not required to make a determination of BART for SO2 or for NOx if a BART-eligible source has the potential to emit less than 40 tons per year of such pollutant(s), or for PM10 if a BART-eligible source emits less than 15 tons per year of such pollutant.

Please explain how "ADEQ determined that the emissions units at the ASARCO smelter are not BART-eligible for PM_{10} emissions."

Freeport-McMoRan Miami Smelter

We concur with ADEQ's conclusion that the NESHAP for Primary Copper Smelting constitutes BART for PM emissions.

We participated in the WRAP group that reported that "[a] double contact acid plant is considered the appropriate retrofit control equipment" and 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_2.

249093

USDA United States Department of Agriculture | Forest Service | Southwestern Region Regional Office
333 Broadway SE
Albuquerque, NM 87102
FAX (505) 842-3800
V/TTY (505) 842-3292

File Code: 2580
Date: November 29, 2010

Lisa Tomczak
Air Quality Planning Section
Arizona Dept. of Environmental Quality
1110 W. Washington Street
Mail Code 3415A
Phoenix, AZ 85007

Dear Ms. Tomczak:

On September 27, the USDA Forest Service received Arizona's Regional Haze State Implementation Plan (SIP). We greatly appreciate the opportunity to work with the Arizona Department of Environmental Quality (AZDEQ) and to provide comments in our review of the plan.

As you are aware, the regional haze regulations of 40 CFR 51.308(i) require consultation between FLMs and the State. Specifically:

> *The state must provide the Federal land Manager with an opportunity for consultation, in person and at least 60 days prior to holding any public hearing on an implementation plan (or plan revision) for regional haze required by this subpart. This consultation must include the opportunity for the affected Federal Land Manager to discuss their:*
>
> *(i) Assessment of impairment of visibility in any mandatory Class I Federal area; and*
>
> *(ii) Recommendations on the development of the reasonable progress goal and on the development and implementation of strategies to address visibility impairment.*

We applaud Arizona's long-standing efforts to improve visibility first with the Grand Canyon Transport Commission, the Section 309 milestones, and now with a Section 308 SIP.

Much of our concern with the latest SIP revision, however, is that it does not meet its reasonable progress goals and allows for degradation of visibility in contravention to the requirements of the Regional Haze Rule. We also question the methodology that was employed in the Best Available Retrofit Technology (BART) exclusion process.

Please find our enclosed comments specific to: (1) Sources of Visibility Impairment; (2) Visibility Modeling and Source Apportionment; (3) BART evaluation; (4) Reasonable Progress Goal Demonstration; and (5) the Long Term Strategy. We feel additional analysis and discussion is needed to support this SIP.

Together, our efforts will ensure the continued progress toward improving visibility conditions in our National Forests and Wilderness Areas, and we look forward to your response. Any questions can be directed to Susanna Ehlers at (505) 842-3840.

Sincerely,

C. L. Newman Jr

CORBIN L. NEWMAN, JR.
Regional Forester

Enclosure

cc: pdl r3 nm mailrooms, Susanna M Ehlers

U.S. Forest Service Specific Comments: Arizona Regional Haze SIP

Chapter 8: Sources of Visibility Impairment

In Section 8.4 - Arizona Emission Data, Tables 8-1 through 8-8 display the differences between the Plan02d and Prp18b inventories to describe the net change in emissions between the baseline and future year during the first planning cycle. Interpretation of these tables is challenging because Arizona has elected to submit a plan under 51.308 yet the reductions anticipated in the Prp18b inventory represent the anticipated to meet milestone required under the original 51.309 submittal. ADEQ must reconcile the inventory differences between original milestone reductions under 51.309 and those that would be realized as a result of SO_2 BART reductions now required under the 51.308 portion of the Regional Haze Rule.

The statewide SO_2 emissions inventory presented in Table 8-1 do not comport with the PSAT modeling results presented in Chapter 9. According to Table 8-1, Arizona anticipates a 28.81% decrease in point source SO_2 emissions between 2002 and 2018 yet PSAT results show an increase in point source impacts at several Class I areas in Arizona.

Chapter 9: Visibility Modeling and Source Apportionment

Under 40 CFR 51.308(d)(3)(iii), a state must document the technical basis it is relying upon to meet its reasonable progress goals. Chapter 8 of the SIP provides a very brief summary of the Western Regional Air Partnership (WRAP) Technical Support System (TSS) and emission inventory data. Chapter 9 describes the air quality modeling source apportionment techniques relied upon to help inform strategy development. However, Chapter 9 does not provide a detailed discussion of the either the Particle Source Apportionment Technique (PSAT) or the Weighted Emissions Potential (WEP) processes, which are crucial to understanding the utility of the various assessment methodologies the state relies upon to set its reasonable progress goals. WEP and PSAT use different emission inventories which should be clarified to aid the interpretation of visibility projections. Additional information regarding the methodologies should be included in this chapter.

Additionally, Chapter 9 does not provide performance evaluations of either prognostic meteorological model data or the base case results from the WRAP Base02d inventory used in the regional air quality models, CMAQ or CAMx. Without an understanding of model performance, we cannot conclude that the state's model is reasonably reliable nor understand inherent model nuances that can aid in our understanding of the model results.

Chapter 10: Best Available Retrofit Technology (BART) Evaluation

The Forest Service concurs with the initial comments provided by the Department of Interior on Arizona's BART exclusion process. Specifically, the WRAP developed CALMET meteorological fields using a nonstandard method which did not require the incorporation of upper atmospheric data. Additionally, previous EPA testing of CALPUFF Version 6.112, utilized by WRAP for its initial CALPUFF modeling, indicated several issues with default technical options which could bias model estimates low. The FLMs have typically only agreed to such an approach for CALPUFF modeling if the states use either the maximum visibility impact

with the annual average natural condition or the 98th percentile impact with 20% best natural conditions. In this SIP, Arizona has used the 98th percentile impact with the annual average natural condition. We request that sources that were determined to not be subject to BART be re-evaluated using the more rigorous criteria using the approach described above.

Chapter 11: Reasonable Progress Goal Demonstration

The Regional Haze Rule requires States to demonstrate reasonable progress in visibility improvement by 2018 for the 20% worst days and to protect visibility on the 20% best days. In mandatory Class I areas in Arizona, the plan goals do not meet the uniform rate of progress (URP) in improving visibility on the 20% worst days by 2018 as mandated in 40 CFR 51.308(d)(1):

> *What are the core requirements for the implementation plan for regional haze? The State must address regional haze in each mandatory Class I Federal area located within the State and in each mandatory Class I Federal area located outside the State which may be affected by emissions from within the State. To meet the core requirements for regional haze for these areas, the State must submit an implementation plan containing the following plan elements and supporting documentation for all required analyses:*
>
> *(1) Reasonable progress goals. For each mandatory Class I Federal area located within the State, the State must establish goals (expressed in deciviews) that provide for reasonable progress towards achieving natural visibility conditions. The reasonable progress goals must provide for an improvement in visibility for the most impaired days over the period of the implementation plan and ensure no degradation in visibility for the least impaired days over the same period.*

The proposed goals in Chapter 11 allow for incremental increases in anthropogenic impacts at most Arizona Class I areas, and also allow for degradation in the least impaired days at four Class I areas (Chiricahua NM, Chiricahua WA, Galiuro WA, and Saguro NP) represented by two IMPROVE monitors. This, again, is contrary to 40 CFR 51.308(d)(1). In a number of cases cited below, both the WEP and PSAT analyses show increases in anthropogenic emissions at a number of Arizona Class I areas.

1. Section 9.3.1 – Chiricahua NM, Chiricahua WA, and Galiuro WA: PSAT results for SO_4 and NO_3 (Figure 9-11 and 9-12) show increases in the AZ point category.
2. Section 9.3.2 – Grand Canyon NP: PSAT results for SO_4 and NO_3 (Figure 9-13 and 9-14) also show an increase in the AZ point category over the baseline period.
3. Section 9.3.3 – Mazatzal WA and Pine Mountain WA: PSAT results for SO_4 and NO_3 (Figure 9-15 and Figure 9-16) show an increase in the AZ point category over the baseline period.
4. Section 9.3.4 – Mount Baldy WA: PSAT results for SO_4 (Figure 9-17) shows nearly steady SO_4 impacts from AZ point and NO_3 (Figure 9-18) shows an increase from AZ point category.
5. Section 9.3.5 – Petrified Forest NP: PSAT results for SO_4 and NO_3 (Figure 9-19 and Figure 9-20) show an increase from AZ point sources.
6. Section 9.3.6 – Saguaro NP West Unit: PSAT results for SO_4 and NO_3 (Figure 9-21 and Figure 9-22) show an increase from AZ point sources.
7. Section 9.3.6 – Saguaro NP East Unit: PSAT results for SO_4 and NO_3 (Figure 9-23 and Figure 9-24) show an increase from AZ point sources.

8. Section 9.3.7 – Sierra Ancha WA: Figure 9-25 shows an increase in SO_4 impact from AZ point category.
9. Section 9.3.8 – Superstition WA: PSAT results for SO_4 and NO_3 (Figure 9-27 and 9-28) show increases in the AZ point category.
10. Section 9.3.10 – Sycamore Canyon WA: PSAT results for SO_4 and NO_3 (Figure 9-29 and 9-30) show increases in the AZ point category.

In Section 11.3.3 – Non-BART Sources, the Forest Service strongly disagrees with the adequacy of the Arizona reasonable progress analysis, especially in lieu of the reality that the uniform rate of progress is not being met for either SO_4 or NO_3 at any of the Arizona Class I areas. The SIP identifies a several source categories for which no attempt was made to complete a reasonable progress analysis. This is also problematic inasmuch as the PSAT results indicate increases in point source impacts from Arizona sources between 2002 and 2018.

Chapter 12: Long Term Strategy

Section 12.4 – Other States' Class I Areas Affected by Arizona Emissions discusses the contribution of Arizona to neighboring states' Class I areas. However, we do not believe this discussion addresses the requirements as specified under 40 CFR 51.308(d)(3)(i-ii):

> *(3) Long-term strategy for regional haze. Each State listed in § 51. 300(b)(3) 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 which may be affected by emissions from the State. The long-term strategy must include enforceable emissions limitations, compliance schedules, and other measures as necessary to achieve the reasonable progress goals established by States having mandatory Class I Federal areas. In establishing its long-term strategy for regional haze, the State must meet the following requirements:*
>
> > *(i) Where the State has emissions that are reasonably anticipated to contribute to visibility impairment in any mandatory Class I Federal area located in another State or States, the State must consult with the other State(s) in order to develop coordinated emission management strategies. The State must consult with any other State having emissions that are reasonably anticipated to contribute to visibility impairment in any mandatory Class I Federal area within the State.*
> >
> > *(ii) Where other States cause or contribute to impairment in a mandatory Class I Federal area, the State must demonstrate that it has included in its implementation plan all measures necessary to obtain its share of the emission reductions needed to meet the progress goal for the area. If the State has participated in a regional planning process, the State must ensure it has included all measures needed to achieve its apportionment of emission reduction obligations agreed upon through that process.*

First, the State must demonstrate that it has included all measures necessary to get its share of the emissions reductions needed to meet the progress goal for the area. The discussion in Section 12.4.1 is presented in terms of the state level contribution for aggregate visibility for all Class I areas within a given state. This approach does not address the specific requirement of 51.308(d)(ii) to examine the efficacy of a state's emission reduction measures to help meet the progress goal of the area, which can only addressed by examination of the reasonable progress of specific Class I areas. Second, we do not believe that Arizona's emission reduction measures are

sufficient to meet this requirement given that incremental increases at a number of Arizona Class I areas attributed to increases in Arizona area sources as documented in the PSAT analysis results from Chapter 9.

GTS 24931

Arizona Electric Power Cooperative, Inc.

3525 N. US Highway 191 S. • Cochise, AZ 85606 • Phone 520-384-4256

November 29, 2010

Mr. Trevor Baggiore, Deputy Director
Arizona Department of Environmental Quality
Air Quality Division
1110 W. Washington Street
Phoenix, AZ 85007

RE: Comments to ADEQ's TSD for AEPCO's Arizona BART Analysis and Determinations

Dear Mr. Baggiore:

Arizona Electric Power Cooperative, Inc. (AEPCO) offers the following comments to clarify information presented in ADEQ's technical support document dated August 18, 2010.

1. For NOx on ST2 and ST3, ADEQ has determined that BART is new low-NOx burners (LNB) with overfire air (OFA) system with a NOx emissions limit of 0.31 lb/MMBtu for both ST2 and ST3. AEPCO would like to clarify that there would be **new** LNB's installed but the fully functional, existing OFA would be utilized.

2. In response to a concern brought to our attention by Mr. Baggiore at the most recent BART stakeholders meeting, AEPCO offers the following explanation: The ST1 PM10 emissions limit of 0.0015 lb/MMBtu listed for fuel oil combustion, anticipates installation of LNB. The PM10 emission limit of 0.0075 lb/MMBtu listed for pipeline natural gas (PNG) combustion assumes good combustion practices without LNB.

In addition, AEPCO offers the following change for your consideration:

For NOx on ST1 (ST1), ADEQ has determined that BART is the installation of LNB with flue gas recirculation with an emissions limit of 0.056 lb/MMBtu. Since normal operation of this unit is in combined cycle with gas turbine 1 (GT1), AEPCO would like to propose combustion with PNG only, in combined cycle operation with all exhaust gas from GT1 recirculated into ST1 (the combined cycle operating configuration represents FGR), and installation of LNB as BART.

Thank you for your consideration of these comments.

Sincerely,

James M. Andrew
Manager Planning & Regulatory Affairs

c/Balaji Vaidyanathan, ADEQ - AQD
Lisa Tomczak, ADEQ – AQD
M. Freeark

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APS A subsidiary of Pinnacle West Capital Corporation

ADEQ AIR QUALITY DIVISION

10 DEC -8 AM 11:15

Scott Davis
Director
Department: Environmental Policy and Programs

Tel. 602-250-3226
Fax 602-250-3872
e-mail: Scott.Davis@aps.com

Mail Station 8376
PO Box 53999
Phoenix, Arizona 85072-3999

December 2, 2010

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Lisa Tomczak
Air Quality Planning Section
Arizona Department of Environmental Quality
1110 W. Washington St, Mail Code 3415A
Phoenix, AZ 85007

Subject: **Comments on the Arizona Department of Environmental Quality's Proposed Regional Haze State Implementation Plan**

Dear Ms. Tomczak:

Arizona Public Service ("APS") appreciates the opportunity to provide comments on the Arizona Department of Environmental Quality's ("ADEQ") Proposed Regional Haze State Implementation Plan ("SIP") to address visibility impairment at Arizona's Class I areas, as required by 40 CFR § 51.308. APS is Arizona's largest and longest-serving electricity utility, serving more than 1.1 million customers in 11 of the state's 15 counties. APS provides these comments in support of ADEQ's proposed SIP and to clarify specific legal and technical issues.

BACKGROUND

The Clean Air Act ("CAA") was amended in 1977 to include a National Visibility Goal to prevent any future, and remedy any existing, impairment of visibility in mandatory Class I Federal areas resulting from manmade air pollution[1]. To address this goal, EPA issued regulations to deal with "reasonably attributable visibility impairment in 1980 and regulations to deal with Regional Haze in July of 1999 ("Regional Haze rule"). The Regional Haze rule was subsequently amended in 2005. As part of the amended Regional Haze rule, each state that has a mandatory Class I Federal area, and each state that has a source of emissions that may reasonably be anticipated to cause or contribute to impairment, must develop a state implementation plan to address regional haze visibility impairment. The state of Arizona has 12 mandatory Class I Federal areas and was identified as subject to the Regional Haze rule under 40 CFR § 51.300(b)(2).

[1] CAA § 169(A).

EPA's Regional Haze rule provides States with two alternative paths to remedy regional haze: 40 CFR § 51.308 ("Section 308") and 40 CFR § 51.309 ("Section 309"). Section 308 requires states to identify BART-eligible sources, predict anticipated visibility improvements associated with various control technologies, and determine Best Available Retrofit Technology ("BART") for each eligible source. Section 309 initially provided an alternative method of satisfying the BART requirements, based upon the findings of the Grand Canyon Visibility Transport Commission ("GCVTC"). Section 309 allowed States to consider visibility improvement over time without performing site specific analysis. However, in response to lawsuits filed by the Center for Energy and Economic Development and the American Corn Growers, EPA revised the Section 309 requirements to be consistent with the Court's decision that each BART-eligible source's impacts on improving visibility in Class I areas be analyzed in the BART determination.

In December 2003, ADEQ adopted and submitted to EPA a Regional Haze SIP pursuant to Section 309. The Arizona Section 309 Regional Haze SIP established SO_2 milestones based on recommendations from the GCVTC. In January 2009, EPA issued a Finding of Failure to Submit a State Implementation Plan in compliance with 40 CFR Part 51. Subsequently, ADEQ decided to opt out of the Section 309 program and submit a Regional Haze SIP pursuant to Section 308.

As part of a Section 308 Regional Haze SIP, ADEQ is required to: (1) establish goals (expressed in deciviews or "dv") that provide for reasonable progress towards achieving natural visibility conditions; (2) provide calculations of baseline and natural visibility conditions; (3) specify a long-term strategy for mitigating regional haze; (4) include a monitoring strategy and statewide inventory of emissions; and (5) determine the BART requirements for regional haze visibility impairment. 40 CFR §§ 51.308(d)(1)-(4), (e).

ADEQ has addressed all implementation plan requirements identified in 40 CFR § 51.308. The reasonable progress goals are recognized within the plan as incremental visibility improvement over time for the most-impaired days and no degradation in visibility for the least-impaired days, at each Class I area. ADEQ used a five year average of IMPROVE monitoring data for the most impaired and least impaired days in determining baseline and natural visibility conditions, making it possible to track visibility improvement. The ADEQ proposed Section 308 Regional Haze SIP also includes sections identifying the monitoring network in place to measure and characterize visibility impairment, an inventory of emissions reasonably anticipated to contribute to visibility impairment, and a long term strategy for addressing regional haze visibility impairment.

Lastly, ADEQ conducted a thorough, reasoned BART process, consisting of three steps: 1) determining BART eligibility; 2) determining if a source is subject to BART; and 3) conducting an analysis of BART control requirements. Two APS facilities were included in the Arizona BART evaluation: the West Phoenix Generating Station and the Cholla Generating Station. Both facilities were determined to be BART eligible and received notifications from ADEQ on June 17, 2007. The notifications indicated that West Phoenix natural gas-fired Combined Cycle Units 1 through 3 were "potentially-subject-to-BART" for NO_x emissions, and Cholla coal-fired Steam Units 1 through 4 were "potentially-subject-to-

BART" for NO_x, PM, and SO_2 emissions. APS subsequently notified ADEQ that Cholla Steam Unit 1 was in operation prior to August 7, 1962 and therefore not BART eligible. APS also notified ADEQ that the West Phoenix Generating Station does not contribute to regional haze in a Class I area and thus is not subject to BART. In the proposed Regional Haze SIP, ADEQ concurred with APS's conclusions in this respect[2].

Steam Units 2 through 4 at the Cholla Generating Station were determined to be subject to BART. At ADEQ's request, APS conducted BART analyses for those units and provided the results to ADEQ in December 2007.

In the proposed Regional Haze SIP, ADEQ concluded that BART controls for Cholla are as follows for Steam Units 2 through 4:

- NO_x- Low NO_x burners (LNB) and separated overfire air (SOFA) systems
- PM_{10}- Fabric filters (0.015 lb/MMBtu)
- SO_2- Wet lime scrubbers (0.15 lb/MMBtu)

COMMENTS

APS appreciates the time and effort put forth by ADEQ in drafting the proposed Section 308 Arizona Regional Haze SIP. APS supports the conclusions made in the proposed SIP and believes that all of the requirements of 40 CFR § 51.308 have been satisfied. Specifically, APS concurs with ADEQ's determination of BART control requirements for the Cholla Generating Station and the conclusion that the West Phoenix Generating Station is not subject to BART requirements.

APS' comments are focused on two areas. The first section provides a discussion of the legal basis as to why ADEQ's BART determination is consistent with the Clean Air Act and why EPA must defer to Arizona's determination concerning what constitutes BART for Cholla. The second section provides comments clarifying certain technical issues and correcting typographical errors in the proposed SIP.

I. ADEQ's BART determination for Cholla is consistent with the Clean Air Act and the BART rules. EPA cannot substitute its BART preferences for Cholla in lieu of ADEQ's determination.

A. <u>Under the Clean Air Act, the states have primary responsibility for assuring air quality within their boundaries.</u>

The Clean Air Act is implemented through "cooperative federalism"[3]: EPA and the states, in distinct yet complementary roles, partner together to implement the goals of the Act. Under the Act, EPA establishes national air quality goals, known as the national ambient air quality standards (NAAQS). The states then have "the primary responsibility for assuring air quality" within their boundaries. 42 U.S.C. § 7407(a).

[2] See pages 142-143 and 149, *Arizona State Implementation Plan Regional Haze Section 308*, Air Quality Division, December 2010

[3] See, *e.g.*, *Connecticut v. EPA*, 696 F.2d 147, 151 (2d Cir. 1982) (describing the Act as a "bold experiment in cooperative federalism").

Congress accorded the states tremendous flexibility in meeting their responsibility to assure NAAQS attainment within their borders. "[S]o long as the ultimate effect of a State's choice of emission limitations is compliance with the national standards for ambient air, the State is at liberty to adopt whatever mix of emission limitations it deems best suited to its particular situation." *Train v. Natural Resources Defense Council,* 421 U.S. 60, 79 (1975) ("*Train*"). It is within the exclusive ambit of the states to choose which sources to control and how to control those sources. The reason for this is simple: as Congress recognized, the states are more attuned than the federal government to local circumstances and concerns, and are better situated to develop efficient, less costly control technology and to determine when it is appropriate to impose requirements more stringent than the federal standards. In short, while EPA establishes national air quality goals, the states have the primary substantive responsibility for implementing those goals.

States are required to memorialize their compliance strategies in "state implementation plans." State implementation plans are subject to limited review by EPA, and their enforcement is primarily by the state. The Act *requires* EPA to approve a SIP, unless the SIP fails to meet the specified criteria. 42 U.S.C. § 7410(a)(2).

Since the inception of the Clean Air Act, the courts have consistently upheld and reinforced the states' paramount role in implementing the requirements of the Act: Congress "left to the States considerable latitude in determining specifically how the standards would be met." *Train* at 87. EPA "is relegated by the Act to a secondary role in the process of determining and enforcing the specific, source-by-source emission limitations ..." *Train* at 79. More specifically,

> The Act gives the Agency *no authority to question the wisdom of a State's choices of emission limitations* if they are part of a plan which satisfies the standards of § 110(a)(2), and the Agency may devise and promulgate a specific plan of its own only if a State fails to submit an implementation plan which satisfies those standards. § 110(c). Thus, so long as the ultimate effect of a State's choice of emission limitations is compliance with the national standards for ambient air, *the State is at liberty to adopt whatever mix of emission limitations it deems best suited to its particular situation.*

Train at 79 (emphasis added).

Since the *Train* decision 35 years ago, the courts have consistently upheld its fundamental premise: EPA may not tell the states what specific controls to include in their SIPs; this is a function reserved exclusively to the states. For example, in *Commonwealth of Virginia v. EPA,* 108 F.3d 1397 (D.C. Cir. 1997), the state of Virginia challenged an EPA "SIP call" directing 12 northeastern states to adopt California's vehicle emission control program. The Court of Appeals reviewed both the original 1977 Clean Air Act and the 1990 Amendments and concluded that neither authorized EPA to require specific emission controls in a SIP. The court explained that "Congress did not give EPA authority to choose the control measures or mix of measures states would put in their implementation plans." *Id.* at 1410. Nor can EPA disapprove a SIP because it dislikes the substance of the SIP: "[W]e are aware of no case ...

supporting the proposition EPA now urges upon us, namely, that under section 110 EPA may condition approval of a state's implementation plan on the state's adopting a particular control measure ..." *Id.* at 1406.

B. <u>The Clean Air Act and BART rules similarly assign to the states the responsibility for making BART determinations.</u>

Like other Clean Air Act programs, responsibility for implementing the Regional Haze rules is bifurcated between EPA and the states, with the states "play[ing] the lead role in designing and implementing regional haze programs." *American Corn Growers Ass'n v. EPA*, 291 F.3d 1, 2 (D.C. Cir. 2002) (*"Corn Growers"*). Indeed, in developing the Regional Haze program of the Clean Air Act, Congress considered – and rejected – an approach "giving EPA the power to determine whether a source contributes to visibility impairment and, if so, what BART controls should be applied to that source." *Id.* at 8 (citing H.R. Conf. Rep. No. 95-564 (1977)). "The Conference Report thus confirms that Congress intended the states to decide which sources impair visibility *and what BART controls should apply to those sources." Id.* (emphasis added).

As for EPA's role,

> Congress directed EPA to issue regulations requiring states to submit [SIPs] containing emission limits, schedules of compliance, and other measures necessary to make reasonable progress toward meeting the national visibility goal.

Id. at 3. Again, EPA sets the goals and requires SIP submissions, and the states determine how, specifically, to comply.

When EPA promulgated the BART rules, it acknowledged Congress' intent that states determine BART: "Congress evinced a special concern with ensuring that *states would be the decision makers*" with respect to "which sources are subject to BART" or "how states make BART determinations." 70 Fed. Reg. 39137, 39104 (July 6, 2005) (emphasis added). EPA further conceded that it *cannot* prescribe "specific control measures a State must implement in its initial SIP for regional haze. That determination can only be made by a State once it has conducted the necessary technical analyses of emissions, air quality, and the other factors that go into determining" BART. 64 Fed. Reg. 35721, 35741 (July 1, 1999).

Notwithstanding the exclusive authority of the states to determine BART, EPA has in the past overstepped its authority under the BART program – and has been duly reprimanded and constrained by the courts. In July 1999, EPA issued rules guiding states in making BART determinations. EPA's rules instructed the states to measure the first four statutory BART factors[4] on a source-specific basis, but to measure the last factor – the anticipated visibility improvement – on a group or area-wide basis. 64 Fed. Reg. at

[4] The five statutory BART factors are: (1) the costs of compliance; (2) the energy and nonair quality environmental impacts of compliance; (3) existing pollution control technology in use at the source; (4) the remaining useful life of the source; and (5) the degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology. 42 U.S.C. § 7491(a)(g)(2).

35714. In *Corn Growers,* industry groups challenged EPA's requirement that states use a "group BART" approach as inconsistent with the Act and with the state's role as chief arbiter of what constitutes BART. The court agreed, concluding that EPA's prescriptive "group BART" requirement "ties the states' hands" and "impermissibly constrain[s] state authority." *Id.*

C. EPA cannot overrule ADEQ's BART determination for Cholla and substitute its own conclusions.

The distinct roles of EPA and the states – ADEQ in this instance – must be respected and preserved. EPA appropriately required ADEQ to submit a regional haze BART SIP, consistent with the BART rules. ADEQ has done so, in a reasoned and compelling manner. As discussed herein, ADEQ's conclusions are consistent with the statute and the BART rules, and EPA must defer to its determination.

EPA cannot substitute ADEQ's judgment for its own. Any attempt by EPA to assert its own "wisdom" in the place of ADEQ's reasonable determination concerning BART for Cholla would erode the long-standing role of the states as chief implementers of the Clean Air Act, and would violate the fundamental tenet of the Act that "air pollution prevention ... and air pollution control at its source is the primary responsibility of the states and local governments." 42 U.S.C. § 7401(a)(3).

II. Technical Comments

A. BART Determinations

1. West Phoenix Generating Station

APS agrees with ADEQ's determination that the Combined Cycle Units CC1, CC2, and CC3 at the West Phoenix Generating Station are not subject to BART. ADEQ informed APS on June 13, 2007 that CC1, CC2, and CC3 were potentially-subject-to-BART for NO_x. APS reviewed ADEQ's letter and recognized that the information used in determining BART eligibility for West Phoenix was flawed and not updated. On September 30, 2007, APS submitted a letter to ADEQ detailing the flawed assumptions and errors set forth in the June 13, 2007 letter. APS committed to fix the errors and resubmit an air dispersion modeling analysis with the adjusted values.

Results from the air dispersion modeling analysis using the corrected values were submitted to ADEQ on October 7, 2007. The results demonstrated that the 98th percentile visibility impact on the Superstition Wilderness and the Mazatzal Wilderness areas were 0.24dv and 0.31dv respectively. Based on CALPUFF modeling results, ADEQ determined that if a "potentially-BART-eligible" source's twenty second highest (98th percentile) visibility impact across the three years of modeling was greater than 0.5 deciviews in any Class I area less than 300 kilometers away, the facility would be considered to contribute to impairment of visibility in that Class I area[5]. The revised modeling results submitted by APS demonstrated that the

[5] See Page 13, *Technical Support Document for Arizona BART Analysis and Determination,*

visibility impacts are below 0.5dv for both wilderness areas within the specified 300 kilometer radius. ADEQ agreed with the revised visibility analysis and concluded that, because the deciview impact on the nearest Class I areas was less than 0.5dv, West Phoenix CC1, CC2, and CC3 Units did not cause or contribute to impairment of visibility at a Class I area.

APS fully supports ADEQ's final assessment of the visibility impacts of West Phoenix Units CC1, CC2, and CC3 on the nearest Class I areas and concurs that these units are not subject to BART.

2. Cholla Generating Station

APS agrees with ADEQ's determination that Cholla Generating Station Steam Unit 1 was in operation prior to August 7, 1962 and therefore is not BART eligible. APS also agrees with ADEQ's conclusion that Cholla Steam Units 2 through 4 are subject to BART and concurs with the proposed control requirements resulting from the BART analysis.

APS received a letter from ADEQ on June 13, 2007 explaining that Cholla Generating Station Steam Units 1 through 4 were potentially subject to BART for NO_x, PM, and SO_2. In further correspondence with ADEQ, APS clarified that Cholla Steam Unit 1 was placed into commercial operation on May 1, 1962. To be classified as a BART-eligible source, the emitting unit must be a listed source, have begun operation after August 7, 1962, be in existence on August 1977, and have the potential to emit 250 tons per year or more of any air pollutant. 40 CFR § 51.301. Since Cholla Steam Unit 1 was in commercial operation before August 7, 1962, it is not BART-eligible.

After determining BART-eligible units at the Cholla Generating Station, ADEQ assessed the units potentially-subject-to-BART and concluded that Cholla Steam Units 2, 3, and 4 triggered a case by case BART analysis for NO_x, PM, and SO_2. APS submitted a complete BART analysis to ADEQ in December 2007.

In evaluating the visibility impairment impact on Class I areas and determining BART control requirements, ADEQ identified existing control technologies in use at the Cholla and all available retrofit control options. ADEQ then eliminated all technically infeasible control options and evaluated the control effectiveness of the remaining technologies. Lastly, ADEQ evaluated the economic, energy, and visibility impacts of the remaining technologies in order to arrive at the selected BART determination.

ADEQ's PM_{10} analysis concluded that BART controls on Cholla Steam Units 2, 3, and 4 are fabric filters with an emission limit of 0.015 lbs/MMBtu. For SO_2, APS installed wet lime scrubbers on Steam Units 4 and 3 in May of 2008 and 2009 respectively, while utilizing four venturi flood disc scrubbers/absorber with a lime reagent on Steam Unit 2. Based on the technology already installed at Cholla and the other factors described above, ADEQ determined that BART controls on Steam Units 2, 3, and 4 for SO_2 are wet lime scrubbers, with an emission limit of 0.15 lb/MMBtu.

ADEQ's NO_x BART analysis evaluated all available retrofit technologies and concluded that, out of the five scenarios reviewed, low NO_x burners with SOFA constitutes BART controls for Cholla Units 2, 3, and 4.

APS supports ADEQ's BART determinations for all three pollutants on Cholla Units 2, 3, and 4. It is important to note that visibility improvements resulting from all NO_x control scenarios are less than 0.5dV. The difference between the application of NO_x combustion controls (LNB and SOFA) and the application of Selective Catalytic Reduction (SCR) technology is a visibility improvement of only 0.2dV. The cost of SCR is eight to ten times the cost of LNB and SOFA – for a 0.2dV improvement. APS agrees that the added cost of retrofitting Cholla Steam Units 2, 3, and 4 with SCR, for a 0.2dV improvement, is not justified. Therefore, APS agrees with ADEQ's decision to establish NO_x BART for Cholla Steam Units 2, 3, and 4 as LNB and SOFA.

B. CALPUFF Model

APS supports ADEQ's BART recommendations. However, for the record, APS wishes to bring to ADEQ's attention current discussions involving changes to the CALPUFF model which ADEQ used to assess the visibility impacts of its proposed BART determination. We include these comments to emphasize that recent developments show that the version of CALPUFF used by ADEQ in its SIP process (version 5.8) over-predicts the contribution of nitrate formation in colder months, and the newer version of the model (version 6.4) corrects this issue.

In making these comments, APS is not suggesting that ADEQ rerun its modeling analysis. We raise this issue in support of ADEQ's determination and to emphasize that, because the older version of CALPUFF supports ADEQ's determination for "reasonable progress goals" in the Clean Air Act, the newer version of the model, which corrects the over prediction of the nitrate contribution, only provides more support to ADEQ's decision.

1. Visibility Modeling Using the CALPUFF Model

CALPUFF is an advanced, non-steady-state meteorological and air quality modeling system developed by Atmospheric Sciences Group scientists at the TRC Corporation. It is maintained by the model developers and distributed by TRC.

CALPUFF has been adopted by EPA in its *Guideline on Air Quality Models* as the preferred model for assessing long range transport of pollutants and their impacts on Federal Class I areas, and on a case-by-case basis for certain near-field applications involving complex meteorological conditions. CALPUFF is recommended by EPA as a refined model for use in analyses for SO_2 and particulate matter compliance assessments with ambient air quality standards and PSD increment consumption for (1) transport greater than 50km from a source; and (2) analyses involving a mixture of both long-range and short range source-receptor distances. EPA's *Guideline on Air Quality Models* also provides for the use of CALPUFF on a case-by-case basis for air

quality estimates involving complex meteorological flow conditions, where steady-state, straight-line transport assumptions are inappropriate.

The CALPUFF modeling system is also recommended by the Federal Land Managers' Air Quality Related Values Workgroup (FLAG) for assessing the effects of distant and multi-source plumes on visibility and pollutant wet/dry deposition fluxes. The CALPOST processor implements the FLAG recommended algorithms for assessing the change in plume extinction due to a modeled source or group of sources. CALPUFF postprocessors allow the calculation of pollutant deposition fluxes of nitrogen and sulfur, as described by the FLAG guidance.

2. Enhancement to CALPUFF's Chemistry Module

Morris et al.[6] reported that the EPA-approved version of CALPUFF with the MESOPUFF II chemistry (Version 5.8) was developed using temperatures of 86, 68 and 50°F. Therefore, the 50°F minimum temperature used in development of the model could result in overestimating sulfate and nitrate formation in colder conditions. These investigators found that CALPUFF (version 5.8) tended to over-predict nitrate concentrations during the winter by a factor of about three.

On November 3, 2010, TRC released a new version (6.4) of CALPUFF, with major improvements to the chemistry module. TRC has implemented these improvements as input options selected by the user. They are as follows:

1. Modification of the existing RIVAD chemical mechanism for the transformation of SO_2 to SO_4 and NO/NO_2 to HNO_3 and NO_3.

2. Replacement of the MESOPUFF-II CHEMEQ model with the ISORROPIA (Version 1.7) model for inorganic gas-particle equilibrium.

3. Addition of a new option for aqueous-phase transformation adapted from the RADM cloud implementation in CMAQ/SCICHEM.

4. Addition of a new option for anthropogenic secondary organic aerosol (SOA) formation based on the CalTech SOA routines implemented in CMAQ-MADRID.

Each option is described in the "CALPUFF Chemistry Updates Users Guide for API Chemistry Options" issued by TRC on October 25, 2010, available at http://www.src.com/calpuff/download/Mod64_Files/UsersInstructions_UpdatedChemistry.pdf.

The EPA-approved version of CALPUFF and the version with the improved chemistry options were evaluated using the 1995 Southwest Wyoming Technical Air Forum (SWWYTAF) database[7], available from the Wyoming Department of

[6] Morris, R., Steven Lau and Bonyoung Koo, 2005. Evaluation of the CALPUFF Chemistry Algorithms. Presented at A&WMA 98th Annual Conference and Exhibition, June 21-25, 2005, Minneapolis, Minnesota.
[7] Background and database description are available at http://deq.state.wy.us/aqd/prop/2003AppF.pdf.

Environmental Quality. Two versions of CALPUFF with different chemistry modules were evaluated with this database:

1. MESOPUFF II chemistry using IWAQM default ammonia background concentration of 1 ppb.

2. Improved CALPUFF RIVAD/ARM3 chemistry using background values of NH_3 concentrations based on measurements in the Pinedale, Wyoming area, which are lower than 1 ppb in winter. Long-term, research-grade denuder measurements taken by ARS[8] in the SW Wyoming area noted that winter ammonia levels were about 0.1 ppb.

Sulfates and nitrates that were predicted by the two models were compared with actual measured values obtained at the Bridger Wilderness Area site and the Pinedale site. For the two model configurations, the results for sulfates were very similar, which was expected since the improvements to the CALPUFF chemistry were anticipated to have the most impact on nitrates predictions. The EPA-approved CALPUFF model was found to significantly over-predict nitrates by a factor of two to three. The performance of the version of CALPUFF with the improved chemistry and measured ammonia was much better, with an over-prediction of about 4% at the Pinedale site and of about 28% at the Bridger site.

The two models were also evaluated in a sensitivity analysis conducted by the Atmospheric and Environmental Research, Inc. (AER) and presented at the October 2009 Air & Waste Management Association Specialty Conference in Raleigh, North Carolina, by Karamchandani et al.[9] Both the EPA-approved version of CALPUFF and the improved version were run with the IWAQM default ammonia background concentration of 1 ppb. The results showed the same trend as that noted above (Morris, et al.): the improved CALPUFF predictions were about a factor of two lower than those from the EPA-approved version of CALPUFF. These results indicated that, with the same ammonia background, the more advanced version (6.4) of CALPUFF would be expected to predict nitrate levels lower than the currently approved version 5.8.

EPA's OAQPS Modeling Group instructed the CALPUFF model developers to run a series of tests and evaluations of the changes recommended in the AER Study. TRC successfully completed those tests and evaluations and submitted the CALPUFF model revisions to the EPA and FLMs for their review and approval. Concurrently, TRC placed the new version of the CALPUFF Model in the public domain at the CALPUFF website.

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[8] *NH_3 Monitoring in the Upper Green River Basin, Wyoming.* J.V. Molenar, H.J. Sewell, J. Collett, et al. Extended abstract #70, presented at the A&WMA Specialty Conference on Aerosol & Atmospheric Optics: Visual Air Quality and Radiation, Moab, UT, 28 April - 2 May 2008.

[9] Karamchandani, P., S. Chen, R. Bronson, and D. Blewitt, 2009. Development of an Improved Chemistry Version of CALPUFF and Evaluation Using the 1995 SWWYTAF Data Base. Presented at the Air & Waste Management Association Specialty Conference on Guideline on Air Quality Models: Next Generation of Models, October 28-30, 2009, Raleigh, NC.

Attachment 1 shows the most recent (November 3, 2010) and prior refinements to the CALPUFF model since its inception in the late 1990s. All model refinements from 2003 to 2007 were approved by the EPA and those since 2008 are awaiting EPA's approval.

3. Use of CALPUFF in BART Analyses

In the 2005 Regional Haze BART rules, EPA expressed a "preference" for the use of the then-existing version of CALPUFF for visibility modeling purposes: "Because the air quality model CALPUFF is *currently the best application available* to predict the impacts of a single source on visibility in a Class I area, we proposed that a CALPUFF assessment be used as the preferred approach first, for determining whether an individual source is subject to BART, and second, in the BART determination process." 70 Fed. Reg. 39104, 39122 (July 6, 2005) (emphasis added). EPA did not specifically require the use of CALPUFF, giving states the latitude to use "another appropriate dispersion model visibility impacts." *Id.* at 39107.

However, EPA also "recognize[d] that, although CALPUFF is the best currently available tool for analyzing the visibility effects of individual sources, it is a model that includes certain assumptions and uncertainties." Id. at 39121. As a result, EPA concluded that states "should not necessarily rely on the maximum modeled impact in determining whether a source may reasonably be anticipated to contribute to visibility impairment in a Class I area." *Id.* EPA further stated:

> We understand the concerns of commenters that the chemistry modules of the CALPUFF model are less advanced than some of the more recent atmospheric chemistry simulations. To date, no other modeling applications with updated chemistry have been approved by EPA to estimate single source pollutant concentrations from long range transport. In its next review of the Guideline on Air Quality Models, EPA will evaluate these and other newer approaches and determine whether they are sufficiently documented, technically valid, and reliable to approve for general use. In the meantime, as the Guideline makes clear, States are free to make their own judgments about which of these or other alternative approaches are valid and appropriate for their intended applications.

Id. at 39123.

In short, while EPA endorsed CALPUFF as the best modeling protocol available in 2005, it specifically recognized that the model is less than perfect, and it committed to evaluate "newer" approaches in the future.

EPA's intention is clear: the BART analysis should be based on the "best application currently available" to predict visibility impacts. At the time, the best application currently available was the 2005 version of CALPUFF. EPA's position, as articulated in 2005, is consistent with that of the courts: if an agency's decision does not constitute a "reasonable, good faith presentation of the *best information available*

under the circumstances," it is arbitrary and capricious. *Lee v. U.S. Air Force*, 220 F. Supp.2d 1129, 1233-34 (D.N.M. 2002) (emphasis added) (citing *Colorado Environmental Coalition v. Dombeck*, 185 F.3d 1162, 1172 (10th Cir. 1999).

Today, the "best application currently available" model for predicting visibility impacts is not the 2005 version of CALPUFF. It is the new, more refined, more accurate version 6.4 of CALPUFF, released on November 3, 2010. The new version of CALPUFF is widely recognized as more accurate.

EPA, by its own concession, must allow the use of the new version of CALPUFF in making BART determinations today. It is the "best information available" at the moment. To rely upon an obsolete, flawed version of CALPUFF -- because that was what existed five years ago when EPA issued the rule -- is inconsistent with fundamental tenets of administrative law and, indeed, with EPA's own acknowledgement of the importance of an accurate model.

C. Technical Clarification and Editorial Corrections

APS has identified certain technical and editorial issues that we believe should either be clarified or corrected as follow:

1. Section 1.4, Background on Regional Haze Rule, Grand Canyon Visibility Transport Commission Finding and Recommendations:

   The GCVTC concluded the contribution of nitrates to total light extinction on an annual basis on the Colorado Plateau is only 4%. APS encourages ADEQ to emphasize this point and suggests adding the following language in this section:

   Pursuant to the 1990 Amendments to the Clean Air Act, Section 169(B), EPA convened the Grand Canyon Visibility Transport Commission (GCVTC) in 1991, comprised of the governors of nine western states, four Native American Tribes, representatives of EPA and Federal Land Managers. Then Arizona Governor Fife Symington served as the Chair of the GCVTC

   Under a public–private partnership, GCVTC worked for five years to assemble the information needed to carry out its mandate and to issue its final report. The GCVTC concluded that visibility impairment on the Colorado Plateau was caused by a multitude of natural and man-made emission sources. Specifically, sulfates, organic and elemental carbon, and dust particles contributed in roughly equal proportions to total light extinction, and nitrates contributed only around 4% to the total light extinction on an annual average basic.

   EPA paid close attention to the recommendations of the GCVTC in developing the 1999 Regional Haze rules, which created Section 309 to address regional haze issues in the West.

2. Section 1.5, Purpose of this Document, Basic Plan Elements, Natural Sources of Visibility Impairment

   APS believes it is important that ADEQ recognize the role of Rayleigh scattering by air molecules. APS suggests that ADEQ include a paragraph clarifying that Rayleigh scattering contributes approximately 10 Mm^{-1} to total extinction; on the Colorado Plateau, this constitutes roughly one-third of the total extinction on an annual average basis.

3. Section 6.3, Monitoring Data

   APS suggests an editorial change on page 38 in the first sentence. APS recommends the replacement of the word "reflect" with "scatter." The latter better represents the visibility impairment dynamic of light in the atmosphere and how it is perceived by the human eye.

   APS also recommends ADEQ replace "Figure 6.3" with "Table 6-3" in the fourth paragraph, because there is no such figure included. Furthermore, since Table 6-2 appears on page 39 (and Table 6-3 is on page 40), APS recommends the order of Tables 6-2 and 6-3 be reversed.

4. Typographical Errors

   APS requests that ADEQ correct the typographical error on pages 141 and page 20 of Appendix D from "Arizona *Power* Service Company" to "Arizona *Public* Service Company."

   In addition, the reference to "Oregon" in the third paragraph of Section 13.1, Federal Land Manager Consultation, page 184, should be replaced with "Arizona."

CONCLUSION

APS agrees with ADEQ's determinations in the proposed Section 308 Regional Haze State Implementation Plan for Arizona. Specifically, we support ADEQ's conclusions that APS West Phoenix Combined Cycle Units CC1, CC2, and CC3 are not subject to BART; that APS Cholla Steam Unit 1 is not BART eligible; and the proposed BART control requirements for Cholla Steam Units 2, 3, and 4.

APS also encourages ADEQ to emphasize that ADEQ has the primary responsibility for assuring air quality within its jurisdiction, that the Clean Air Act clearly assigns authority to ADEQ to make BART determinations, and that EPA must defer to ADEQ's BART determinations.

APS appreciates the opportunity to provide these comments. Should you have any questions please contact Mark Hajduk at (602) 250-3394.

Sincerely,

Scott Davis

Scott Davis
Director, Environmental Policy & Programs
Arizona Public Service

ATTACHEMNT 1

CALPUFF MODEL Updates:

November 3, 2010. Two new chemistry options have been introduced into the latest Version 6 series of the CALPUFF modeling system. The new programs include CALPUFF (Version 6.4) and POSTUTIL (Version 1.64). The changes to the chemistry include modifications to the RIVAD chemical conversion algorithms for the transformation of SO2 to SO4 and NO/NO2 to HNO3 and NO3, addition of the ISORROPIA (Version 2.1) model for inorganic gas-particle equilibrium, addition of aqueous-phase transformation adapted from the RADM cloud implementation in CMAQ/SCICHEM and a new option for anthropogenic secondary organic aerosol (SOA) formation based on the CalTech SOA model implemented in CMAQ-MADRID. These changes are based on work by Karamchandani et al. (2008) with an earlier version of ISORROPIA and CALPUFF. Other changes in this release also include MCB-F updates as well as new model options such as a nested grid option in CALPUFF.

August 4, 2008. An implementation of the draft FLAG (2008) guidance on visibility has been added to a new beta Version 6 of CALPOST. The GUI has been enhanced to include a library of the f(RH) and background extinction values for each Class I area in the United States. Changes to Version 6 of CALMET and CALPUFF that do not affect results when running in regulatory mode have been included in this update.

June 27, 2008. Version 6 of the model has been updated to include all updates through MCB-E as well as the new regulatory switch used in Version 5.8 and settings recommended by the EPA. An extensive set of new features has been added to the graphical user interface system and support processors.

June 29, 2007. The EPA has approved an update in CALPUFF from V5.711a (dated July 16, 2004) to V5.8 (dated June 23, 2007). This update includes code changes described in Model Change Bulletin B (MCB-B), MCB-C and MCB-D. CALMET has been updated from V5.53a (dated July 16, 2004) to V5.8 (dated June 23, 2007). The new codes are based on the VISTAS-series codes (CALPUFF V5.756 and CALMET V5.726) with the main changes being the addition of a regulatory switch in CALMET and switch settings recommended by the EPA to configure the models to be consistent with the prior regulatory versions. The model preprocessors and postprocessors in the EPA-approved section have been updated to the VISTAS-series of the model codes.

August 4, 2006. Update of VISTAS Version 5 (CALMET, CALPUFF, CALPOST, POSTUTIL, CALMET GUI, and CALPro GUI).

CALMET v5.726 (dated August 1, 2006) includes corrections in the overwater buoyancy flux calculations, and modifications to correct run-time stoppages seen in specific configurations.
CALPUFF v5.756 (dated July 25, 2006) includes a correction to a potential temperature gradient calculation near the top of the domain, and modifications to turn off debug output for slugs and to allow ozone dataset v2.1 files to be used with the UTM map projection.
CALMET, CALPUFF, CALPOST, and POSTUTIL executables recompiled with new large parameter configurations consistent with VISTAS applications.
VISTAS Example Screening BART Simulation and Sample Emissions Data Spreadsheets updated.

June 15, 2006. The EPA has approved an update to CALPUFF from v5.7 (dated April 2, 2003) to v5.711a (dated July 16, 2004) as described in Model Change Bulletin A (MCB-A).

April 14, 2006. Update of Version 6 (CALMET, CALPUFF, CALPOST, POSTUTIL, and CALPro GUI); Update of VISTAS Version 5 (CALMET, CALPUFF, POSTUTIL, BUOY, and CALPro GUI); VISTAS Sub-Regional Sample Files and Data Files available and new description of one-step ALM procedure.

April 3, 2006. Release of Version 6 of the CALPUFF modeling system.

March 30, 2006. Update of CALMM5 to eliminate possible duplicate hours being retained when using multiple MM5 output files from different MM5 runs with overlapping hours.

January 9, 2006. Model Change Bulletin B (MCB-B) has been added that addresses changes to the modeling system codes needed to update the current BETA-Test (MCB-A) release. These changes are posted here to provide users access to important updates prior to the next release of the system. Model Change Bulletin B(051216) identifies the changes in CALMET and CALPUFF and may be used to update the corresponding codes. Users who are currently running the BETA-Test (MCB-A) versions of these programs may download updated versions by going to the "Download" page. Note that a revised GUI installation for the BETA-Test (MCB-B) system is provided there as well, which contains the updated CALMET and CALPUFF executables.

May 25, 2005. A version of CALMM5 (MM5 V3) has been added to the Download BETA-Test page. This version of CALMM5 processes MM5 Version 3 output data directly.

July 16, 2004. A Model Change Bulletin (MCB) has been added that addresses changes to the modeling system codes needed to update the current BETA-Test release. These changes will be part of the next release of the system, but are posted here to provide users access to important updates in the interim. Model Change Bulletin A(040716) identifies the changes in CALMET,CALPUFF, READ62,and SMERGE, and may be used to update the corresponding codes. Users who are currently running the BETA-Test versions of these programs may download updated versions by going to the "Download" page. Note that a revised GUI installation for the BETA-Test system is provided there as well, which contains the updated CALMET and CALPUFF executables.

July 11, 2003. Changes to the official version of the CALPUFF modeling system are available for beta testing on the "Download" page. These modifications are not yet officially accepted by the US EPA, but they are provided for user testing.

April 17, 2003. A new version of the CALPUFF modeling system has been released. This version of the model is the EPA-recommended version that should be used for regulatory application studies. It includes numerous upgrades and new features, including a "no-observations" option in CALMET allowing the model to be run with 3-D prognostic (e.g., MM5) meteorological data alone, introduction of the PRIME building downwash model, a generalized coordinate transformations, new self-documenting control (input) files for the preprocessors and postprocessors, and a set of new GUIs for running the preprocessing programs. The elements of the beta-test version that has previously been available are implemented into the new release. More information on the specific model updates are provided in the download area of the web page.

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ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

Proposed Regional Haze State Implementation Plan

Comments of Peabody Energy Company

VIA ELECTRONIC MAIL TO: tomczak.lisa@azdeq.gov

Peabody Energy Company (Peabody) appreciates the opportunity to comment on the State of Arizona's proposed Regional Haze State Implementation Plan (the Regional Haze SIP). Peabody is the world's largest private-sector coal company, and its coal products fuel 10 percent of all U.S. electricity generation and 2 percent of worldwide electricity. As such, Peabody has a vested interest in the regulation of sources that utilize its coal, including the regulations established under the Clean Air Act for addressing visibility and regional haze.

GENERAL COMMENTS

Overall, with certain exceptions, Peabody supports the approach taken by Arizona in developing its Regional Haze SIP and believes that it complies with the requirements of the Clean Air Act, 42 U.S.C. §§ 7491, 7492 (CAA §§ 169A, 169B) and the implementing regulations adopted by the U.S. Environmental Protection Agency (EPA) at 40 C.F.R. Part 51.300 et seq. In particular, Peabody supports the Reasonable Progress Goals (RPGs), the Best Available Retrofit Technology (BART) determinations, and the Long-Term Strategy (LTS) contained in Arizona's Regional Haze SIP. Peabody's specific comments are described more fully below:

SPECIFIC COMMENTS

1. Reasonable Progress Goals (RPGs)

The Clean Air Act "leaves wide discretion" to the states about how RPGs are to be achieved. *Util. Air Regulatory Grp. v. EPA*, 471 F.3d 1333, 1340 (D.C. Cir. 2006). The Regional Haze Rule sets no presumptive target for making determinations of RPGs, and does not mandate specific rates of progress. While states must consider certain statutory factors, the Rule makes clear that states must only "determine the rate of progress for remedying existing impairment that is reasonable" and that states "have flexibility in determining their reasonable progress goals based on consideration of the statutory factors." *Regional Haze Regulations*, 64. Fed. Reg. 35,714, 35,731/2 (July 1, 1999).

The eleven step analysis undertaken by Arizona to determine appropriate and attainable RPGs for the 2008 to 2018 planning period comports with discretion Arizona is granted in the statute. Although the RPGs established provide for a slower rate of visibility improvement than a mathematically-calculated Uniform Rate of Progress (URP), the RPGs are realistic and properly take into account both the significant reductions expected in Arizona's anthropogenic

emissions and the challenges associated with natural or international emission sources that Arizona cannot control.

As noted in the Regional Haze SIP, significant reductions in anthropogenic emissions of nitrogen oxides (NO_x) and sulfur dioxides (SO_2) are expected in the next few years due to a wide variety of regulatory programs, and those reductions will serve to improve visibility at Arizona's Class I areas – modeling reveals that reductions in these pollutants of between 17 and 20 percent are expected by 2018. In fact, the overall percentage reductions in NO_x and SO_2 are similar to the percentage reduction in visibility impairment contemplated by the calculated URP that would reach natural visibility conditions in 2064. Accordingly, it is clear that Arizona is doing its part to improve visibility and meet the goals of the Clean Air Act.

However, the anthropogenic emissions of visibility impairing pollutants over which Arizona has jurisdiction are unfortunately not the only sources of visibility impairment at its national parks and wilderness areas – emissions from other states, other countries, and even natural sources have a much greater impact on visibility in Arizona. The analysis provided in Section 8.5 of the Regional Haze SIP clearly illustrates the impact other emissions sources are having and will continue to have on visibility at Class I areas in Arizona. Perhaps most notably, point sources in Mexico, the highest contributors of SO_2 in the region, are expected to increase emissions of SO_2 by 150,000 tpy by 2018. In addition, despite the significant reductions in anthropogenic NO_x and SO_2 from Arizona sources, natural sources of other visibility-impairing pollutants such as primary organic aerosols, elemental carbon, fine and coarse particulate matter, and ammonia are expected to increase as well, in some cases dramatically. If the RPGs established in Arizona's Regional Haze SIP did not take these challenges into account, the RPGs could be lower (and perhaps more in-line with the URP), but they would also represent an unrealistic goal that would not be achievable.

Arizona's decision to take a pragmatic, realistic approach to establishing attainable goals for visibility improvements in spite of these challenges is commendable. Despite the inability to regulate natural emissions sources or emissions sources in other jurisdictions, Arizona's Regional Haze SIP will ensure meaningful visibility improvements at many Class I areas as a result of emissions reductions, primarily from motor vehicles and stationary sources. Arizona's plan also comports with EPA regulations and guidance by following the four-factor structure for determining whether even greater visibility improvements are possible with additional control requirements. Although Arizona did not identify any additional controls that could reasonably be imposed beyond those required as BART or by other air quality programs, Arizona's commitment to continue investigating possible emissions control technologies before the next SIP revision will help ensure continued progress toward the natural visibility conditions goal. As such, Arizona's proposed Regional Haze SIP represents an appropriate exercise of its discretion to establish RPGs by balancing the benefits of improved visibility with the cost of regulation, considering all information currently available.

2. Best Available Retrofit Technology (BART)

As required by the Clean Air Act and EPA regulations, Arizona conducted a BART analysis of BART-eligible sources in the state to determine whether additional controls may be

appropriate. Generally, Peabody supports Arizona's BART analysis – using the "top-down" framework traditionally employed to determine "best available control technology" (BACT) is consistent with EPA guidance and provides a rational and deliberate means for analyzing potential control alternatives. So long as all five BART factors are considered, the Regional Haze Rule allows Arizona to compare tradeoffs between the benefits and costs associated with various control technology alternatives in setting BART requirements, and gives Arizona "great leeway to make the BART determinations required by the Clean Air Act." *Am. Corn Growers Ass'n. v. EPA*, 291 F.3d 1, 21 (D.C. Cir. 2002) (Garland, J., concurring in part and dissenting in part). However, in determining BART, Arizona is not required to undertake a cost-benefit analysis in deciding the type of controls to impose, nor does the Clean Air Act specify the weight to be accorded to any of the five factors a state must consider. *Id.* at 19. Arizona's analysis takes all five factors into account, and does so on a unit-by-unit basis, as required by *American Corn Growers*. Accordingly, Arizona's BART determinations represent an appropriate and defensible implementation of the BART requirement, and Peabody supports Arizona's Regional Haze SIP in that respect.

However, some of the controls that Arizona proposes to require as BART do not represent cost-effective control options. For example, the BART determination for the Arizona Public Service's (APS's) Cholla Generating Station indicates that the cost-effectiveness of installing a fabric filter on Unit 2 is $160,747 per ton of particulate matter removed annually, which clearly cannot be considered cost-effective. The Regional Haze SIP notes that the Cholla Generating Station had already decided to install a fabric filter before Arizona proposed it as BART, which likely explains how such a costly control could possibly be considered BART, particularly given the fact that Arizona appropriately ruled out other unreasonably expensive controls (e.g., selective catalytic reduction technology for Cholla Generating Station, which would have cost more than $10,000 per ton of NO_x). But Arizona's decision to prepare a cost-effectiveness calculation at all could suggest that Arizona would support a BART control option, despite such enormously high costs.

Arizona should clarify that the $160,747 per ton cost for the fabric filter at Cholla Generating Station does not represent a cost-effective BART control option, since it would be unreasonable to impose such a high cost on sources that have not already decided to install the controls for other reasons. As an alternative, Arizona could consider planned controls as part of the baseline for considering other control options, given that the controls will be installed regardless of the outcome of the BART analysis. Arizona could also simply omit the cost-effectiveness calculation altogether where the source does not seek to rule out a control option on the basis of cost-effectiveness, similar to the approach taken for controls that have already been installed (e.g., the scrubbers at the Cholla Generating Station).

In any event, Peabody fully supports Arizona's use of an entirely different cost-effectiveness measurement – dollars per deciview. Although EPA guidance suggests that a cost-per-ton measure is an appropriate means to determine cost-effectiveness, such an approach fails to take into account the fact that the purpose of the regional haze program is to improve visibility, not simply reduce emissions. A dollar-per-deciview metric more closely aligns the cost-effectiveness calculations with the regional haze program goals, and thus represents a more appropriate comparison point for determining whether the cost of a control option is worth the

corresponding visibility improvement. As such, Arizona should continue utilizing a dollar-per-deciview perspective to determine the cost-effectiveness of various control alternatives.

3. Long Term Strategy (LTS)

Peabody also supports Arizona's proposed Long Term Strategy in that it provides an appropriate means for developing additional information that will help the state determine whether additional controls may be imposed on non-BART eligible sources. Even though the availability of additional controls, and the benefits associated with those controls, cannot be determined at this time, Arizona's commitment to researching additional control opportunities will help ensure that Arizona not only meets but exceeds its established RPGs. As noted in the proposed Regional Haze SIP, additional control alternatives that Arizona expects to identify in the next few years will help achieve even greater emission reductions and greater visibility improvements than currently expected. Such a holistic review of the potential control options fully complies with the requirement to develop state-wide strategies to address regional haze and update the SIP as needed to ensure all reasonable control options are considered and implemented as appropriate.

CONCLUSION

Peabody appreciates the opportunity to comment on Arizona's proposed Regional Haze SIP. We hope these comments will prove useful in finalizing a Regional Haze SIP that strikes the right balance in protecting both Arizona's natural lands and its businesses.

Dated: December 2, 2010

Respectfully submitted,

/s/ Peter S. Glaser

Peter Glaser
Troutman Sanders LLP
401 9th Street, N.W.
Suite 1000
Washington, D.C. 20004
202-274-2998
peter.glaser@troutmansanders.com

COUNSEL FOR PEABODY ENERGY COMPANY

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ADEQ
AIR QUALITY DIVISION

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P. O. Box 52025
Phoenix, AZ 85072-2025
(602) 236-5900
www.srpnet.com

Mail Station: PAB352
Phone: (602) 236-2968
Fax: (602) 236-6690
Email: Kevin.Wanttaja@srpnet.com

December 2, 2010

Ms. Lisa Tomczak
Air Quality Planning Section
Arizona Department of Environmental Quality
1110 W. Washington Street, Mail Code 3415A

Re: Comments on Proposed Regional Haze State Implementation Plan

Dear Ms. Tomczak:

The Salt River Project Agricultural Improvement and Power District (SRP) appreciates the opportunity to provide comments to the Arizona Department of Environmental Quality (ADEQ) on the Proposed Regional Haze State Implementation Plan (SIP). SRP owns and operates the Coronado Generating Station (CGS), located near St. Johns in Apache County, Arizona. ADEQ's proposed Regional Haze SIP includes Best Available Retrofit Technology (BART) emission limits for CGS.

SRP would like to offer the following comments on the proposed Regional Haze SIP and the BART determination for CGS:

1. SRP agrees with ADEQ's proposed BART emission limits for CGS. In addition, SRP supports the approach taken by ADEQ in developing the BART emission limits proposed in the SIP for stationary sources. In the case of nitrogen oxide (NO_x) emissions from CGS, this approach recognizes that a BART emission limit that requires the implementation of Selective Catalytic Reduction (SCR) cannot be justified due to the significantly higher cost of this technology and the small visibility improvement that is expected to be achieved. In addition, ADEQ properly recognizes that the "reasonable progress" provisions of the Environmental Protection Agency's (EPA's) Regional Haze Rule will allow additional opportunities to evaluate whether still more NO_x emission reductions are needed in future periods to meet the long-term program goals.

2. SRP strongly encourages ADEQ to reject any comments received during this comment period that advocate for the installation of the most stringent controls available as BART without an appropriate technical and/or regulatory basis. As noted in the EPA's Regional Haze Rule, States have broad discretion in establishing BART for stationary sources using an approach that the State deems to be most appropriate. Under the Clean Air Act, States are given the primary responsibility for assuring air quality within their boundaries (42 U.S.C. 747(a)). Similarly, the Clean Air Act and BART rules assign to the States the responsibility for making BART determinations and "designing and implementing regional haze programs." American Corn Growers Ass'n v. EPA, 291 F.3d 1, 2 (D.C.

Cir. 2002). EPA acknowledged the States' role when it promulgated the BART rules: "Congress evinced a special concern when ensuring that States would be the decision makers" with respect to "which sources are subject to BART" or "how States make BART determinations." 70 Fed. Reg. 39137, 39104 (July 6, 2005). EPA also conceded that it cannot prescribe "specific control measures a State must implement in its initial SIP for regional haze. That determination can only be made by a State once it has conducted the necessary technical analysis of emissions, air quality, and the other factors that go into determining BART." 64 Fed. Reg. 35721, 35741 (July 1, 1999). In light of this clear guidance, and because ADEQ's proposed Regional Haze SIP is consistent with the BART rules, ADEQ should reject any suggestions of an alternate BART determination for CGS.

3. As noted by Arizona Public Service (APS) in their comments on ADEQ's proposed BART determinations, the CALPUFF model, which is used to evaluate the visibility improvement attributable to BART control options, has been updated by the model developer, TRC Corporation. SRP agrees with the assessment by APS and others that the updated model provides for more accurate treatment of nitrate chemistry. SRP encourages ADEQ to adopt and use the most up-to-date version of the CALPUFF model in future modeling conducted to support regional haze planning. It is critical for States, as well as EPA and the Federal Land Managers, to make planning decisions using those tools demonstrated to provide the most accurate information. It is clear that CALPUFF model development has advanced, and it is logical to expect additional enhancements as modelers continue to apply the model in various applications. It is important for ADEQ to follow such modeling advancements and adopt those changes that enhance the quality of SIP development efforts.

4. As a final note, SRP would like to propose the correction of a minor typographical error in the proposed SIP. In Section XIV of Appendix D, Table 3, baseline NO_x emissions from both Units 1 and 2 at CGS are listed as 0.433 lb/MMBtu. Baseline NO_x emissions from Unit 2 should be 0.466 lb/MMBtu. SRP believes that the modeling results presented in this appendix are based on the correct baseline emission rate of 0.466 lb/MMBtu from Unit 2, and that the reference to 0.433 lb/MMBtu is simply a typographical error.

SRP appreciates ADEQ's consideration of these comments. Please do not hesitate to call if you have any questions or need additional information.

Sincerely,

Kevin Wanttaja
Manager, Environmental Services

EC 14173.1110

RESPONSIVENESS SUMMARY
Comments Taken at the Public Hearing and Written Comments Received on the Proposed 2010 Regional Haze State Implementation Plan Under Section 308 of the Federal Regional Haze Rule

Chapter 1 – Introduction

(1) Comment: In Section 1.4, *Background on the Regional Haze Rule, Grand Canyon Visibility Transport Commission Findings and Recommendation*s, the GCVTC concluded the contribution of nitrates to total light extinction on an annual basis on the Colorado Plateau is only 4%. APS encourages ADEQ to emphasize this point and suggests adding language to highlight that fact.

Response: ADEQ acknowledges the comment but does not concur that it is necessary to revise the historical background information. Since the publication of the GCVTC report in 1996, total extinction from nitrates may have changed and ADEQ cannot confirm the continued accuracy of the stated percentage.

(2) Comment: In Section 1.5, Purpose of the Document, Basic Plan Elements, Natural Sources of Visibility Impairment. APS believes it is important that ADEQ recognize the role Rayleigh scattering by air molecules. APS suggest that ADEQ include a paragraph clarifying that Rayleigh scattering contributes approximately 10 Mm-1 to total extinction. On the Colorado Plateau, this constitutes roughly one-third of the total extinction on an annual average basis.

Response: ADEQ acknowledges the comment but does not concur that it is necessary to revise the information. Rayleigh scattering is factored into the visibility impairment analyses and further discussion is duplicative.

Chapter 4 – Section 4.3 – Regional Haze Monitoring Commitments

(3) Comment: ADEQ needs to discuss its commitment to assuring continued visibility monitoring in the future.

Response: ADEQ has revised Section 4.3 to include a discussion of its commitment to continue visibility monitoring in the future. ADEQ's current monitoring plan identifies the IMPROVE sites as the visibility network for monitoring regional haze and are described in Section 4.2 of Chapter 4. ADEQ will continue to use the federally operated and funded IMPROVE sites for monitoring visibility conditions at the Class I areas and will encourage the continued funding and maintenance of IMPROVE.

Chapter 6 – Arizona Class I Area Baseline, Natural Conditions, and Uniform Rate of Progress

(4) Comment: Section 6.3, Monitoring Data. APS suggests an editorial change on page 38 in the first sentence. APS recommends the replacement of the word "reflect" with "scatter." The latter term better represents the visibility impairment dynamic of light in the atmosphere and how it is perceived by the human eye. APS also recommends ADEQ replace "Figure 6.3" with "Table 6 -3" in the fourth paragraph, because there is no such figure include. Furthermore, since Table 6 – 2 appears on page 39 (and Table 6-3 is on page 40), APS recommends the order of Tables 6-2 and 6-3 be reversed.

Response: ADEQ has revised the narrative and clarified the reference to Table 6.3.

Chapter 7 – Visibility Impairment at Class I areas

(5) Comment: ADEQ indicates elevated organic carbon (OC) may be due to fire. Include daily time series in addition to monthly time series to identify the specific dates of elevated OC and compare to Arizona fire activity data, because the contributions are more complicated and include anthropogenic and secondary natural carbon that vary seasonally and spatially.

Response: ADEQ has included daily time series for those Class I areas with elevated OC and included information in Sections 7.4, 7.5, and 7.6.2 regarding fires that coincide with the elevated readings.

Chapter 8 – Emissions Inventory

(6) Comment: Please address explicitly the assumptions used in the Western Regional Air Partnership (WRAP) 2018 PRP18b emissions inventory for Arizona's BART sources and compare those modeling assumptions to the final emissions limits for sulfur dioxide (SO_2) and nitrogen oxides (NO_X) 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.

Response: ADEQ has reviewed the WRAP 2018 PRP18b emission inventory and is unable to accurately attribute facility emissions on a unit-specific basis. In this regard, ADEQ is unable to compare the modeling assumptions between WRAP's inventory and the BART limits that are proposed at this time.

(7) Comment: The emissions table (Table 8.1) indicates that total SO_2 emissions from point sources will decrease by 2018; however, SO_2 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_4) will increase at several Class I areas.

Response: ADEQ has researched the matter regarding copper smelters and has determined that the projected emission increase of 13,273 tons per year from the 2 smelters is erroneous. The discrepancy is a result of the fact that the baseline emission inventory was based on actual emissions from the 2 facilities and the 2018 inventory considered the facility wide emission limits for the 2 smelters based on state law. The Department expects that the actual 2018 inventory will show a decrease in emissions from the baseline years in part because of potential sulfur dioxide emission control upgrades that may be necessary at the 2 facilities to comply with the new 1-hour $S0_2$ primary standard.

The emissions inventories in the SIP (Chapter 8) are plan02d and PRP18b. The Particulate Matter Source Apportionment Technology (PSAT) results were modeled by WRAP using plan02c and base18b emissions inventories and WRAP did not re-model using the current inventories (plan02d and PRP18b). The base18b inventory shows an increase in SO_2 emissions from Arizona point sources. The PRP18b inventory shows a decrease in SO_2 from point sources in Arizona. ADEQ expects that if the PSAT model was run using the current inventory (PRP18b), there would be reduced contribution to SO_4 from point sources.

(8) Comment: Table 8.2 indicates that NO_X emissions from point sources will not change between 2002 and 2018. Is this consistent with ADEQ's final BART determinations?

Response: ADEQ does not have any information to prove that the WRAP analysis is incorrect. It should be noted that using the BART limits to compare against the actual emissions from 2002 does not reflect that

companies will be operating below the determined BART limits and therefore the decrease in NOx could larger than what was projected in the PRP18b inventory.

(9) Comment: 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). Emissions of VOCs and POA are held constant for natural fire and biogenic sources, but are projected to increase for anthropogenic point and area sources and dust. Does ADEQ agree with the WRAP emissions projections for 2018 for road dust, fugitive dust, windblown dust, and area sources?

Response: ADEQ agrees with the emissions projections developed by WRAP; they are representative of the best data and information available. Western states consented with and invested time, money, and effort into the technical work conducted by WRAP. ADEQ has no other information that contradicts the work conducted by WRAP.

(10) Comment: It is difficult to interpret the emissions inventories because Arizona has elected to submit a plan under 51.308, yet the reductions anticipated in the PRP 18b inventory represent anticipated to meet milestone required under the original 51.309 submittal. (sic) ADEQ must reconcile the inventory differences between original milestone reductions under 51.309 and those that would be realized as a result of SO_2 BART reductions now required under the 51.308 portion of the Regional Haze Rule.

Response: The PRP18b emissions inventory is a projection of 2018 emissions using states' final BART determinations or a state's best estimate of BART in addition to controls that were on-the-books and on-the-way by December 2008. The PRP18b was a separate effort from the emissions inventory that was conducted by those states participating in the original 309 program and submitting revised 309 SIPs; however, both emissions inventories were developed using the same source data and information. The PRP18b emissions inventory utilized presumptive BART for Arizona sources. See response to comment six for reconciliation regarding SO_2 emissions inventory compared to BART.

(11) Comment: The statewide SO_2 emissions inventory does not comport with the PSAT modeling results. The emissions inventory shows a decrease in SO_2 emissions from Arizona, yet PSAT modeling shows increases in SO_4 at several Class I areas.

Response: The emissions inventories in the SIP (Chapter 8) are plan02d (January 2008) and PRP18b (December 2008), which are the current inventories using information that was up to date at the time the inventory was developed. The PSAT results were modeled by WRAP using the plan02c and base18b emissions inventories (December 2005) and were not re-modeled using the current inventories. The base18b inventory showed an increase in SO_2 emissions from Arizona point sources. The PRP18b inventory shows decreases in SO_2 from point sources in Arizona. ADEQ expects that if the PSAT model was run using the current inventory (PRP18b), there would be reduced contribution to SO_4 from point sources.

Chapter 9 –Visibility Modeling and Source Apportionment

(12) Comment: 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_4 and EC and less accurate for nitrate (NO_3) and OC.

Response: ADEQ has added narrative and information regarding model performance to Appendix C, Section 2. A Web link has also been provided in Chapter 9 to the *Final Report for the Western Regional Air Partnership (WRAP) 2002 Visibility Model Performance Evaluation,* which provides detailed information regarding model performance.

(13) Comment: Chapter 9 does not include a detailed discussion of the Particulate Matter Source Apportionment Technology (PSAT) or Weighted Emissions Potential (WEP) processes. WEP and PSAT use different emissions inventories, which should be clarified to aid the interpretation of visibility projections. Additional information regarding the methodologies should be included in this chapter.

Response: ADEQ has a narrative and more detailed description of the PSAT and WEP processes to Appendix C, Section 2.

(14) Comment: The SIP does not contain a performance evaluation of either prognostic meteorological model data or the base case results from the WRAP Base02d inventory used in the regional air quality models, CMAQ or CAMx. Without an understanding of model performance, we cannot conclude that the state's model is reasonably reliable nor understand inherent model nuances that can aid in our understanding of the model results.

Response: ADEQ has added a narrative and information regarding model performance to Appendix C, Section 2. A Web link has also been provided in Chapter 9 to the *Final Report for the Western Regional Air Partnership (WRAP) 2002 Visibility Model Performance Evaluation,* which provides detailed information regarding model performance.

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

Response: ADEQ understands this comment to refer to relative response factors. Additional information regarding the relative response factor has been included in Appendix C, Section 2.

(16) Comment: Soil (fine particulate matter) is projected to increase by 2018 at every Class I area and 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.

Response: ADEQ agrees with the assessment that fine particulate matter (PM) is projected to increase by 2018 at all Class I areas and organic carbon (OC) is projected to increase at the IMPROVE monitors CHIR1 (Chiricahua NM, Chiricahua WA, and Galiuro WA), SAGU1 (Saguaro NP-East Unit), and TONT1 (Superstition WA). The Weighted Emissions Potential (WEP) indicates these increases are due to area sources and sources of fugitive dust. The WEP modeling does hold natural sources constant (e.g. natural fire); however, the potential for OC from natural fire varies between 60% and 80% at all Class I areas in Arizona. ADEQ notes that WEP projections show that sources of fine PM from Mexico and New Mexico have a higher potential to contribute to fine PM at CHIR1 on worst visibility days than sources of fine PM from Arizona.

(17) Comment: 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_4 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_2 emissions from the two copper smelters (assigned to Gila County) may explain the increases in SO_4 concentrations at the Class I areas.

Response: The 2018 inventory (PRP18b) is the most current inventory developed by WRAP, which incorporates all of the controls on-the-books or on-the-way by December 2008. The 2018 inventory does not take into account the new SO_2 standard proposed by EPA and reductions associated with implementation and compliance with the new standard. The emissions inventories in the SIP (Chapter 8) are plan02d and PRP18b. The PSAT results were modeled by WRAP using the plan02c and base18b emissions inventory, which were developed in December 2005, and were not re-modeled using the current inventories. The base18b inventory showed an increase in SO_2 emissions from Arizona point sources. The PRP18b inventory shows decreases in SO_2 from point sources in Arizona. ADEQ expects that if the PSAT model was run using the current inventory (PRP18b), there would be reduced contribution to SO_4 from point sources. As explained in the Department's response to Comment #7, the projected emission increase from the 2 smelters is erroneous and that the Department expects that SO_2 emissions will decrease significantly from baseline levels as a result of the efforts of the two facilities to comply with the new 1-hour SO_2 primary standard.

(18) Comment: In some instances (e.g., page 89-90 in the October 25, 2010 draft concerning PSAT modeling for Mazatzal) the narrative incorrectly refers to SO_4 emissions when SO_2 emissions were intended.

Response: ADEQ has made the appropriate corrections.

(19) Comment: PSAT modeling shows that NO_3 concentrations due to NO_X emissions from Arizona point sources will increase by 2018. Increases in SO_4 and NO_3 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.

Response: The emissions inventories in the SIP (Chapter 8) are plan02d and PRP18b, developed in January 2008 and December 2008, respectively. The PSAT results were modeled by WRAP using the plan02c and base18b emissions inventory, which were developed in December 2005, and were not re-modeled using the current inventories. The base18b inventory showed an increase in SO_2 and NO_X emissions from Arizona point sources. The PRP18b inventory shows decreases in both SO_2 and NO_X from point sources in Arizona. ADEQ expects that if PSAT was run using the current inventory (PRP18b), there would be reduced contribution to SO_4 or NO_3 from point sources. ADEQ notes that visibility projections assume growth and new sources. Prevention of Significant Deterioration (PSD) contains a visibility component and protects against visibility impairment as sources are permitted. Emissions inventories and visibility projections are representative of the best data and modeling available.

(20) Comment: The WEP projections indicate increases in Arizona's contributions to fine and coarse PM and to organic carbon from area sources, road dust, fugitive dust, and windblown dust, which are anthropogenic sources. The WEP analyses do not support ADEQ's conclusions that PM is largely due to natural sources and therefore does not need to be considered in the reasonable progress analysis. It is recommended that ADEQ consider measures to reduce anthropogenic PM in the reasonable progress analysis.

Response: ADEQ addresses measures to reduce anthropogenic PM in the long-term strategy. The nonattainment and maintenance areas for PM_{10} in Arizona contain measures to control PM_{10} from human

activities. ADEQ addressed the anthropogenic contributions in a manner it deemed most appropriate for this SIP submission, which is a state discretionary decision.

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

Response: ADEQ has changed the incorrect reference.

Chapter 10 – Best Available Retrofit Technology (BART)

BART Exemption Criteria

(22) Comment: 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 FLMs 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 98th percentile visibility impact with the 20% best natural conditions. ADEQ is reporting 98th 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).

Response: EPA specified use of the CALPUFF model for states to use in determining the "subject-to-BART" status of eligible sources. Although recent evaluations of CALPUFF against atmospheric tracer data performed by EPA/OAQPS show that CALPUFF is the worst-performing Long Range Transport (LRT) model of the LRT models reviewed (Anderson and Brode, 2010), at the time the modeling was performed WRAP followed EPA requirement to use the model.

Part of CALPUFF's problems are related to the CALMET diagnostic wind model that produces unphysical meteorological fields. The use of upper-air observations with MM5 prognostic meteorological output in CALMET exacerbates this problem. This is one reason why EPA has developed the Mesoscale Model InterFace (MMIF) tool to directly map MM5/WRF data to CALPUFF without using CALMET and EPA/OAQPS intends to promote guidance using MMIF instead of CALMET. Thus, whether observed upper-air data are used or not should not affect the CALPUFF estimates as they would still suffer from the inaccuracies inherent in the modeling system.

Reporting impacts as Arizona has chosen to do, for the purposes of determining which sources are "subject-to-BART", is a state discretionary decision under the BART rule.

(23) Comment: Most states have followed EPA staff guidance to interpret the 98th percentile impact as either the maximum 8th highest value in any single year or the 22nd highest value for three years combined, whichever is more conservative. ADEQ used the 8th highest value averaged over three years, which is a less conservative metric. Had ADEQ used the 8th 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.

Response: The initial modeling analysis to assess BART applicability for CLC was conducted using potential to emit (PTE), as this was the information that was readily available. In its submittal, the company utilized actual emission rates based on historical stack test data. The company's modeling analysis, using actual emissions data, followed the modeling protocols that were uniformly applied to all Arizona sources and documented that the visibility impairment resulting from the facility is below the threshold of 0.5 dv. ADEQ has determined that it is not necessary to revisit the analysis.

(24) Comment: In the modeling to determine if a source is subject to BART, all emissions that are above the de minimis level should be included, even if those emissions are less than 250 tons.

Response: The BART regulations in 40 CFR Part 51 do not establish these criteria. As specified in 40 CFR Part 51 Appendix Y Section I.F, the BART guidance codified in the Appendix is intended to serve as guidance for fossil-fuel fired plants with a capacity in excess of 750 MW. The guidance discusses how states may not establish de minimis levels lower than the applicable PSD significant thresholds. ADEQ's position is that the guideline applies exclusively to the fossil fuel plants referenced above. In that regard, the Department has determined that there is no established regulatory de minimis threshold other than 250 tons per year for sources that do not belong to the fossil fuel category and consequently, has processed BART modeling documents and BART proposals consistent with that determination.

(25) Comment: The Forest Service concurs with comments provided by the Department of Interior on Arizona's BART exclusion process. Specifically, the WRAP developed CALMET meteorological fields using a nonstandard method that did not require the incorporation of upper atmospheric data. Additionally, previous EPA testing of CALPUFF Version 6.112, utilized by WRAP for its initial CALPUFF modeling, indicated several issues with default technical options that could bias model estimates low. The FLMs have typically only agreed to such an approach for CALPUFF modeling if the states use either the maximum visibility impact with the annual average natural condition or the 98th percentile impact with 20% best natural condition. In this SIP, Arizona has used the 98th percentile impact with the annual average natural condition. We require that sources that were determined to not be subject-to-BART be re-evaluated using the more rigorous criteria using the approach described above.

Response: See response to comment 22.

Ammonia Modeling Assumptions

(26) Comment: The FLMs (NPS) 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 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 CH2MHill for Arizona Electric Power Cooperative's Apache Generating Station. We recommend that the same levels be used for Comanche and Cholla Generating Stations.

Response: ADEQ is not aware of any recent ammonia monitoring conducted in the area around either Coronado or Cholla Generating Stations that would support higher background ammonia inputs. In addition, NPS has not provided any specific details regarding any such monitoring as part of their comments. In the absence of such information, ADEQ has determined that the modeling assumptions that were made by the sources are appropriate.

BART Costs and Benefit Analyses

(27) Comment: The FLMS and NPS 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_x emissions and have overestimated the costs of SCR installation and operation. Although there are several methods for estimating SCR costs, our experience leads us to believe that no one method is perfect and that the costing methods need to be tempered by real-world data. Both OAQPS and EPA Region 8 have advised against the use of CUECost. Instead, the BART Guidelines recommend use of the OAQPS Control Cost Manual. We believe it is not appropriate to use the CUECost model, nor is it appropriate to escalate costs into the future and compare them against current cost thresholds.

Response: ADEQ has determined that the cost computations presented by the facilities in support of their BART applications are reasonable. Many of the computations are based on vendor data and site-specific conditions. The Department does not agree that the computations over-estimate the costs of retrofit technologies and under-estimate the associated emission decreases and visibility improvement.

(28) Comment: Please clarify how the costs were factored into the BART determinations. At the public stakeholder meeting on October 19, ADEQ 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_x burners, existing PM and SO_2 controls) even when more effective controls were identified in the $1500-2000 range.

Response: The BART regulations codified under 40 CFR 51 Appendix Y reference the dollar per ton ($/ton) metric and specify its use in the BART evaluation process. ADEQ used both the dollar per deciview ($/dv) and $/ton metrics in its BART analyses. Using the $/ton metric solely would render the analysis to be a technology determination process like what is involved in the PSD/BACT determination. Since the goal of the regional haze program is to identify cost-effective technology solutions to address visibility degradation, the Department considers the $/dv metric to be an important step in the decision-making process. It should be noted that the Department does not use a "bright-line" threshold while evaluating $/ton or $/dv values.

It should also be noted that BART determinations were based on all BART factors specified in 40 CFR Part 51 taken together, not just costs

(29) Comment: ADEQ presents the visibility benefit in $/dv for only 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. The BART Guidelines represent an attempt to create a workable approach to estimating visibility impairment. As such, they require several assumptions, simplifications, and shortcuts about when visibility is impaired in a Class I area, and how much impairment is occurring. The Guidelines do not attempt to address the geographic extent of the impairment, but assume that all Class I areas are created equal, and that there is no difference between widespread impacts in a large Class I area and isolated impacts in a small Class I area. To address the problem of geographic extent, we have been looking at the cumulative impacts of a source on all Class I areas affected, as well as the cumulative benefits from reducing emissions. While there are certainly more sophisticated approaches to this problem, we believe that this is the most practical, especially when considering the modeling techniques and information available. Please report the benefits of controls at all Class I areas, not just the benefit at the Class I area with maximum impact. (Comment received from FLMs and NPS.)

Response: ADEQ did not compute or consider cumulative dollar per deciview values in its evaluation. Maximum visibility impacts from a facility could be at different locations, under different meteorological

conditions, and at different times within multiple Class I areas; adding up visibility improvements across the board would result in an erroneous depiction of the visibility improvement that can be expected.

(30) Comment: Please provide a summary of the BART controls and expected emission reductions in Chapter 10 in addition to Appendix D.

Response: Chapter 10 includes information regarding the BART process and the results of that process. ADEQ has made direct references to the summary provided in the introduction of the BART documentation allowing direct access to the more detailed analyses for each facility that directly follows.

BART Recommendations

Arizona Electric Power Cooperative (AEPCO) – Apache Generating Station Units 2 and 3

(31) Comment: For NO_X, the FLMs and NPS recommend SCR for Apache Units 2 and 3 rather than Low NO_X 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_X emissions rate of 0.05 lb/mmBtu.

Response: ADEQ respectfully disagrees with the recommended BART strategy. ADEQ conducted its 7-step BART analysis incorporating the 5-step process referenced in 40 CFR Part 51, using the best available information. As mentioned in the Department's responses to other comments, the agency's position is that dollar per ton cannot be considered as the sole metric in a BART evaluation. The BART process is not an emission reduction technology evaluation but is a program designed to address regional haze and therefore must also consider the costs relative to the expected visibility improvement. ADEQ is retaining its BART decision.

(32) Comment: For SO_2, the FLMs and NPS recommend that ADEQ require the existing scrubbers to achieve at least 90% SO_2 removal with an annual average SO_2 emissions limit not to exceed 0.12 lb/mmBtu. The FLMs and NPS concur with ADEQ's BART determination for PM.

Response: ADEQ acknowledges the comment for the PM BART, but respectfully disagrees with the recommended BART strategy for SO_2. ADEQ conducted its 7-step BART analysis incorporating the 5-step process referenced in 40 CFR Part 51, using the best available information and is retaining its BART decision. Additionally, the Department has determined that the emission limits are appropriate in the pounds per million Btu form. The emission rates used in the visibility modeling correspond to specific pound per million Btu values and those values have been determined to be the BART limit, and will ensure that the modeling assumptions are truly enforceable.

Arizona Public Service Cholla Units 2, 3, and 4

(33) Comment: For NO_X, the FLMs and NPS recommend SCR for Cholla Units 2, 3, and 4 rather than Low NO_X 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_X emissions rate of 0.05 lb/mmBtu.

Response: ADEQ respectfully disagrees with the recommended BART strategy. The Department conducted its 7-step BART analysis incorporating the 5-step process referenced in 40 CFR Part 51, using the best available information. As mentioned in the Department's responses to other comments, the agency's position is that dollar per ton cannot be considered as the sole metric in a BART evaluation. The BART

process is not an emission reduction technology evaluation but is a program designed to address regional haze and therefore must also consider the costs relative to the expected visibility improvement.

(34) Comment: For SO_2, the FLMs and NPS recommend that ADEQ require the existing scrubbers to achieve at least 90% SO_2 removal with an annual average SO_2 emissions limit not to exceed 0.12 lb/mmBtu. The FLMs and NPS concur with ADEQ's BART determination for PM.

Response: ADEQ acknowledges the comment for PM BART. The Department respectfully disagrees with the recommended BART strategy for sulfur dioxide. The Department conducted its BART analysis based on the 5-step process referenced in 40 CFR Part 51 using best available information. The Department is retaining its BART decision. Additionally, the Department has determined that the emission limits are appropriate in the pounds per million Btu form. The emission rates used in the visibility modeling correspond to specific pound per million Btu values and those values have been determined to be the BART limit, and will ensure that the modeling assumptions are truly enforceable.

Salt River Project (SRP) Coronado Generating Station (CGS) Units 1 and 2

(35) Comment: 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.

Response: See response to comment 26.

(36) Comment: For NO_X, FLMs and NPS concur with ADEQ's estimated $1,021/ton for combustion controls plus SCR. It is likely the corrected visibility benefits would support SCR as BART.

Response: ADEQ respectfully disagrees with the recommended BART strategy. The Department conducted its 7-step BART analysis incorporating the 5-step process referenced in 40 CFR Part 51, using the best available information. The BART process is not an emission reduction technology evaluation but is a program designed to address regional haze and therefore must also consider the costs relative to the expected visibility improvement. ADEQ has determined the visibility modeling was done appropriately and is retaining its BART decision.

(37) Comment: For SO_2, the FLMs and NPS concur with Wet Flue Gas Desulfurization for both units with an associated SO_2 emission rate of 0.08 lbs/MMBtu on 30-day rolling average basis.

Response: ADEQ acknowledges the comment.

(38) Comment: 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" and "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. The FLMs and NPS recommend the BART determination for Coronado be re-evaluated.

Response: PM emissions from both units are currently controlled with hot-side ESPs. Salt River Project (SRP) proposed a filterable PM/PM_{10} BART limit of 0.03 lb/MMBtu, achieved using ESP, as BART for CGS. This proposal was based on a Prevention of Significant Deterioration Best Available Control

Technology analysis that was performed for Unit 2 at CGS as part of the significant revision application that was submitted in 2008. The analysis demonstrated that the replacement of the existing ESP with a new fabric filter baghouse was not cost effective.

Since the use of ESPs was determined to be BACT for Unit 2 at CGS as part of a recent PSD permitting process, this technology and the associated BACT limit of 0.03 lb/MMBtu for filterable PM/PM_{10} constitutes BART for both units at CGS. ADEQ notes this finding is consistent with EPA BART guidance in 40 CFR Part 51, Appendix Y.

Catalyst Paper (Snowflake) Inc. (CPSI) (formerly Abitibi)

(39) Comment: The NO_X emissions rate evaluated for control measures and proposed by ADEQ as BART is twice as high as the uncontrolled NO_X 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_X is unacceptable and needs to be redone. The BART analysis for SO_2 is flawed with unsupported costs and underestimated benefits. The BART analysis for SO_2 is unacceptable and needs to be redone.

Response: ADEQ is revisiting the analysis conducted by CPSI and will respond to the above comment in a subsequent addendum to this plan submittal. Based on the threshold visibility impact from the facility, the revised analysis may not change the BART outcome for the facility.

Arizona Public Service (APS) West Phoenix

(40) Comment: 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.

Response: The documents were posted to ADEQ's Web site on January 6, 2011 at the following location: http://www.azdeq.gov/environ/air/haze/download/apswp1.pdf

Arizona Portland Cement Company

(41) Comment: 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.

Response: ADEQ disagrees. The exemption criteria were correctly applied. Kiln 4 was determined to be BART-eligible, but not subject-to-BART. The visibility impacts evaluation was made following appropriate protocols that were uniformly applied to all Arizona sources. The Department's determination is that APCC facility is not subject-to-BART based on the visibility impacts from the facility's operation being below the threshold of 0.5 dv.

Chemical Lime Company – Nelson Lime Plant

(42) Comment: 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 in 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. The FLMs and NPS conclude that the Chemical Lime Company – Nelson Lime Plant is subject to BART.

Response: The documents were posted to ADEQ's Web site on January 6, 2011 at the following location: http://www.azdeq.gov/environ/air/haze/download/clcnelson1.pdf

(43) Comment: 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.

Response: CLC did account for particulate matter in its modeling to document that its BART-eligible units do not contribute to visibility impairment above the threshold of 0.5 dv. The 154 tons per year referenced in the comment was information submitted to WRAP by ADEQ for the initial modeling of the facility. The company used PM emission rates based on source-test data. The revised dispersion modeling was conducted in accordance with the modeling protocols that were uniformly applied to all Arizona sources.

Tucson Electric Power (TEP) – Irvington Generating Station

(44) Comment: 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.

Response: Neither EPA rules in 40 CFR Part 51 nor BART guidance documents require a source to have gone through NSR to be exempt from BART eligibility. ADEQ's determination is that Unit I4 was reconstructed after August 7, 1977, and therefore is not "BART-eligible".

ASARCO Hayden Smelter

(45) Comment: The FLMs and NPS 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_2. The FLMs and NPS disagree with exempting the PM_{10} emissions from BART; in the BART guidelines the PM_{10} level for exemption is 15 tons per year (tpy), not 250 tpy.

Response: ADEQ acknowledges the comment about SO_2 BART. With regard to the comment about PM emissions, please refer to ADEQ's response to comment 24.

Freeport-McMoRan Miami Smelter

(46) Comment: The FLMs and NPS 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_2. The FLMs and NPS also agree that the NESHAP for Primary Copper Smelting constitutes BART for PM.

Response: ADEQ acknowledges the comment.

General Comments Regarding the Steps in ADEQ's BART Analysis

(47) Comment: ADEQ has assumed that 24-hour and 30-day rolling average SCR emissions would be the same as the corresponding annual average emission rate. However, the FLMs and NPS looked at monthly data for 28 EGUs with SCRs operating at or below 0.05 lb/mmBtu on an annual average (see Appendix 2009 monthly emissions) and found that, of the 228 months of data, 214 were at or below 0.06 lb/mmBtu. For tangentially-fired EGUs, we found that 84 of 89 were at or below 0.06 lb/mmBtu. The FLMs and NPS conclude that SCR can achieve 0.05 lb/mmBtu on an annual basis and 0.06 lb/mmBtu on a 30-day rolling average basis.

Response: ADEQ's BART evaluations were based on site-specific information provided by the applicants. It is the Department's understanding that such information was based partially on feedback received from vendors and plant personnel who are intimately familiar with the specific equipment that is being considered. In that regard, the Department based its BART computations on the emission rates proposed by the applicant for the different control technology options.

(48) Comment: ADEQ has stated that SNCR and SCR installation could impact the salability and disposal of fly ash due to ammonia levels. Other environmental impacts involve the potential public and employee safety hazard associated with the storage of ammonia, especially anhydrous ammonia, and the transportation of the ammonia to the power plant site. The FLMS and NPS disagree with this statement. According to the Institute for Clean Air Companies, ammonia can be handled safely. FLMs and NPS discussions with SNCR vendors indicate that the concern about ash salability is likely unfounded.

Response: ADEQ agrees that ammonia can be transported safely but acknowledges there is added risk in its transport and handling. Based on the comment regarding the fly ash salability, the Department is revisiting this issue for Catalyst Paper which is the only Arizona facility that made the claim.

General BART Comments

(49) Comment: For NO_X on AEPCO's ST2 and ST3, ADEQ has determined that BART is the new low-NO_X burners (LNB) with overfire air (OFA) system with a NOx emission limit of 0.31 lb/MMBtu for both ST2 and ST3. AEPCO would like to clarify that new LNBs would be installed, but the fully functional, existing OFA would be utilized.

Response: ADEQ appreciates AEPCO's clarification and has made the appropriate changes to the BART TSD.

(50) Comment: In response to a concern brought to our attention by ADEQ, AEPCO offers the following explanation: the AEPCO ST1 PM_{10} emission limit 0.0015 lb/MMBtu listed for fuel oil combustion anticipated the installation of LNB. The PM_{10} emission limit of 0.0076 lb/MMBtu listed for pipeline natural gas (PNG) combustion assumes good combustion practices without LNB.

Response: ADEQ acknowledges the comment. Based on subsequent communication with AEPCO personnel, ADEQ is eliminating fuel oil as a fuel choice for Steam Turbine 1 and will limit the fuel to natural gas.

(51) Comment: For NO_X on AEPCO's ST1, ADEQ has determined that BART is the installation of LNB with flue gas recirculation with an emissions limit of 0.056 lb/MMBtu. Since the normal operation of this

unit is combined cycle with gas turbine 1 (GT1), AEPCO would like to propose combustion with PNG only, in combined cycle operation with all exhaust gas from GT1 recirculated into ST1 (the combined cycle operating configuration represents FGR), and installation of LNB as BART.

Response: ADEQ acknowledges the comment. Based on subsequent communication with AEPCO personnel, ADEQ is eliminating fuel oil as a fuel choice for Steam Turbine 1 and will limit the fuel to natural gas.

(52) Comment: APS supports the conclusions made in the proposed SIP and believes that all of the requirements of 40 CFR 51.308 have been satisfied.

Response: ADEQ acknowledges the comment.

(53) Comment: *Train v. Natural Resources Defense Council*, 421 U.S. 60(1975) and court decisions in the 35 years following have consistently upheld the fundamental premise that EPA may not tell the states what specific controls to include in their SIPs; this a function reserved exclusively to the states.

Response: ADEQ acknowledges the comment.

(54) Comment: ADEQ's BART determination for Cholla is consistent wit the Clean Air Act and the BART rules. EPA cannot substitute its BART preferences for Cholla in lieu of ADEQ's determination. Under the CAA, the states have primary responsibility for assuring air quality within their boundaries. The CAA and the BART rules similarly assign to the states the responsibility for making BART determinations. EPA cannot overrule ADEQ's determination for Cholla and substitute its own conclusion.

Response: ADEQ acknowledges the comment.

(55) Comment: APS agrees with ADEQ's determination that the Combined Cycle Units CC1, CC2, and CC3 at the West Phoenix Generating Station are not subject to BART. ADEQ informed APS on June 13, 2007, that CC1, CC2, and CC3 were potentially subject to BART for NO_X. APS reviewed ADEQ's letter and recognized that the information used in determining BART eligibility for West Phoenix was flawed and not updated. On September 30, 2007, APS submitted a letter to ADEQ detailing the flawed assumptions and errors set forth in the June 13, 2007 letter. APS committed to fix the errors and resubmit an air dispersion modeling analysis with the adjusted values. Results from the modeling analysis using the corrected values were submitted to ADEQ on October 7, 2007. ADEQ agreed with the revised visibility analysis and concluded that, because the deciview impact on the nearest Class I areas was less than 0.5 dv, West Phoenix, CC1, CC2, and CC3 Units did not cause or contribute to impairment of visibility at a Class I area. APS fully supports ADEQ's final assessment of the visibility impacts and concurs that these units are not subject to BART.

Response: ADEQ acknowledges the comment.

(56) Comment: APS supports ADEQ's BART determinations for SO_2, NO_X, and PM on Cholla Units 2, 3, and 4. It is important to note that visibility improvements resulting from all NO_X control scenarios are less than 0.5 dv. The difference between the application of NO_X combustion controls (LNB and SOFA) and the application of Selective Catalytic Reduction (SCR) technology is a visibility improvement of only 0.2 dv. The cost of SCR is eight to ten times the cost of LNB and SOFA – for a 0.2 dv improvement. APS agrees that the added cost of retrofitting Cholla Steam Units 2, 3, and 4 with SCR, for a 0.2 dv improvement, is not

justified. Therefore, APS agrees with ADEQ's decision to establish NO_X BART for Cholla Steam Unit 2, 3, and 4 as LNB and SOFA.

Response: ADEQ acknowledges the comment.

(57) Comment: ADEQ should recognize current discussions involving changes to the CALPUFF model that ADEQ used to assess the visibility impacts of its proposed BART determination. Recent developments shows that the version of CALPUFF used by ADEQ in its SIP process (Version 5.8) over-predicts the contribution of nitrate formation in colder months and the newer version of the model (Version 6.4) corrects this issue.

Response: ADEQ acknowledges APS's input regarding the matter. In light of the determination that the CALPUFF version used in the modeling analysis over-predicts nitrate formation and consequently likely overstates the associated visibility degradation, the Department is taking the conservative position of using the prior modeling results.

(58) Comment: SRP agrees with ADEQ's proposed BART emission limits for CGS. In addition, SRP supports the approach taken by ADEQ in developing the BART emissions limits proposed in the SIP for stationary sources. In the case of nitrogen oxide emissions from CGS, this approach recognizes that a BART emission limit that requires the implementation of Selective Catalytic Reduction (SCR) cannot be justified due to the significantly higher cost of this technology and the small visibility improvements that is expected to be achieved. In addition, ADEQ properly recognizes that the "reasonable progress" provisions of the Federal Regional Haze Rule will allow additional opportunities to evaluate whether still more NO_X emissions reductions are needed in future periods to meet the long-term program goals.

Response: ADEQ acknowledges the comment.

(59) Comment: SRP strongly encourages ADEQ to reject any comment received during this comment period that advocates for the installation of the most stringent control available as BART without an appropriate technical and/or regulatory basis. As noted in the Federal Regional Haze Rule, states have broad discretion in establishing BART for stationary sources using an approach that the state deems to be most appropriate. Under the Clean Air Act, states are given the primary responsibility for assuring air quality within their boundaries (42 U.S.C. 7407(a)). Similarly, the Clean Air Act and BART rules assign to the states the responsibility for making BART determinations and "designing and implementing regional haze programs." EPA acknowledged the states' roles when it promulgated the BART rules: "Congress evinced a special concern when ensuring that states would be the decision makers" with respect to "which sources are subject to BART" or "how States make BART determinations." EPA also conceded that it cannot prescribe "specific control measures a state must implement in its initial SIP for regional haze. That determination can only be made by a state once it has conducted the necessary technical analysis of emission, air quality, and the other factors that go into determining BART." In light of this clear guidance, and because ADEQ's proposed Regional Haze SIP is consistent with the BART rules, ADEQ should reject any suggestions of an alternate BART determination for CGS.

Response: ADEQ acknowledges the comment.

(60) Comment: SRP notes that the version of CALPUFF that was used to evaluate visibility improvement attributable to BART has been updated. SRP agrees with the assessment made by other sources that the updated model provides for more accurate treatment of nitrate chemistry. SRP encourages ADEQ to adopt

and use the most up-to-date version of the CALPUFF model in future modeling conducted to support regional haze planning. It is critical for states, as well as EPA and the Federal Land Managers, to make planning decisions using those tools demonstrated to provide the most accurate information. It is clear that CALPUFF model development has advanced, and it is logical to expect additional enhancements as modelers continue to apply the model in various applications. It is important for ADEQ to follow such modeling advancements and adopt those changes that enhance the quality of SIP development efforts.
Response: ADEQ acknowledges SRP's input regarding the matter. In light of the determination that the CALPUFF version used in the modeling analysis over-predicts nitrate formation and consequently likely overstates the associated visibility degradation, the Department is taking the conservative position of using the prior modeling results.

(61) Comment: SRP would like to propose to revise what appears to be a typographical error in the proposed SIP. In Section XIV of Appendix D, Table 3, baseline NO_X emissions from both Units 1 and 2 at CGS are listed as 0.433 lb/MMBtu. Baseline NO_X emissions from Unit 2 should be 0.466 lb/MMBtu. SRP believes that the modeling results presented in the appendix are based on the correct baseline emission rate of 0.466 lb/MMBtu from Unit 2, and that the reference to 0.433 lb/MMBtu is simply a typographical error.

Response: ADEQ has made the appropriate corrections.

(62) Comment: So long as all five BART factors are considered, the Regional Haze Rule allows Arizona to compare tradeoffs between the benefits and costs associated with various control technology alternatives in setting BART requirements, and gives Arizona "great leeway to make the BART determinations required by the Clean Air Act." *Am. Corn Growers Ass'n v. EPA*, 2901 F.3d 1, 21 (D.C. Cir. 2002).

Response: ADEQ acknowledges the comment.

(63) Comment: Some of the controls that Arizona proposes to require as BART do not represent cost-effective control options. Arizona should clarify that the $160,747 per ton cost for the fabric filter at Cholla Generating Station does not represent a cost-effective BART control option, since it would be unreasonable to impose such a high cost on sources that have not already decided to install the controls for other reasons. As an alternative, Arizona could consider planned controls as part of the baseline for considering other control options, given that the controls will be installed regardless of the outcome of the BART analysis. Arizona could also simply omit the cost-effectiveness calculation altogether where the source does not seek to rule out a control option on the basis of cost-effectiveness, similar to the approach taken for controls that have already been installed (e.g., the scrubbers at the Cholla Generating Station).

Response: ADEQ agrees with the comment. Language has been added to the technical support document to clarify that the $160,747 per ton value would not be considered a cost-effective number in a BART evaluation.

(64) Comment: Peabody supports Arizona's proposed Long Term Strategy in that it provides an appropriate means for developing additional information that will help the state determine whether additional controls may be imposed on non-BART eligible sources. Even though the availability of additional controls, and the benefits associated with those controls, cannot be determined at this time, Arizona's commitment to researching additional control opportunities will help ensure that Arizona not only meets but exceeds its established RPGs. As noted in the proposed Regional Haze SIP, additional control alternatives that Arizona expects to identify in the next few years will help achieve even greater emission reductions and greater visibility improvements than currently expected. Such a holistic review of the potential control options fully

complies with the requirement to develop state-wide strategies to address regional haze and update the SIP as needed to ensure all reasonable control options are considered and implemented as appropriate.

Response: ADEQ acknowledges the comment.

(65) Comment: BART determinations should identify the compliance methods or the averaging times for proposed control limits. EPA recommends the use of continuous emissions monitors for NO_X and SO_2, and no longer than a 30-day rolling average for an emission limit.

Response: ADEQ agrees with the comment and language has been added regarding the compliance and averaging methods.

(66) Comment: To determine the feasibility of emission controls, the analysis must rely on dollars per ton ($/ton) as the primary metric for a BART determination. Dollars per deciview ($/dv) may be used as a supplementary metric; however, the $/dv metric should be applied to visibility improvement in all Class I areas within a 300 km radius of the source.

Response: The BART regulations codified under 40 CFR 51 Appendix Y reference the dollar per ton ($/ton) metric in the BART evaluation process. ADEQ used both the dollar per deciview ($/dv) and $/ton metrics in its BART analyses. In addition, the Department also gave consideration to the threshold visibility impact from the emission units with current controls and the incremental deciview impact from retrofitting with other controls. Using the $/ton metric solely would render the analysis to be a technology determination process like what is involved in the PSD/BACT determination. Since the goal of the regional haze program is to identify cost-effective technology solutions to address visibility degradation, the Department considers the $/dv metric to be an important step in the decision-making process. ADEQ did not compute or consider cumulative dollar per deciview values in its evaluation. Maximum visibility impacts from a facility could be at different locations, under different meteorological conditions, and at different times within multiple Class I areas; adding up visibility improvements across the board would result in an erroneous depiction of the visibility improvement that can be expected.

(67) Comment: The analysis must clearly state how each factor is weighted in arriving at the conclusion on BART. For example, both $/ton and $/dv appear reasonable for the most stringent control at AEPCO (Units 2 and 3) and at APS Cholla (Units 2, 3, and 4), but lesser controls were selected as BART.

Response: ADEQ disagrees with the premise that the relative weights of the different factors being considered need to be justified to substantiate the BART technology and associated emission limit that is being chosen. As stated in the Department's response to comment 67, the Department's 7-step process incorporated the EPA recommended 5-factors and evaluated figures for dollar per ton, dollar per deciview, and incremental visibility improvement to make its BART determinations. The Department did not apply any pre-determined weighting for these factors. The general concept driving the decision-making process was to identify cost-effective control strategies that would meaningfully contribute to visibility improvement at the Class I areas.

For AEPCO Units 2 and 3 and APS Cholla Units 2, 3, and 4, the Department evaluated all BART factors and determined that low-NO_X burners with over-fired air constitute BART. ADEQ did not solely rely on $/ton and $/dv, but considered all of the factors together. It should be noted that the determination of whether or not a cost metric is reasonable is a discretionary state decision and will likely vary from state to state.

(68) Comment: In analyzing sources that burn various coal types with different levels of SO_2, an efficiency limit is a more effective control. EPA suggests ADEQ provide an efficiency limit.

Response: ADEQ has determined that the emission limits are appropriate in the pounds per million Btu form. The emission rates used in the visibility modeling correspond to specific pound per million Btu values and those values have been determined to be the BART limit, and they will ensure that the modeling assumptions are truly enforceable.

(69) Comment: The analysis of the two smelters should clarify the fugitive emissions numbers, fugitive emission control techniques, and the basis for the SO_2 BART decision.

Response: ADEQ has provided a brief discussion about the emission capture techniques at the two smelters below:

ASARCO

ASARCO Hayden smelter operates the following control technologies on the equipment subject-to-BART:

Emissions Units Subject-to-BART	Current Control
Flash furnace, converter process gases	Primary capture system, double contact acid plant
Captured fugitive emissions (converter secondary hood, flash furnace, slag tapping & matte tapping hoods) and dryers	Secondary capture system, baghouse

ASARCO has implemented a number of changes to the company's process and control equipment over time. Prior to 1971, all smelting operation process gases from the facility were emitted into the atmosphere after electrostatic precipitators removed the particulate matter from the gases. In 1971, ASARCO installed an acid plant as an SO_2 control for primary converter gases to reduce SO_2 emissions from the facility. In 1983, ASARCO replaced twelve multiple-hearth roasters and two reverberatory furnaces with an INCO Flash smelting furnace. At the same time, ASARCO installed a 650 ton per day oxygen plant that would enrich the smelting process gases. Based upon this addition, the company was able to replace the existing single contact acid plant with a new double-contact acid plant. The emissions reductions resulting from these projects were estimated to be 63,584 tons per year of SO_2. According to ASARCO's calculations, the double-absorption acid plant recovers 99.81 percent of the SO_2 emissions that are vented to it. In 1992, ASARCO made a modification to the smelter's existing gas handling system, and installed a wet gas handling system. This modification decreased the flash furnace off gas temperature by 400° F. Due to the lower temperatures, the volume of gas being vented from the flash furnace was reduced, enabling the converters to vent additional gases to the acid plant. This additional ventilation allowed the secondary hoods to capture more SO_2 emissions from the converter building. In 1999/2000, ASARCO redesigned the converter primary hood doors and installed flexible seals to minimize the escape of fugitive emissions to the secondary hooding system.

SO_2 emissions based on 2006 permit renewal application are as below:

Emission unit/activity	SO_2 Emissions, tpy
Main stack (Flash furnace, converter primary, Acid Plant)	397
Annulus stack (Converter secondary hood, flash furnace, slag tapping & matte tapping hoods, and dryers)	15,164

Emission unit/activity	SO_2 Emissions, tpy
Flash furnace fugitives	1,078
Converter fugitives	2,257

In anticipation of the new 1-hour SO_2 primary National Ambient Air Quality Standards (NAAQS), the company continues to evaluate additional SO_2 capture and control options.

FMMI

Current Air Pollution Control Equipment for Equipment subject-to-BART at the FMMI Smelter is listed in the table below:

Emissions Units Subject-to-BART	Current Control
Electric Furnace (Process Gases)	Acid plant tail gas system
Electric Furnace (Captured Fugitive Emissions)	Wet scrubber and wet electrostatic precipitator
Hoboken Converters (Process Gases)	Acid plant tail gas system
Hoboken Converters (Fugitive Emissions)	Copper converter capture system
Remelt/Mold Pouring Vessel (similar to Anode Vessel)	Natural gas and steam injection

The FMMI smelter is a major source of Hazardous Air Pollutants (HAPs), and is therefore subject to the requirements of 40 CFR 63 Subpart QQQ, National Emissions Standards for Hazardous Air Pollutants (NESHAP) for Primary Copper Smelting. The NESHAP identifies several operating and maintenance practices that will have the effect of optimal capture of emissions released and as applicable, optimal performance of control technologies to minimize emissions released to the atmosphere. In anticipation of the new 1-hour SO_2 primary National Ambient Air Quality Standards (NAAQS), the company continues to evaluate additional SO_2 capture and control options.

SO_2 emissions based on 2010 permit renewal application are listed in the table below:

Emission Unit/Activity	SO_2 Emissions, tpy
Acid Plant tail gas stack	3,515
Vent Fume Stack	1,336
Smelter fugitives	5,517

Chapter 11 – Reasonable Progress Determination

(70) Comment: The eleven step analysis undertaken by Arizona to determine appropriate and attainable Reasonable Progress Goals (RPGs) for the 2008 to 2018 planning period comports with discretion Arizona is granted in the statute. Although the RPGs established provide for a slower rate of visibility improvement than a mathematically-calculated Uniform Rate of Progress (URP), the RPGs are realistic and properly take into account both the significant reductions expected in Arizona's anthropogenic emissions and the challenges associated with natural or international emission sources that Arizona cannot control. Point sources in Mexico, the highest source of SO2 in the region, are expected to increase by 150,000 tons per year (tpy) by 2018.

Arizona's decision to take a pragmatic, realistic approach to establishing attainable goals for visibility improvements in spite of these challenges is commendable. Despite the inability to regulate natural emissions sources or emissions sources in other jurisdictions, Arizona's Regional Haze SIP will ensure meaningful visibility improvements at many Class I areas as a result of emissions reductions, primarily from motor vehicles and stationary sources. Arizona's plan also comports with EPA regulations and guidance by following the four-factor structure for determining whether even greater visibility improvements are possible with additional control requirements. Arizona's commitment to continue investigating possible emissions control technologies before the next SIP revision will help ensure continued progress toward the natural visibility conditions goal. Arizona's proposed Regional Haze SIP represents an appropriate exercise of its discretion to establish RPGs by balancing the benefits of improved visibility with the cost of regulation, considering all information currently available.

Response: ADEQ acknowledges the comment.

Degradation on Best Days

(71) Comment: 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.

Response: Section 308(d)(1) of the Regional Haze Rule requires that states ensure no degradation in visibility for the least impaired days. Visibility projections however, show degradation at two IMPROVE monitors, CHIR1 and SAGU1. The degradation at CHIR1 and SAGU1 amounts to 0.03 dv and 0.1 dv, respectively, above the projected visibility conditions on best days in 2018. According to established literature, the change in deciview that is perceptible to the human eye is 0.5 dv. Even though the amount of degradation is very small, ADEQ agrees that it needs to be addressed. The primary pollutants contributing to visibility impairment on best days at CHIR1 and SAGU1 are sulfate, organic carbon, and coarse mass. It is important to note that coarse mass deciview is not modeled for 2018 due to model performance issues.

Sulfate

PSAT modeling of sulfate at CHIR1 on best days in 2018 indicates that the Outside Domain and Mexico contribute 43% and 23.1% towards sulfate concentrations, respectively. Arizona sources are projected to contribute 15.1%. At SAGU1, the Outside Domain and Mexico are also the highest contributors at 47% and 17.9%, respectively. Arizona sources are projected to contribute 13.7% towards sulfate in 2018 on best days at SAGU1. Emissions of SO_2 from point sources in Mexico are projected to increase by approximately 150,000 tpy by 2018. CMAQ modeling projections show that SO_2 will have the highest light extinction on best days at both CHIR1 and SAGU1.

Organic Carbon

On best days, WEP analysis for 2018 shows that Arizona sources of primary organic aerosol (POA) emissions have a total potential of 77% to contribute at CHIR1 and a 95% potential to contribute at SAGU1. The primary anthropogenic source of POA emissions are area sources. The potential for area sources within Arizona to contribute to POA emissions is projected to be 7.6% and 9.5% at CHIR1 and SAGU1 in 2018, respectively, which is an increase of 2% and SAGU1 and 1.8% at CHIR1. WEP analysis also shows that the

potential for sources of natural fire to impact visibility on best days is approximately 62% and 76% at CHIR1 and SAGU1, respectively, which is a much larger potential than from area sources.

Coarse PM

The primary components of coarse PM are road dust, fugitive dust, and windblown dust. The potential for coarse PM from Arizona sources of road dust and fugitive dust in 2018 is projected to be 6% (increase of 1%) and 17% (increase of 7%), respectively, at CHIR1 on best days. The potential for Arizona sources of windblown dust to contribute to coarse PM at CHIR1 in 2018 is about 8%. It should be noted that sources of windblown dust from New Mexico have a 43% potential to contribute to coarse PM on best days at CHIR1. At SAGU1, the potential for coarse PM from Arizona sources of road dust and fugitive dust is about 20% (increase of 7%) and 89% (increase of 52%), respectively. The impact of windblown dust from Arizona sources to coarse PM at SAGU1 is about 10%. The potential to contribute to windblown dust from sources in Mexico is projected to be 11% in 2018.

Source apportionment analysis shows that global and international contribution has a significant effect on visibility on best days at CHIR1 and SAGU1. It is reasonable to assert that the increase in SO_2 from Mexico coupled with the contribution from the Outside Domain is one of the reasons why there is degradation in visibility on best days at these monitors. Another factor contributing to degradation is the impact of natural sources of organic carbon, which is approximately six times the contribution from area sources of organic carbon at CHIR1 and SAGU1. While the contribution from natural sources is large, ADEQ recognizes that the anthropogenic contribution of area sources must be addressed. The WEP analysis shows that the contribution to coarse PM at CHIR1 from Arizona sources of road dust and fugitive dust is high; however, it also shows that windblown dust from New Mexico has a greater potential to contribute to visibility impairment. It is reasonable to assert that the contribution from New Mexico has a greater effect on visibility than that from Arizona.

All of the factors mentioned above are likely the primary reasons why there is a slight degradation in visibility at CHIR1 and SAGU1. ADEQ acknowledges the anthropogenic contribution from Arizona sources and will further address these emissions from anthropogenic sources in the next planning period. Changes being considered by EPA regarding the primary standards may reduce the contribution from anthropogenic sources and have a collateral benefit to the secondary visibility standard. ADEQ expects that these changes will further reduce the impact of visibility impairing pollutants in addition to other control measures implemented by ADEQ.

(72) Comment: The plan must explain what is causing projected degradation on the best days at two Class I areas: Chiricahua/Galiuro and Saguaro East. In Saguaro East, Arizona's projected share of nitrates in 2018 is 53.57 percent. Ensuring there is no degradation on best days is a statutory requirement.

Response: See response to comment 71. ADEQ's calculation shows that Arizona's contribution to nitrate is 32.7% at SAGU1 on best days in 2018. ADEQ is unable to determine the basis for EPA's calculated percentage.

(73) Comment: 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).

Response: ADEQ acknowledges the suggestion and has decided to not include the information. The Visibility Information Exchange Web System (VIEWS) trend analysis is not capable of providing a revised deciview for 2018 projections; however, the analysis does point out that for SAGU1 and CHIR1 (the

monitors showing degradation on best days), the visibility impairment on best days shows incremental decreases between 2000 and 2008.

(74) Comment: Because Arizona will not meet the uniform rate of progress (URP) 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.

Response: ADEQ has calculated revised URPs using the RPGs and projected natural visibility conditions at each Class I area in Arizona. This information is included in Section 11.5 of this SIP submittal.

(75) Comment: The FLMs and NPS 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. The FLMs and NPS 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.

Response: ADEQ acknowledges the comment.

(76) Comment: The FLMs agree with ADEQ's conclusion to focus on SO_2 and NO_X emissions in the reasonable progress analysis. The FLMs disagree with ADEQ's conclusion not to consider PM and OC emissions in the reasonable progress analysis because large fractions of these emissions are from nonanthropogenic sources. ADEQ should consider what controls may be feasible to reduce anthropogenic emissions of dust, VOC, and POA from area source categories such as agricultural and construction practices and residential wood smoke.

Response: ADEQ acknowledges the suggestion. EPA rules and guidance do not specifically state which key pollutants and source categories should be selected for the four-factor analyses in the first planning period. As a result, ADEQ has not provided additional analysis.

(77) Comment: 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_4 and NO_3 at Class I areas in Arizona. The table indicates Arizona's contribution to SO_4 is 7-24% and to NO_3 is 7-53%.

Response: ADEQ has corrected the discrepancy in the percentages reported in the table.

(78) Comment: ADEQ identifies major source categories for SO_2 and NO_X emissions (Table 11.2). The FLMs and NPS 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.

Response: ADEQ did not evaluate the visibility impacts from non-BART sources as this is not a requirement under EPA rules for reasonable progress analyses. While the original draft submitted to and reviewed by the Federal Land Managers contained a statement that visibility impacts were expected to be minimal, without a more comprehensive analysis, such a statement cannot be supported and ADEQ removed it from the SIP prior to public comment.

For reasonable progress towards long-term visibility improvement goals ADEQ included its analysis of non-BART sources in Chapter 11. This analysis included all sources that had actual emissions over 40 tons per year of NO_X and SO_2. In analyzing the inventory of sources, ADEQ determined that the evaluation could be meaningfully conducted by categorizing the inventory based on the significant emission units involved. Once the sources were categorized, ADEQ analyzed the viability of add-on controls. For some categories, the Department was unable to conduct a comprehensive 4-factor analysis and elected to conduct an evaluation for the feasibility of new controls as well as analyze the broad spectrum of new regulations that will apply to the facilities. Where possible, the Department did conduct a 4-factor analysis for exploring additional controls for visibility improvement.

(79) Comment: Between the September and October drafts of the SIP provided to the FLMs, 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. The FLMs and NPS found those tables very informative and encourage ADEQ to reinstate them.

Response: ADEQ's approach to identifying specific sources and emissions that may be candidates for controls under reasonable progress has changed. As a result, the tables were no longer representative of the narrative and were removed.

(80) Comment: EC/R developed a Four-Factor Analysis Report for WRAP covering industrial boilers, cement manufacturing, lime kilns, and internal combustion engines, which are major source categories identified by ADEQ. It appears that ADEQ did not use the information provided within the report and the FLMs and NPS recommend ADEQ use this report in the reasonable progress analysis.

Response: As part of the assessment for non-BART sources, ADEQ reviewed the information in the report titled "Supplementary Information for Four Factor Analyses by WRAP States" dated May 4, 2009. In review of the document, the Department determined that the information presented was too broad, lacked critical information and could not be meaningfully adapted for the purposes of Arizona's categorical analysis. The cost computations for the various technology options appeared to be derived from a generic costing tool called AIRControlNet. Additionally, several assumptions in the EC/R report do not appear to be substantiated by specific site and vendor data. In this regard, the Department decided not to utilize the above-mentioned report for its analyses.

(81) Comment: The FLMs recommend that BART-eligible point sources that were determined not to be subject to BART should be considered for reasonable progress. ADEQ should consider a lower visibility impact threshold than 0.5 dv in a reasonable progress analysis.

Response: ADEQ does not concur with using a lower visibility threshold. EPA BART guidance uses a 0.5 dv as the visibility threshold and it is the state's authority to select the threshold used for reasonable progress. There is no rationale provided for selecting a lower threshold. Using a lower visibility threshold would potentially subject non-BART sources to a more rigorous and more onerous process than sources subject-to-BART without providing visibility benefit. The changes proposed by EPA to the primary NAAQS and other regulatory changes being considered by EPA will result in enforceable reductions that will likely contribute to visibility improvements.

(82) Comment: The FLMs recommend that ADEQ review the reasonable progress analysis completed by Colorado as an example of a strong analysis of potential emissions control costs and benefits.

Response: ADEQ acknowledges the comment.

(83) Comment: 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. ADEQ should make a more binding commitment to emissions controls to be defined within the next five years and implemented by 2018.

Response: The efficacy of current control measures are under continuing review for the purposes of ongoing planning as well as planning for areas within Arizona recently classified as nonattainment for PM. Non-BART sources will most likely be controlled at or beyond the expectations of current NO_X, PM, and SO_X measures based on current and future revisions to the NAAQS for 8-hour ozone (lower standard to be announced June 2011); SO_2 (new standard announced June 2010); NO_2 (new standard announced January 2010); secondary NO_2 and SO_2 (new standard proposed July 2011); and PM (new standard proposed February 2011). All of these revised standards have implementation and attainment demonstration dated prior to 2018.

(84) Comment: Correction under Section 11.4.1, item 4, mobile sources are not the largest anthropogenic source of SO_2. (Comment received from FLMs and NPS.)

Response: ADEQ has corrected the error.

(85) Comment: 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.

Response: ADEQ has revised the long-term strategy in Chapter 12 to support this assertion.

(86) Comment: There is not a sufficient level of information and analysis to demonstrate whether additional controls are needed on non-BART sources in order to achieve reasonable progress. It would be helpful to know whether there are specific sources near Class I areas with emissions that may significantly affect visibility.

Response: In its analysis of non-BART sources for reasonable progress towards long-term visibility improvement goals, ADEQ included all sources that had actual emissions over 40 tons per year of NO_X and SO_2. In analyzing the inventory of sources, ADEQ determined that the evaluation could be meaningfully conducted by categorizing the inventory based on the significant emission units involved. Once the sources were categorized, ADEQ analyzed the viability of add-on controls. For some categories, the Department was unable to conduct a comprehensive 4-factor analysis and elected to conduct an evaluation for the feasibility of new controls as well as analyze the broad spectrum of new regulations that will apply to the facilities. Where possible, the Department did conduct a 4-factor analysis for exploring additional controls for visibility improvement. Due to a lack of any detailed rule requirement or additional information in guidance outlining a procedure for analyzing the visibility impact of non-BART sources, a review of these sources will be conducted along with the adequacy of the entire plan as required by 40 CFR 51.308(h). This adequacy check-in is currently scheduled to occur before the end of the first planning period.

(87) Comment: The plan must include an assessment of the number of years it would take to reach natural conditions if visibility improvement continues at the rate of progress that the state selected as reasonable.

Response: ADEQ has provided an assessment in Chapter 11 of the number of years it would take to reach natural conditions using the rate of progress as established by the 2018 visibility projections.

Chapter 12 – Long Term Strategy

(88) Comment: In Section 12.3 the FLMs and NPS 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, and fugitive dust) are projected to increase with population and should be considered by ADEQ.

Response: ADEQ discusses strategies to mitigate the contribution from anthropogenic sources of PM in Section 12.7. There are ten areas that are either currently or formerly nonattainment areas under the PM_{10} National Ambient Air Quality Standard (NAAQS). These areas are required to have control measures in place to reduce PM from anthropogenic activities. The anthropogenic contribution to OC and EC from prescribed fire is discussed in Section 12.7.5. Arizona has a certified Enhanced Smoke Management Program to reduce the impact of smoke from prescribed fire. ADEQ is considering revisions to the permit program for open burning to ensure efficient tracking of the potential contribution to OC and EC from area sources. Regarding population growth specifically, all existing PM plans are required to periodically update emissions inventory data for changes in population, commuting patterns, transportation projects, and any other new or changing source of particulates. This also includes a review and update of the related control measures for each plan. Changes to the NAAQS also require an analysis of population trends as will be the case for the anticipated revision to the PM NAAQS in 2011, and was the case for the newly established PM planning areas for the State of Arizona. In the case of OC and EC emissions, changes in population would most likely not result in an increase in anthropogenic fire but rather possible increases in mobile source emissions which would be tracked and mitigated as part of PM or ozone plans or transportation plans required for state and national parks. For those CIAs not covered by current or future SIPs, or transport requirements under Section 110(a)(2)(D) of the Clean Air Act, it is doubtful any population increase would cause a significant increase in emissions of any of these pollutants.

(89) Comment: 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?

Response: ADEQ has included tables in Section 12.3 presenting the percentage contribution from Arizona to other Class I areas as well as tables presenting the percentage contribution from other states and regions to Arizona's Class I areas.

(90) Comment: The FLMs appreciate that ADEQ discusses Arizona's requirements for Prevention of Significant Deterioration (PSD) and New Source Review (NSR) to evaluate air quality related values, specifically visibility.

Response: ADEQ acknowledges the comment.

(91) Comment: The discussion of measures to control dust and area sources in PM_{10} nonattainment areas in Section 12.6 is very helpful. Do the PM_{10} monitoring data demonstrate the effectiveness of these controls?

Response: There is evidence to support that monitoring data demonstrates the effectiveness of PM_{10} control measures. EPA has made clean data findings for a number of PM_{10} moderate planning areas in Arizona due to the implementation and enforcement of various Reasonably Available Control Measures (RACM) as well as Best Available Control Measures (BACM) and Most Stringent Measures (MSM) in the serious

metropolitan planning area. The annual average concentrations at five monitoring stations in the greater Phoenix area show from 1990 to 2009, concentrations of PM_{10} have decreased ten micrograms per cubic meter, or 24%. Expanding to 11 monitors, the concentrations have decreased 15 micrograms per cubic meter or 25%. For moderate areas under maintenance plans, emission reductions due to the type of measures more commonly found in and around Class I areas (e.g. reduced track-out from unpaved roads, paving or stabilization of unpaved roads, retrofit or replacement of wood-burning stoves, anchoring of mining tailings, etc.) continue to show ongoing emission management.

(92) Comment: 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?

Response: No Arizona sources accepted permit limits to be exempt from BART.

(93) Comment: In Section 12.6.5, ADEQ discusses the Enhanced Smoke Management Program (ESMP). Does the ESMP address whether the smoke management measures are voluntary or mandatory, specifically identify the Class I areas as sensitive receptors, and specify that avoiding impacts to Class I areas be considered in the smoke management decisions?

Response: Arizona's ESMP addresses each of these points. ADEQ has expanded the discussion of the ESMP in the long-term strategy in Section 12.6.5. The rules for Arizona's Enhanced Smoke Management Program indicate that the measures are mandatory, Class I areas are identified as sensitive receptors, and mitigating smoke impact to Class I areas is considered in the smoke management decision process.

(94) Comment: Section 12.7 discusses federal requirements for renewable fuels. If Arizona has state rules requiring implementation of renewable fuels, they should be discussed in this section.

Response: Authority to develop and implement renewable or alternative fuels rests predominantly with the federal government (e.g., CAFE standards for fuel efficiency, boutique fuels, etc.). Under the authority of the Arizona Corporation Commission (ACC), rules that govern energy generation and use fall under the state's "portfolio standards" requirement. As stated by the Arizona Corporation Commission's Website at http://www.azcc.gov/divisions/utilities/electric/environmental.asp:

> "In 2006, the Commission approved the Renewable Energy Standard and Tariff (REST). These rules require that regulated electric utilities must generate 15 percent of their energy from renewable resources by 2025. Each year, Arizona's utility companies are required to file annual implementation plans describing how they will comply with the REST rules. The proposals include incentives for customers who install solar energy technologies for their own homes and businesses. The Commission's Renewable Energy Standards encourage utilities to use solar, wind, biomass, biogas, geothermal and other similar technologies to generate "clean" energy to power Arizona's future."

The actual emission reductions from the implementation of the state's portfolio standards is not information currently available for this SIP. The increased percentage of energy from renewables does show a positive trend in Arizona as the renewable standard was considerably lower at the time of the 2003 Regional Haze SIP submission under Section 309 but was still deemed reasonable progress at that time.

Local authority regarding fuels for mobile sources, including ultra-low diesel fuels and other alternative fuels cited in Arizona ozone and carbon monoxide SIPs, can be found on the Arizona Department of Weights and Measures Website at http://azdwm.gov/. Emission reductions for mobile sources, however, have already

been captured by the WRAP and are reflected in the emission inventories and projections already cited throughout this SIP.

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

Response: ADEQ has completed the discussion of long-term strategies for the November version of the SIP.

(96) Comment: Section 12.8 discusses the WRAP commitment to provide final regional modeling once the BART determinations are complete. It is not likely that WRAP will be able to fulfill this commitment; therefore ADEQ should delete this commitment. (Comment received from FLMs and NPS.)

Response: ADEQ agrees with this statement and has removed the commitment.

(97) Comment: 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.

Response: As stated in the response to Comment #6, ADEQ has reviewed the WRAP 2018 PRP18b emission inventory and is unable to accurately attribute facility emissions on a unit-specific basis. In that regard, ADEQ is unable to identify BART measures or emission reductions that were not taken into account in the WRAP 2018 PRP18b emissions inventory.

Chapter 13 – Consultation

(98) Comment: Please correct references to Oregon.

Response: ADEQ has removed references to the Oregon Regional Haze SIP.

(99) Comment: APS notes that ADEQ should correct the reference to Oregon in the third paragraph of Section 13.1, Federal Land Manager Consultation, Page 184, and replace with Arizona. APS also requests that ADEQ correct the typographical error on pages 141 and page 20 of Appendix D from "Arizona Power Service Company" to "Arizona Public Service Company."

Response: ADEQ has corrected the typographical error and removed incorrect references.