ARIZONA DEPARTMENT
OF
ENVIRONMENTAL QUALITY

Douglas A. Ducey
Governor

Misael Cabrera
Director

**CERTIFIED MAIL**
**RETURN RECEIPT REQUESTED**

Alexis Strauss
Acting Regional Administrator
U.S. Environmental Protection Agency, Region IX
Mail Code: ORA-1
75 Hawthorne Street
San Francisco, CA 94105

Subject: 2016 Revision to the Arizona State Implementation Plan for Regional Haze

Dear Ms. Strauss,

The Arizona Department of Environmental Quality (ADEQ) hereby adopts and submits to the U.S. Environmental Protection Agency (EPA) the *"Arizona State Implementation Plan Revision to the Arizona Regional Haze Plan for Salt River Project Agricultural Improvement and Power District - Coronado Generating Station"* as a revision to the Arizona State Implementation Plan (SIP).

On February 28, 2011, ADEQ adopted and submitted to EPA, *Arizona's State Implementation Plan for Regional Haze under Section 308 of the Federal Regional Haze Rule*. On December 5, 2012, EPA acted on elements of Arizona's Regional Haze SIP approving its $SO_2$ and $PM_{10}$ Best Available Retrofit Technology (BART) determinations, disapproving its $NO_X$ BART determination, and establishing a $NO_X$ BART FIP for the Unit 1 and Unit 2 (77 FR 72511; effective January 4, 2013). The EPA also promulgated a FIP for the CGS units, requiring installation and operation of selective catalytic reduction (SCR) systems for control of NOx emissions on both CGS units. Unit 2 was equipped with SCR in 2014, as required by a consent decree between SRP and the United States.

This SIP revision proposes an alternative to the BART determinations for Unit 1. The BART alternative is comprised of interim operating strategy (seasonal curtailments) followed by installation of SCR or permanent cessation of operation of Unit 1 by December 31, 2025, with revised NOx emission limits. Moreover, the BART alternative also adds annual plant-wide $SO_2$ emissions cap, and revises emission limits for $SO_2$ for both units compared to the $SO_2$ BART limits.

The SIP revision consists of copies of the authorizing statutes (Enclosure 1), the SIP Completeness Checklist demonstrating that this submission satisfies the requirements of 40 C.F.R. Part 51 Appendix V (Enclosure 2), and the SIP revisions as described above (Enclosure 3). Two paper

copies and an electronic exact duplicate of the hard copy on CD are included with this letter. If you have any questions, please contact me at (602) 771-2288.

Sincerely,

Timothy S. Franquist, Director
Air Quality Division

Copy to Colleen McKaughan, EPA
Tom Webb, EPA

# ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

Douglas A. Ducey
Governor

Misael Cabrera
Director

May 25, 2016

To: Timothy S. Franquist Jr.
Division Director
Air Quality Division

Under A.R.S. §49-104 (D) (2), I authorize you, Timothy S. Franquist Jr., Division Director, Air Quality Division, Arizona Department of Environmental Quality, to perform any act, including execution of any pertinent documents, which I as Director of the Arizona Department of Environmental Quality am authorized or required to do by law with respect to A.R.S. Title 49, chapters 1 and 2 and any other acts relating to air quality including personnel actions.

This authority shall remain in effect until it is revoked or upon your separation from the Arizona Department of Environmental Quality. You may further delegate this authority in the best interest of the agency, however, those delegations must be in writing and you must forward a copy of any further delegations to me.

This delegation is effective as of May 23, 2016 and revokes all earlier delegations. I ratify all acts performed by you as Air Quality Division Deputy Director concerning the duties and functions in this delegation letter.

Misael Cabrera
Director

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# ENCLOSURE 1

# Arizona Revised Statutes 49-104, 49-106, 49-404

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# Authorizing Statute

## A.R.S. § 49-104

**A.R.S. § 49-104.** *Powers and duties of the department and director*

A. The department shall:

1. Formulate policies, plans and programs to implement this title to protect the environment.
2. Stimulate and encourage all local, state, regional and federal governmental agencies and all private persons and enterprises that have similar and related objectives and purposes, cooperate with those agencies, persons and enterprises and correlate department plans, programs and operations with those of the agencies, persons and enterprises.
3. Conduct research on its own initiative or at the request of the governor, the legislature or state or local agencies pertaining to any department objectives.
4. Provide information and advice on request of any local, state or federal agencies and private persons and business enterprises on matters within the scope of the department.
5. Consult with and make recommendations to the governor and the legislature on all matters concerning department objectives.
6. Promote and coordinate the management of air resources to assure their protection, enhancement and balanced utilization consistent with the environmental policy of this state.
7. Promote and coordinate the protection and enhancement of the quality of water resources consistent with the environmental policy of this state.
8. Encourage industrial, commercial, residential and community development that maximizes environmental benefits and minimizes the effects of less desirable environmental conditions.
9. Assure the preservation and enhancement of natural beauty and man-made scenic qualities.
10. Provide for the prevention and abatement of all water and air pollution including that related to particulates, gases, dust, vapors, noise, radiation, odor, nutrients and heated liquids in accordance with article 3 of this chapter and chapters 2 and 3 of this title.
11. Promote and recommend methods for the recovery, recycling and reuse or, if recycling is not possible, the disposal of solid wastes consistent with sound health, scenic and environmental quality policies. Beginning in 2014, the department shall report annually on its revenues and expenditures relating to the solid and hazardous waste programs overseen or administered by the department.
12. Prevent pollution through the regulation of the storage, handling and transportation of solids, liquids and gases that may cause or contribute to pollution.
13. Promote the restoration and reclamation of degraded or despoiled areas and natural resources.
14. Assist the department of health services in recruiting and training state, local and district health department personnel.
15. Participate in the state civil defense program and develop the necessary organization and facilities to meet wartime or other disasters.
16. Cooperate with the Arizona-Mexico commission in the governor's office and with researchers at universities in this state to collect data and conduct projects in the United States and Mexico on issues that are within the scope of the department's duties and that relate to quality of life, trade and economic development in this state in a manner that will help the Arizona-Mexico commission to assess and enhance the economic competitiveness of this state and of the Arizona-Mexico region.

17. Unless specifically authorized by the legislature, ensure that state laws, rules, standards, permits, variances and orders are adopted and construed to be consistent with and no more stringent than the corresponding federal law that addresses the same subject matter. This provision shall not be construed to adversely affect standards adopted by an Indian tribe under federal law.

B. The department, through the director, shall:

1. Contract for the services of outside advisers, consultants and aides reasonably necessary or desirable to enable the department to adequately perform its duties.
2. Contract and incur obligations reasonably necessary or desirable within the general scope of department activities and operations to enable the department to adequately perform its duties.
3. Utilize any medium of communication, publication and exhibition when disseminating information, advertising and publicity in any field of its purposes, objectives or duties.
4. Adopt procedural rules that are necessary to implement the authority granted under this title, but that are not inconsistent with other provisions of this title.
5. Contract with other agencies, including laboratories, in furthering any department program.
6. Use monies, facilities or services to provide matching contributions under federal or other programs that further the objectives and programs of the department.
7. Accept gifts, grants, matching monies or direct payments from public or private agencies or private persons and enterprises for department services and publications and to conduct programs that are consistent with the general purposes and objectives of this chapter. Monies received pursuant to this paragraph shall be deposited in the department fund corresponding to the service, publication or program provided.
8. Provide for the examination of any premises if the director has reasonable cause to believe that a violation of any environmental law or rule exists or is being committed on the premises. The director shall give the owner or operator the opportunity for its representative to accompany the director on an examination of those premises. Within forty-five days after the date of the examination, the department shall provide to the owner or operator a copy of any report produced as a result of any examination of the premises.
9. Supervise sanitary engineering facilities and projects in this state, authority for which is vested in the department, and own or lease land on which sanitary engineering facilities are located, and operate the facilities, if the director determines that owning, leasing or operating is necessary for the public health, safety or welfare.
10. Adopt and enforce rules relating to approving design documents for constructing, improving and operating sanitary engineering and other facilities for disposing of solid, liquid or gaseous deleterious matter.
11. Define and prescribe reasonably necessary rules regarding the water supply, sewage disposal and garbage collection and disposal for subdivisions. The rules shall:

(a) Provide for minimum sanitary facilities to be installed in the subdivision and may require that water systems plan for future needs and be of adequate size and capacity to deliver specified minimum quantities of drinking water and to treat all sewage.
(b) Provide that the design documents showing or describing the water supply, sewage disposal and garbage collection facilities be submitted with a fee to the department for review and that no lots in any subdivision be offered for sale before compliance with the

standards and rules has been demonstrated by approval of the design documents by the department.

12. Prescribe reasonably necessary measures to prevent pollution of water used in public or semipublic swimming pools and bathing places and to prevent deleterious conditions at such places. The rules shall prescribe minimum standards for the design of and for sanitary conditions at any public or semipublic swimming pool or bathing place and provide for abatement as public nuisances of premises and facilities that do not comply with the minimum standards. The rules shall be developed in cooperation with the director of the department of health services and shall be consistent with the rules adopted by the director of the department of health services pursuant to section 36-136, subsection H, paragraph 10.

13. Prescribe reasonable rules regarding sewage collection, treatment, disposal and reclamation systems to prevent the transmission of sewage borne or insect borne diseases. The rules shall:

(a) Prescribe minimum standards for the design of sewage collection systems and treatment, disposal and reclamation systems and for operating the systems.

(b) Provide for inspecting the premises, systems and installations and for abating as a public nuisance any collection system, process, treatment plant, disposal system or reclamation system that does not comply with the minimum standards.

(c) Require that design documents for all sewage collection systems, sewage collection system extensions, treatment plants, processes, devices, equipment, disposal systems, on-site wastewater treatment facilities and reclamation systems be submitted with a fee for review to the department and may require that the design documents anticipate and provide for future sewage treatment needs.

(d) Require that construction, reconstruction, installation or initiation of any sewage collection system, sewage collection system extension, treatment plant, process, device, equipment, disposal system, on-site wastewater treatment facility or reclamation system conform with applicable requirements.

14. Prescribe reasonably necessary rules regarding excreta storage, handling, treatment, transportation and disposal. The rules shall:

(a) Prescribe minimum standards for human excreta storage, handling, treatment, transportation and disposal and shall provide for inspection of premises, processes and vehicles and for abating as public nuisances any premises, processes or vehicles that do not comply with the minimum standards.

(b) Provide that vehicles transporting human excreta from privies, septic tanks, cesspools and other treatment processes shall be licensed by the department subject to compliance with the rules. The department may require payment of a fee as a condition of licensure. After July 20, 2011, the department shall establish by rule a fee as a condition of licensure, including a maximum fee. As part of the rule making process, there must be public notice and comment and a review of the rule by the joint legislative budget committee. After September 30, 2013, the department shall not increase that fee by rule without specific statutory authority for the increase. The fees shall be deposited, pursuant to sections 35-146 and 35-147, in the solid waste fee fund established by section 49-881.

15. Perform the responsibilities of implementing and maintaining a data automation management system to support the reporting requirements of title III of the superfund amendments and reauthorization act of 1986 (P.L. 99-499) and article 2 of this chapter.

16. Approve remediation levels pursuant to article 4 of this chapter.

17. Establish or revise fees by rule pursuant to the authority granted under title 44, chapter 9, article 8 and chapters 4 and 5 of this title for the department to adequately perform its duties. All fees shall be fairly assessed and impose the least burden and cost to the parties subject to the fees. In establishing or revising fees, the department shall base the fees on:

(a) The direct and indirect costs of the department's relevant duties, including employee salaries and benefits, professional and outside services, equipment, in-state travel and other necessary operational expenses directly related to issuing licenses as defined in title 41, chapter 6 and enforcing the requirements of the applicable regulatory program.

(b) The availability of other funds for the duties performed.

(c) The impact of the fees on the parties subject to the fees.

(d) The fees charged for similar duties performed by the department, other agencies and the private sector.

C. The department may:

1. Charge fees to cover the costs of all permits and inspections it performs to ensure compliance with rules adopted under section 49-203, except that state agencies are exempt from paying the fees. Monies collected pursuant to this subsection shall be deposited, pursuant to sections 35-146 and 35-147, in the water quality fee fund established by section 49-210.

2. Contract with private consultants for the purposes of assisting the department in reviewing applications for licenses, permits or other authorizations to determine whether an applicant meets the criteria for issuance of the license, permit or other authorization. If the department contracts with a consultant under this paragraph, an applicant may request that the department expedite the application review by requesting that the department use the services of the consultant and by agreeing to pay the department the costs of the consultant's services. Notwithstanding any other law, monies paid by applicants for expedited reviews pursuant to this paragraph are appropriated to the department for use in paying consultants for services.

D. The director may:

1. If the director has reasonable cause to believe that a violation of any environmental law or rule exists or is being committed, inspect any person or property in transit through this state and any vehicle in which the person or property is being transported and detain or disinfect the person, property or vehicle as reasonably necessary to protect the environment if a violation exists.

2. Authorize in writing any qualified officer or employee in the department to perform any act that the director is authorized or required to do by law.

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# Authorizing Statute

## A.R.S. § 49-106

**A.R.S. § 49-106.** *Statewide application of rules*

The rules adopted by the department apply and shall be observed throughout this state, or as provided by their terms, and the appropriate local officer, council or board shall enforce them. This section does not limit the authority of local governing bodies to adopt ordinances and rules within their respective jurisdictions if those ordinances and rules do not conflict with state law and are equal to or more restrictive than the rules of the department, but this section does not grant local governing bodies any authority not otherwise provided by separate state law.

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# Authorizing Statute

## A.R.S. § 49-404

**A.R.S. § 49-404.** *State implementation plan*

A. The director shall maintain a state implementation plan that provides for implementation, maintenance and enforcement of national ambient air quality standards and protection of visibility as required by the clean air act.

B. The director may adopt rules that describe procedures for adoption of revisions to the state implementation plan.

C. The state implementation plan and all revisions adopted before September 30, 1992 remain in effect according to their terms, except to the extent otherwise provided by the clean air act, inconsistent with any provision of the clean air act, or revised by the administrator. No control requirement in effect, or required to be adopted by an order, settlement agreement or plan in effect, before the enactment of the clean air act in any area which is a nonattainment or maintenance area for any air pollutant may be modified after enactment in any manner unless the modification insures equivalent or greater emission reductions of the air pollutant. The director shall evaluate and adopt revisions to the plan in conformity with federal regulations and guidelines promulgated by the administrator for those purposes until the rules required by subsection B are effective.

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# ENCLOSURE 2

# State Implementation Plan Completeness Checklist

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**STATE IMPLEMENTATION PLAN COMPLETENESS CHECKLIST**

**Submittal of**

***Arizona Regional Haze State Implementation Plan Revision for the Salt River Project Coronado Generating Station, December 2016***

40 CFR Part 51, Appendix V, *Criteria for Determining the Completeness of Plan Submissions*, contains the "minimum criteria for determining whether a State Implementation Plan submitted for consideration by EPA is an official submission for purposes of review under § 51.103," *Submission of plans, preliminary review of plans*. Appendix V requires the following to be included in plan submissions for review by EPA:

***Administrative Materials***

1. "A formal letter of submittal from the Governor or his designee, requesting EPA approval of the plan or revision thereof (hereafter ''the plan'')." [Appendix V, 2.1(a)]

   See cover letter and delegation of authority from Misael Cabrera, Director of ADEQ, to Timothy Franquist, Director of the ADEQ Air Quality Division.

2. "Evidence that the State has adopted the plan in the State code or body of regulations; or issued the permit, order, consent agreement (hereafter ''document'') in final form. That evidence shall include the date of adoption or final issuance as well as the effective date of the plan, if different from the adoption/issuance date." [Appendix V, 2.1(b)]

   See cover letter.

3. "Evidence that the State has the necessary legal authority under State law to adopt and implement the plan." [Appendix V, 2.1(c)]

   See Enclosure 1.

4. "A copy of the actual regulation, or document submitted for approval and incorporation by reference into the plan, including indication of the changes made (such as, redline/strikethrough) to the existing approved plan, where applicable ..." [Appendix V, 2.1(d)]

   See Enclosure 3.

5. "Evidence that the State followed all of the procedural requirements of the State's laws and constitution in conducting and completing the adoption/issuance of the plan." [Appendix V, 2.1(e)]

   See cover letter and Enclosure 3, Appendix D.

6. "Evidence that public notice was given of the proposed change consistent with procedures approved by EPA, including the date of publication of such notice." [Appendix V, 2.1(f)]

   See Enclosure 3, Appendix D.

7. "Certification that public hearing(s) were held in accordance with the information provided in the public notice and the State's laws and constitution, if applicable and consistent with the public hearing requirements in 40 CFR 51.102." [Appendix V, 2.1(g)]

See Enclosure 3, Appendix D.

8. "Compilation of public comments and the State's response thereto." [Appendix V, 2.1(h)]

   See Enclosure 3, Appendix D.

***Technical Support***

9. "Identification of all regulated pollutants affected by the plan." [Appendix V, 2.2(a)]

   Nitrogen oxides, sulfur dioxide and particulate matter.

10. "Identification of the locations of affected sources including the EPA attainment/nonattainment designation of the locations and the status of the attainment plan for the affected areas(s)." [Appendix V, 2.2(b)]

    See Enclosure 3, Chapter 3.

11. "Quantification of the changes in plan allowable emissions from the affected sources; estimates of changes in current actual emissions from affected sources or, where appropriate, quantification of changes in actual emissions from affected sources through calculations of the differences between certain baseline levels and allowable emissions anticipated as a result of the revision." [Appendix V, 2.2(c)]

    See Enclosure 3, Chapter 2 and Appendix A, Chapter 4.

12. "The State's demonstration that the national ambient air quality standards, prevention of significant deterioration increments, reasonable further progress demonstration, and visibility, as applicable, are protected if the plan is approved and implemented. For all requests to redesignate an area to attainment for a national primary ambient air quality standard, under section 107 of the Act, a revision must be submitted to provide for the maintenance of the national primary ambient air quality standards for at least 10 years as required by section 175A of the Act." [Appendix V, 2.2(d)]

    See Enclosure 3, Chapter 3.

13. "Modeling information required to support the proposed revision, including input data, output data, models used, justification of model selections, ambient monitoring data used, meteorological data used, justification for use of offsite data (where used), modes of models used, assumptions, and other information relevant to the determination of adequacy of the modeling analysis." [Appendix V, 2.2(e)]

    See Enclosure 3, Chapter 2 and Appendix A, Chapter 5.

14. "Evidence, where necessary, that emission limitations are based on continuous emission reduction technology." [Appendix V, 2.2(f)]

    See Enclosure 3, Appendix B.

15. "Evidence that the plan contains emission limitations, work practice standards and recordkeeping/reporting requirements, where necessary, to ensure emission levels." [Appendix V, 2.2(g)]

See Enclosure 3, Appendix B.

16. "Compliance/enforcement strategies, including how compliance will be determined in practice." [Appendix V, 2.2(h)]

    See Enclosure 3, Appendix B.

17. "Special economic and technological justifications required by any applicable EPA policies, or an explanation of why such justifications are not necessary." [Appendix V, 2.2(i)]

    This plan does not rely on any special economic and technological justifications in support of the control strategies contained within.

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# ENCLOSURE 3

# Arizona State Implementation Plan Revision to the Airozna Regional Haze Plan for the Salt River Project Coronado Generating Station

# December 2016

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# ADDENDUM TO REVISION TO THE ARIZONA REGIONAL HAZE PLAN FOR THE SALT RIVER PROJECT CORONADO GENERATING STATION

**Air Quality Division**

**November 10, 2016**

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# 1. Background

The Salt River Project Agricultural Improvement and Power District's ("SRP") Coronado Generating Station ("CGS") consists of two pulverized coal-fired, electric utility steam boilers (Units 1 and 2), which generate approximately 762 megawatts ("MW") (net) of electricity. Both units are Regional Haze Program - BART-eligible units per 40 CFR § 51.301. The Arizona Department of Environmental Quality ("ADEQ") determined that both CGS units may reasonably be anticipated to cause or contribute to visibility impairment at a Class I area and, as such, are subject to best available retrofit technology ("BART").

On February 28, 2011, ADEQ submitted to EPA the state's initial Regional Haze SIP for the first planning period of the regional haze program. This submission included BART determinations for CGS Units 1 and 2. On December 5, 2012, EPA issued a final rule approving in part and disapproving in part ADEQ's Regional Haze SIP. EPA also promulgated a FIP for the CGS units, requiring installation and operation of selective catalytic reduction ("SCR") systems for control of NOx emissions on both CGS units. Unit 2 was equipped with SCR in 2014, as required by a consent decree between SRP and the United States.

On January 22, 2016, SRP submitted an Application for a Significant Permit Revision and a Regional Haze State Implementation Plan Revision for CGS, referred to as the application to ADEQ. On July 19, 2016, SRP submitted addenda to the application (hereinafter referred to as "July 19, 2016 Proposal"). In these submittals, SRP requested ADEQ to adopt a BART alternative as a revision to the Arizona Regional Haze SIP and to submit the revision to EPA for approval. On July 19, 2016, ADEQ issued the revised SIP and Permit for public comment and subsequently held a public hearing on August 23, 2016, which also was the close of the public comment period.

On October 19, 2016, SRP submitted an addendum to ADEQ, requesting ADEQ to revise certain aspects of the proposed SIP and permit revision. These revisions addressed comments received during the comment period.

On October 20, 2016, ADEQ met with SRP to discuss concerns regarding the interim control strategies that are a part of the CGS BART alternative. Consequently SRP submitted a request letter to ADEQ on October 25, 2016 (see Section 2 for details), to address those concerns.

The purpose of this addendum is to document changes to the CGS BART alternative since its proposal by ADEQ for public comment and to provide additional information regarding the revision and supplementation of the Arizona Regional Haze SIP as it relates to CGS.

# 2. Modifications to the CGS BART Alternative

The July 19, 2016 Proposal comprised of two alternative operating strategies as Better-than-BART ("BTB") compliance options, as follows:

- Operating Strategy (OS-1): Seasonal Curtailments Followed by SCR on Unit 1

  As proposed by ADEQ on July 19, 2016, this operating strategy would have required SRP to comply with the Unit 1 interim BART alternative operating strategy referred to herein as interim operating strategy ("IS"), followed by installation of an SCR system on Unit 1 no later than

December 31, 2029. The interim BART alternative operating strategy included, for each year during the interim period, four separate, alternative seasonal curtailment periods (IS1, IS2, IS3, and IS4) for CGS Unit 1 (i.e., periods during which Unit 1 would not be allowed to operate at all) coupled with options that in some cases would require operation at $SO_2$ emissions rates below the $SO_2$ BART limits at both units and at a NOx emissions rate at or below the current NOx permit limit for Unit 1. In each year during the interim strategy period, the length of the required curtailment period for Unit 1 would have depended on the NOx emissions performance of Unit 1 and the $SO_2$ emissions performance of Units 1 and 2.

- Operating Strategy (OS-2): Seasonal Curtailments Followed by Unit 1 Shutdown

  Under this operating strategy, as proposed by ADEQ on July 19, 2016, SRP would have complied with the interim operating strategy followed by permanent cessation of operation of Unit 1 no later than December 31, 2029.

Compared to the July 19, 2016 Proposal, the revised BART alternative includes the following changes:

- A reduction in the maximum permitted $SO_2$ emission rate limit for each unit from 0.080 lb/MMBtu to 0.060 lb/MMBtu (on a 30-boiler-operating-day average) beginning December 5, 2017.
- Addition of an annual plant-wide $SO_2$ emissions cap of 1,970 tons per year (tpy), effective in each year beginning in 2018. If the Unit 1 Shutdown option is selected, there will be a Unit 2 cap of 1080 tpy beginning once Unit 1 is shutdown.
- Change of the BART Alternative Operating Strategy dates:
  - The deadline for SRP to submit notification of Operating Strategy selection is December 31, 2022, changed from the proposal's deadline of December 31, 2026.
  - The deadline for SRP to install and begin operating SCR on Unit 1 (if OS-1 is selected) or to close Unit 1 permanently (if OS-2 is selected) is December 31, 2025, changed from December 31, 2029.

Table 1 provides an overview of the modifications to the CGS BART alternative that ADEQ made in response to public comments.[1] The changes to the BART alternative deadlines will shorten the interim operating period from approximately twelve years to approximately eight years. Moreover, due to a lower, more stringent $SO_2$ emission limit of 0.060 lb/MMBtu for each of the two units, the proposed interim operating strategy that was labelled IS1 (which included a 0.080 lb/MMBtu $SO_2$ emission limit) has been removed, while the interim operating strategies referred to as IS3 and IS4 are retained as proposed. ADEQ determined that IS2 should also be retained, except that the $SO_2$ emission limits for both units under IS2 are decreased from 0.070 lb/MMBtu in the proposal to 0.060 lb/MMBtu. Finally, the newly added annual plant-wide $SO_2$ emissions cap of 1,970/1,080 (tpy) will provide an enhanced degree of certainty that CGS's future actual annual $SO_2$ emissions will be significantly lower each year than previous $SO_2$ emission limits applicable to the facility.

[1] Elements of the final BART alternative that reflect modifications to the July 19, 2016 proposal are presented in red font in Table 1.

**Table 1 Comparison of the July 19, 2016 Proposal and the Revised Proposal**

| Control Strategy | | July 19, 2016 Proposal (used for previous public notice) | | | | Revised Proposal | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unit 1 (lb/MMBtu) (30-boiler-operating-day average) | | Unit 2 $SO_2$ (lb/MMBtu) (30-boiler-operating-day average) | Unit 1 Curtailment Period | Unit 1 (lb/MMBtu) (30-boiler-operating-day average) | | Unit 2 $SO_2$ (lb/MMBtu) (30-boiler-operating-day average) | Annual Plant-Wide $SO_2$ Cap (tons/year) | Unit 1 Curtailment Period |
| | | $NO_x$ | $SO_2$ | | | $NO_x$ | $SO_2$ | | | |
| Interim Operating Strategy | IS1 | 0.320 | 0.080 | 0.080 | Oct. 1-Apr. 15 | N/A | N/A | N/A | N/A | N/A |
| | IS2 | 0.320 | 0.070 | 0.070 | Oct. 21-Jan. 31 | 0.320 | 0.060 | 0.060 | 1,970 | Oct. 21-Jan. 31 |
| | IS3 | 0.320 | 0.050 | 0.050 | Nov. 21-Jan. 20 | 0.320 | 0.050 | 0.050 | 1,970 | Nov. 21-Jan. 20 |
| | IS4 | 0.310 | 0.060 | 0.060 | Nov. 21-Jan. 20 | 0.310 | 0.060 | 0.060 | 1,970 | Nov. 21-Jan. 20 |
| Final BART Alternative Strategy | SCR Installation | 0.065 | 0.080 | 0.080 | N/A | 0.065 | 0.060 | 0.060 | 1,970 | N/A |
| | Shutdown | N/A | N/A | 0.080 | N/A | N/A | N/A | 0.060 | 1,080 | N/A |
| Timeline | | Notification date: December 31, 2026<br>Shutdown or install & operate SCR: December 31, 2029 | | | | Notification date: December 31, 2022<br>Shutdown or install & operate SCR: December 31, 2025 | | | | |

# 3. ADEQ's Evaluation of Modifications to the CGS BART Alternative

ADEQ's evaluation of the modifications to the CGS BART alternative focuses on the following two criteria:

- Whether the revised CGS BART alternative satisfies the BTB test; and
- Whether the SIP revision, after modifications to the CGS BART alternative, will interfere with the ability of the program area to attain/maintain the National Ambient Air Quality Standards ("NAAQS") or any other applicable requirement of the Clean Air Act ("CAA").

## 3.1 Better-than-BART Test

As discussed in the Arizona State Implementation Plan Revision to the Arizona Regional Haze Plan for the Salt River Project Coronado Generating Station ("CGS SIP Revision"), dated July 19, 2016, ADEQ determined under 40 CFR § 51.308(e)(3) that the alternative "achieve[s] greater reasonable progress than would be achieved through the installation and operation of BART" (40 CFR § 51.308(e)(2)), which is the underlying criterion for approval of a BART alternative SIP.

40 CFR § 51.308(e)(3) specifies two tests for determining whether a BART alternative achieves greater reasonable progress than BART. Under the first test set out in that provision, if the distribution of emissions under the alternative measure is not substantially different than under BART, and the alternative measure results in greater emissions reductions, then the alternative measure may be deemed to achieve greater reasonable progress. However, under the second test set out in 40 CFR § 51.308(e)(3), if the distribution of emissions is significantly different than under BART or if the alternative measure does not result in greater emissions reductions, then a dispersion modeling analysis to determine the differences in visibility between BART and the BART alternative may be conducted for each impacted Class I area, for the worst 20% and best 20% of days (W20% days and B20% days). The modeling demonstrates "greater reasonable progress" if both of the following prongs are satisfied:

- Prong 1: Visibility does not decline in any Class I area; and

- Prong 2: There is an overall improvement in visibility, determined by comparing the average differences between BART and the BART alternative over all affected Class I areas.

### *3.1.1 Interim Operating Strategies*

ADEQ has determined that the interim operating strategies do not necessarily achieve greater emissions reductions than the 2016 EPA BART Reconsideration because, although there will be greater reductions in emissions of two of the visibility-impairing pollutants – $SO_2$ and PM – during the interim control strategy period under the BART alternative as compared to BART for CGS, there will be higher NOx emissions as compared to BART for CGS. Therefore, SRP opted to perform a dispersion modeling analysis to demonstrate that the BART alternative would result in "greater reasonable progress" consistent with the two-prong test above.

Compared to the July 19, 2016 Proposal that ADEQ issued for public review and comment, the revised BART alternative removes interim operating strategy IS1 but retains interim operating strategies IS2, IS3 and IS4 (see Table 1). The $SO_2$ emission limits under IS3 and IS4 are unchanged because those emission limits are equal to or lower than 0.060 lb/MMBtu (on a 30-boiler-operating-day average). The $SO_2$ emission

limit for IS2, however, has been decreased from 0.070 lb/MMBtu to 0.060 lb/MMBtu (hereinafter referred to as "Modified IS2").

The modifications reflected in the revised BART alternative do not affect the previous photochemical grid model ("PGM") visibility assessment for IS3 and IS4, which is presented in the Technical Support Document for Regional Haze State Implementation Plan Revision for the Coronado Generating Station ("TSD"). As demonstrated in the TSD, both IS3 and IS4 satisfied Prong 1 and Prong 2 of the Better-than-BART test. While the PGM visibility assessment did not directly model Modified IS2 with a lower emission limit of 0.060 lb/MMBtu, this scenario provides additional visibility improvement at the affected Class I areas as compared to the original IS2. As demonstrated in the TSD, the original IS2 also satisfied Prong 1 and Prong 2 of the Better-than-BART test. Therefore, the interim operating strategies (Modified IS2, IS3 and IS4) each achieves greater reasonable progress than the BART control strategy.

As presented in the TSD at page 11, the estimated plant-wide annual $SO_2$ emissions under IS3 and IS4 (which, again, are unchanged in the final BART alternative) are 1,526 tons per year and 1,831 tons per year, respectively. The annual $SO_2$ emissions under Modified IS2 will be lower than annual $SO_2$ emissions under IS4 because Modified IS2 includes the same $SO_2$ emission limit as IS4 but requires a longer curtailment period than IS4. Therefore, the annual $SO_2$ emissions for Modified IS2, IS3 and IS4 are, in each case, expected to be below the annual plant-wide $SO_2$ emissions cap of 1,970 tons per year.

### *3.1.2 Final Operating Strategies*

In Table 2, ADEQ compares estimated emissions at CGS of NOx, PM and $SO_2$ under BART control strategy (i.e., 2016 EPA BART Reconsideration for NOx and 2012 ADEQ BART for $SO_2$ and PM) and the CGS BART alternative as modified. If SRP selects SCR as the final control strategy for Unit 1, the emissions of NOx and PM under the BART alternative would be identical to the emissions of those pollutants under BART. However, if SCR is the final operating strategy for Unit 1, the BART alternative as modified would achieve greater reductions in $SO_2$ emissions than BART would. If SRP selects the shutdown of Unit 1 as the final operating strategy, the BART alternative would achieve greater emission reductions for all three visibility-impairing pollutants ($SO_2$, NOx, and PM). Therefore, either of the two final operating strategies – i.e., (i) SCR with a permanently lower $SO_2$ emission limit for both units or (ii) permanent shutdown of Unit 1, which also would entail a permanently lower SO2 emission limit at Unit 2 – would result in improved visibility across all affected Class I areas as compared to BART. ADEQ also determines that it is unnecessary to model the final operating strategies since both of those strategies would result in greater reductions in emissions of visibility-impairing pollutants than BART.

### *3.1.3 Timing of Emissions Reductions*

The revised BART alternative does not change the starting date of the BART alternative. As part of the BART alternative, the interim operating strategy will take effect on the same compliance date established by EPA's BART FIP, December 5, 2017. This date is within the period of the first long-term strategy for regional haze.

The revised BART alternative changes the deadline to install and operate SCR on Unit 1 or to close Unit 1, from December 31, 2029, to December 31, 2025. In other words, the final controls (SCR or shutdown) will be implemented four years earlier than the date previously proposed, and the interim operating period thus will be shortened from approximately twelve years to approximately eight years. While these changes are intended to address some commenters' concerns associated with the implementation of the interim control strategies, they do not affect the "Better-than-BART" demonstration.

**Table 2 Estimated Emissions for $NO_X$, PM and $SO_2$ under BART Control Strategy and the Revised BART Alternative**

| Scenario | Unit | $SO_2$ | | NOx | | PM | |
|---|---|---|---|---|---|---|---|
| | | Annual Emission (tons/year ) | Combined Emission of Unit 1 and Unit 2 (tons/year) | Annual Emission (tons/year) | Combined Emission of Unit 1 and Unit 2 (tons/year) | Annual Emission (tons/year ) | Combined Emission of Unit 1 and Unit 2 (tons/year) |
| BART Control Strategy | Unit 1 | 1,285[a] | 2,651 | 1,044[a] | 2,410 | 482[a] | 994 |
| | Unit 2 | 1,366[a] | | 1,366[a] | | 512[a] | |
| Revised BART Alternative - SCR | Unit 1 | 964[b] | 1,970 (annual emission cap) | 1,044 | 2,410 | 482 | 994 |
| | Unit 2 | 1,025[b] | | 1,366 | | 512 | |
| Revised BART Alternative - Shutdown | Unit 1 | 0 | 1,080 (annual emission cap) | 0 | 1,366 | 0 | 512 |
| | Unit 2 | 1,025[b] | | 1,366 | | 512 | |

[a] *TSD Pgs. 10,11;*
[b] *Assuming the same heat inputs and annual utilization rate, the annual emissions for Revised BART Alternative = the annual emissions for BART Control Strategy * (0.06/0.08).*

The BART alternative as originally proposed achieves greater reasonable progress than BART and meets the requirements of 40 CFR § 51.308(e)(3) and based on the analysis described above, the implementation of the BART alternative as modified, during the periods of both the interim and the final operating strategies, would achieve even better progress towards improved visibility conditions.

## 3.2 Clean Air Act Section 110(l) Analysis

To be approvable by EPA, revisions to an Arizona RH SIP must not interfere with applicable requirements of the CAA, as provided in CAA Section 110(l):

> *"(l) PLAN REVISIONS - Each revision to an implementation plan submitted by a State under this Act shall be adopted by such State after reasonable notice and public hearing. The Administrator shall not approve a revision of a plan if the revision would interfere with any applicable requirement concerning attainment and reasonable further progress (as defined in section 171), or any other applicable requirement of this Act."*

This section demonstrates that this SIP revision will not interfere with any applicable requirement of the CAA.

### *3.2.1 Demonstrating Noninterference with Attainment of the National Ambient Air Quality Standards (NAAQS)*

As previously discussed in the CGS SIP Revision document, the CGS BART alternative (the July 19, 2016 Proposal) would not interfere with attainment or maintenance of the $PM_{10}$, $PM_{2.5}$, NOx, $SO_2$ or ozone NAAQS. Compared to the July 19, 2016 Proposal, the revised BART alternative imposes more stringent $SO_2$ emission limits for both units, and would require SRP to shut down Unit 1 or to install and operate SCR at Unit 1 four years earlier than the originally proposed date. Therefore, the revised BART alternative will not interfere with attainment or maintenance of the NAAQS for any criteria pollutant. Indeed, the revised BART alternative will further improve ambient air quality as compared to the July 19, 2016 Proposal.

### *3.2.2 Demonstrating Noninterference with Regional Haze Program Requirements*

As discussed in Section 3.1, implementation of the revised BART alternative, during the periods of both the interim and the final operating strategies, will achieve greater reasonable progress toward natural visibility conditions than would be achieved through BART. Moreover, the revised BART alternative will take effect on the same compliance date established by EPA's BART FIP, December 5, 2017. Therefore, the emission reductions under the revised BART alternative will occur during the first long-term planning period under Arizona's regional haze requirements.

As shown in the TSD, the Interagency Monitoring of Protected Visual Environments ("IMPROVE") monitoring data collected from CGS-affected Class I areas indicate that ammonium sulfate plays a more significant role in visibility impairment than ammonium nitrate. As ADEQ determined, the ratio of $SO_2$-attributed visibility extinction to NOx-attributed visibility extinction averaged over all Class I areas potentially affected by CGS is 4.2 to 1. ADEQ also observed that ammonium sulfate accounts for 15%-30% of aerosol light extinction, whereas ammonium nitrate's contribution is only 4%-8%, for Class I areas potentially affected by CGS. Compared to the July 19, 2016 Proposal, the revised BART alternative will further reduce $SO_2$ emissions to provide additional visibility improvement at relevant Class I areas.

Accordingly, the revised BART alternative will not interfere with applicable regional haze program requirements under the CAA.

## 4. Conclusion

The originally proposed BART alternative for CGS satisfies the "Better-than-BART" test and the BART Alternative as modified provides even greater improvements to visibility at affected Class I areas. Moreover, the revised BART alternative for CGS will not interfere with any applicable requirement of the CAA.

# Arizona State Implementation Plan

## Revision to the Arizona Regional Haze Plan for the Salt River Project Coronado Generating Station

**Air Quality Division**
**July 19, 2016**

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# 1.0 INTRODUCTION AND BACKGROUND

## 1.1 Introduction

The Arizona Department of Environmental Quality ("ADEQ") is proposing a source-specific revision to the Arizona Regional Haze State Implementation Plan ("Arizona RH SIP") that establishes an alternative to best available retrofit technology ("BART") for the Salt River Project Agricultural Improvement and Power District's ("SRP") Coronado Generating Station ("CGS"). This document provides information necessary for revision and supplementation of the Arizona RH SIP and the U.S. Environmental Protection Agency ("EPA") Federal Implementation Plan ("FIP") for CGS. Specifically, this document includes:

- A demonstration that CGS's alternative to BART ("BART Alternative") satisfies the "Better-than-BART" ("BTB") test; and
- A demonstration that the SIP revision will not interfere with the ability of the program area to attain/maintain the National Ambient Air Quality Standards ("NAAQS") or any other requirement of the Clean Air Act ("CAA").

## 1.2 Regulatory Background

CGS consists of two pulverized coal-fired, electric utility steam boilers (Units 1 and 2), which generate approximately 762 megawatts (MW) (net) of electricity. Units 1 and 2 were completed and started operation in 1979-1980. CGS generates electricity for sale and the SIC code for this operation is 4911. Units 1 and 2 are dry-bottom turbo-fired boilers with a net rated output of 380 MW and 382 MW, respectively, primarily firing low-sulfur western coals. Both units are Regional Haze Program - BART eligible units per 40 CFR § 51.301. ADEQ determined that the CGS units may reasonably be anticipated to cause or contribute to visibility impairment at a Class I area and, as such, are subject to BART.

On February 28, 2011, ADEQ submitted to EPA the state's initial Regional Haze SIP for the first planning period of the regional haze program. This submission included BART determinations for CGS Units 1 and 2. On December 5, 2012, EPA issued a final rule approving in part and disapproving in part ADEQ's Regional Haze SIP.[1] EPA also promulgated a FIP for the CGS units with an oxides of nitrogen ("$NO_x$") emission limit of 0.065 pounds per million British thermal unit (lb/MMBtu), applicable across both CGS units on a 30-boiler-operating-day average basis. The final compliance date for the BART FIP $NO_x$ limit is December 5, 2017 (five years from the date of publication of the FIP) and involves installation and operation of selective catalytic reduction ("SCR") systems for control of $NO_x$ emissions on both CGS units. Unit 2 was equipped with SCR in 2014, as required by a consent decree between SRP and the United States.[2]

SRP filed a petition for administrative reconsideration of the $NO_x$ BART determination for CGS with EPA in February 2013. EPA granted reconsideration of the $NO_x$ emission limit and compliance methodology (i.e., the methodology used to calculate compliance with the plant-wide average) in April 2013. On March 31, 2015, EPA proposed revisions to the $NO_x$ BART determination for the CGS units.[3] The proposal established a Unit 1 BART $NO_x$ limit of 0.065 lb/MMBtu and a Unit 2 BART $NO_x$ limit of 0.080 lb/MMBtu. Both limits are to be met on a 30-boiler-operating-day average. EPA did not propose to change the initial compliance date for the $NO_x$ BART limits, which remains December 5, 2017. EPA has taken final action on the reconsideration, which was published in the Federal Register on April 13, 2016, approving a unit-

[1] 77 Fed. Reg. 72512 (Dec. 5, 2012).
[2] United States v. Salt River Project Agricultural Improvement and Power District, Civil Action No. 2:08-cv-1479-JAT (D. Ariz.), August 12, 2008.
[3] 80 Fed. Reg. 17010 (Mar. 31, 2015).

specific NOx BART limit of 0.065 lb/MMBtu for Unit 1 and a unit-specific NOx BART limit of 0.080 lb/MMBtu for Unit 2 (2016 EPA BART Reconsideration).[4,5]

In June 2014, EPA released its proposed Carbon Pollution Emission Guidelines for Existing Electric Utility Generating Units, commonly referred to as the Clean Power Plan ("CPP"). This rule was finalized in August 2015.[6] The final rule gave states until September 2018 to submit final plans outlining how they will meet the requirements set forth by EPA in the final CPP. Efforts to comply with the CPP may conflict with SRP's existing obligations under EPA's BART FIP. On February 9, 2016, the U.S. Supreme Court granted a stay, halting implementation of the CPP pending the resolution of legal challenges to the program in court.[7] This action has created additional uncertainty for SRP with respect to the nature and timing of its compliance obligation for the CGS units.

On January 22, 2016, SRP submitted an Application for a Significant Permit Revision and a Regional Haze State Implementation Plan Revision for CGS, referred to as the application to ADEQ. On July 19, 2016, SRP submitted addendums to the application. In these submittals, SRP requested that ADEQ adopt the BART Alternative as a revision to the Arizona Regional Haze SIP and submit the revision to EPA for approval.

## 2.0 REVISION TO ARIZONA'S REGIONAL HAZE PROGRAM - 2016

### 2.1 BART Alternative Operating Strategies for CGS

To meet the requirements of the regional haze rule ("RHR"), SRP evaluated a BART Alternative comprised of two alternative operating strategies as BTB compliance options as follows.

#### *2.1.1 Operating Strategy (OS-1): Seasonal Curtailments Followed by SCR on Unit 1*

This operating strategy requires SRP to comply with the Unit 1 interim BART alternative operating strategy referred, also to herein as interim operating strategy ("IS") followed by installation of an SCR system on Unit 1 no later than December 31, 2029, to achieve a $NO_x$ limit of 0.065 lb/MMBtu at Unit 1 on a 30-boiler-operating-day average. The interim operating strategy includes four separate seasonal curtailment periods for CGS Unit 1 coupled with options for operation at a lower sulfur dioxide ("$SO_2$") emissions rate below the BART limits for both units and a $NO_x$ emissions rate below the current permit limit for Unit 1. In each year, the length of the required curtailment period for CGS Unit 1 is dependent on the $NO_x$ emissions performance of Unit 1 and the $SO_2$ emissions performance of Units 1 and 2.

#### *2.1.2 Operating Strategy (OS-2): Seasonal Curtailments Followed by Unit 1 Shutdown*

Under this operating strategy, SRP would comply with the interim operating strategy followed by permanent cessation of operation of Unit 1 no later than December 31, 2029.

#### *2.1.3 BART Alternative Implementation Schedule*

Per the BART Alternative, the interim operating strategy will take effect on December 5, 2017, the compliance date established by EPA's BART FIP. In the first year of implementation, Unit 1 will begin the interim operating strategy on December 5 and end according to the emissions performance of that year.

[4] 81 Fed. Reg. 21735 (Apr. 13, 2016).
[5] The 2016 EPA BART Reconsideration was not challenged and is considered final.
[6] 80 Fed. Reg, 64662 (Oct. 23, 2015).
[7] The stay applies pending resolution of the legal challenges to the program in the U.S. Court of Appeals for the D.C. Circuit and, if applicable, in the Supreme Court.

In subsequent years, the interim operating strategy will begin and end according to the emission performance of the corresponding year. Once SRP achieves certainty regarding future operation of CGS Unit 1 under a final approved CPP state plan, SRP will finalize its choice of BART Alternative operating strategy and will submit a notification to EPA and ADEQ. This notification will be made no later than December 31, 2026.

The CPP is currently stayed by the Supreme Court, increasing uncertainty about the schedule for implementation of the rule and thus impacting SRP's ability to finalize plans regarding CGS. Based on the anticipated litigation schedule, there will likely not be a final decision in the CPP litigation until at least 2018. Assuming the CPP implementation schedule revision provides a day-for-day compliance deadline extension to account for the stay, initial compliance could be expected to begin in 2025, 1 year prior to the 2026 BART Alternative Option notification deadline. With additional pre-notification planning and recognizing the need to potentially take other preliminary steps before the notification deadline, SRP expects that it will have sufficient time to design and construct an SCR if it selects OS-1 and to make the necessary resource arrangements if it selects OS-2.

If OS-1 is selected, SRP will apply the interim operating strategy until an SCR system is installed and operating, no later than December 31, 2029. If OS-2 is selected, SRP will apply the interim operating strategy until the Unit 1 closure no later than December 31, 2029.

Figure 1 shows an overview of the BART Alternative operating strategies for CGS Unit 1. Table 1 lists the emission limits for Unit 1 and Unit 2 and the curtailment periods for Unit 1 for the four seasonal curtailment options under the interim operating strategy phase of the BART Alternative. For comparison purposes, the emission limits required by the 2016 EPA BART Reconsideration for $NO_x$ and 2012 ADEQ BART for $SO_2$ as approved by EPA (hereinafter referred to as "BART control strategy") are also included in Table 1. The interim operating strategy and compliance methods are incorporated as a new Attachment "E" to the facility's Operating Permit (Appendix B).

**Figure 1: Overview of BART Alternative Operating Strategies for CGS Unit 1**

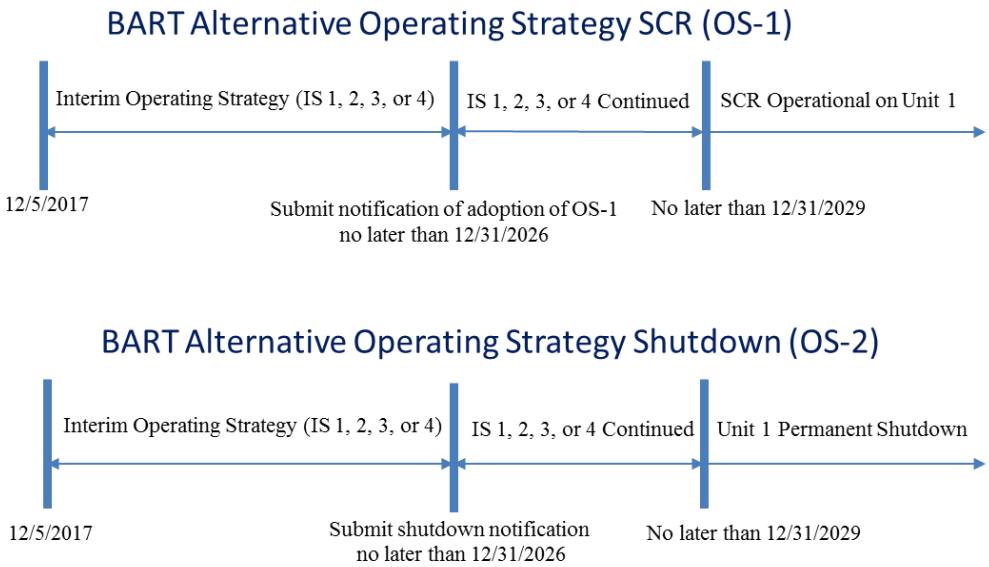

**Table 1: Emission Limits for CGS under BART Alternative Operating Strategies**

| Control Strategy | | Unit 1 (lb/MMBtu) (30-boiler-operating-day average) | | Unit 2 $SO_2$ (lb/MMBtu) (30-boiler-operating-day average) | Unit 1 Curtailment Period |
|---|---|---|---|---|---|
| | | $NO_x$ | $SO_2$ | | |
| BART control strategy (2016 EPA BART Reconsideration for $NO_x$ and 2012 ADEQ BART for $SO_2$) | | 0.065 | 0.080 | 0.080 | N/A |
| BART Alternative Operating Strategy SCR Option (OS-1) | | | | | |
| Interim Operating Strategy | IS1 | 0.320 | 0.080 | 0.080 | Oct. 1-Apr. 15 |
| | IS2 | 0.320 | 0.070 | 0.070 | Oct. 21-Jan. 31 |
| | IS3 | 0.320 | 0.050 | 0.050 | Nov. 21-Jan. 20 |
| | IS4 | 0.310 | 0.060 | 0.060 | Nov. 21-Jan. 20 |
| Final BART Alternative Strategy | SCR Installation and Operation no later than December 31, 2019 | 0.065 | 0.080 | 0.080 | N/A |
| BART Alternative Operating Strategy Shutdown Unit 1 Option (OS-2) | | | | | |
| Interim Operating Strategy | IS1 | 0.320 | 0.080 | 0.080 | Oct. 1-Apr. 15 |
| | IS2 | 0.320 | 0.070 | 0.070 | Oct. 21-Jan. 31 |
| | IS3 | 0.320 | 0.050 | 0.050 | Nov. 21-Jan. 20 |
| | IS4 | 0.310 | 0.060 | 0.060 | Nov. 21-Jan. 20 |
| Final BART Alternative Strategy | Unit Closure no later than December 31, 2029. | 0.000 | 0.000 | 0.080 | N/A |

## 2.2 Overview of ADEQ's Evaluation of BART Alternative Operating Strategy

### *2.2.1 BART Alternative Operating Strategy - 1 – SCR Pathway*

The first BART Alternative operating strategy requires SRP to comply with the interim operating strategy followed by installation of an SCR system on Unit 1 no later than December 31, 2029. For this BART Alternative, ADEQ's evaluations focused on the interim operating strategy since the final BART Alternative operating strategy, viewed in isolation, is identical to the 2016 EPA BART Reconsideration. For the interim operating strategy, each of the four seasonal curtailment options must address the visibility impacts from the CGS units on Class I areas in accordance with EPA's RHR at 40 CFR § 51.308. Accordingly, ADEQ evaluated each of the seasonal curtailment options under the interim operating strategy to determine whether or achieves greater overall visibility benefits on average as compared to the BART control strategy.

OS-1, which requires installation and operation of an SCR system on Unit 1, triggers prevention of significant deterioration ("PSD") review for collateral emissions increases for three pollutants: particulate matter less than 10 micrometers ("µm") mean aerodynamic diameter ("$PM_{10}$"), particulate matter less than 2.5 µm mean aerodynamic diameter ("$PM_{2.5}$"), and sulfuric acid mist ("$H_2SO_4$"). Accordingly, ADEQ has evaluated OS-1 to determine whether it complies with associated PSD requirements. This evaluation is

contained in Appendix C; the PSD review is presented in Technical Support Document of significant permit revision #63088 to Operating Permit #52639).

### *2.2.2 BART Alternative Operating Strategy - 2 – Shutdown Pathway*

Under OS-2, in which SRP chooses to cease operation of Unit 1 by December 31, 2029, SRP will comply with the interim operating strategy until the unit closes no later than December 31, 2029. The shutdown option will result in long-term environmental benefits, while providing for interim emission reductions, achieved by the end of the first regional haze planning period, that are better than BART.

## 2.3 ADEQ's Evaluation of BART Alternative Operating Strategy

### *2.3.1 Evaluation Criteria*

Under the RHR, evaluations of BART Alternatives must contain the following three elements:

- A demonstration that the alternative measure will achieve greater reasonable progress than would have resulted from the installation and operation of BART at all sources subject to BART in the state and covered by the alternative program. 40 CFR § 51.308(e)(2)(i).

- A requirement that all necessary emissions reductions take place during the first long-term planning period for regional haze. 40 CFR § 51.308(e)(2)(iii).

- A demonstration that the emissions reductions resulting from the alternative measure will be surplus to those reductions resulting from measures adopted to meet requirements of the Clean Air Act as of the baseline date of the SIP. 40 CFR § 51.308(e)(2)(iv).

The following sections outline how the BART alternative achieves these three elements.

### *2.3.2 Demonstration of Greater Reasonable Progress*

40 CFR § 51.308(e)(2)(i) establishes five criteria for demonstrating that BART Alternative measures will achieve greater reasonable progress than would have resulted from installation and operation of BART, as follows:

- 40 CFR § 51.308(e)(2)(i)(A) - A list of all BART-eligible sources. ADEQ included a list of all BART-eligible sources in the Arizona Regional Haze SIP.[8]

- 40 CFR § 51.308(e)(2)(i)(B) - A list of all BART-eligible sources that would be covered by the BART Alternative. The BART Alternative covers emissions from CGS Units 1 and 2.

- 40 CFR § 51.308(e)(2)(i)(C) - An analysis of BART and associated emissions reductions from the units covered by the BART Alternative. This information is provided in the sections below and in the Technical Support Document ("TSD") for this SIP submittal.

- 40 CFR § 51.308(e)(2)(i)(D) - An analysis of projected emissions reductions through application of the BART Alternatives. This information is provided in the sections below and in the TSD.

- 40 CFR § 51.308(e)(2)(i)(E) - A determination that the alternative "achieves greater reasonable

[8] 79 FR 56322, 77 FR 75704, 75719–75720; 78 FR 46142, 46151–46152

progress than would be achieved through the installation and operation of BART at the covered sources." The determination is to be made based either on the relevant criteria in 40 CFR § 51.308(e)(3) or on the "clear weight of evidence" as provided in 40 CFR § 51.308(e)(2)(i)(E). This information is presented here.

40 CFR § 51.308(e)(3) specifies two tests for determining whether the BART Alternative achieves greater reasonable progress than BART. Under that provision, if the distribution of emissions under the alternative measure is not substantially different than under BART, and the alternative measure results in greater emissions reductions, then the alternative measure may be deemed to achieve greater reasonable progress. However, under 40 CFR § 51.308(e)(3), if the distribution of emissions is significantly different or if the alternative measure does not result in greater emissions reductions, then a dispersion modeling analysis to determine the differences in visibility between BART and the BART Alternative may be conducted for each impacted Class I area, for the worst and best 20% of days (W20% and B20% days), and the regulations do not preclude use of dispersion modeling analyses in other circumstances to support a BART Alternative. The modeling demonstrates "greater reasonable progress" if both of the following criteria are met:

- Prong 1: Visibility does not decline in any Class I area; and

- Prong 2: There is an overall improvement in visibility, determined by comparing the average differences between BART and the BART Alternative over all affected Class I areas.

ADEQ has determined that the BART Alternative operating strategies do not necessarily achieve greater emissions reductions than the 2016 EPA BART Reconsideration, because, although there will be greater $SO_2$ and PM emissions reductions under the alternative, there will be higher NOx emissions as compared to BART for CGS. (See subsection 2.3.4 below.) Therefore, SRP opted to perform a dispersion modeling analysis to demonstrate that the BART alternative would result in "greater reasonable progress" consistent with the two-prong test above. SRP conducted the photochemical grid model ("PGM") visibility assessment with The Comprehensive Air Quality Model with Extensions ("CAMx").[9] In July 2015, EPA proposed revisions to its modeling guidelines that would delist CALPUFF as the EPA-preferred long range transport model and recommended PGMs for applications involving secondary $PM_{2.5}$ formation, including visibility impairment due to sulfate and nitrate.[10] Moreover, to demonstrate "greater reasonable progress," ADEQ believes that a full PGM that includes modeling all emissions in the modeling domain would be more appropriate than CALPUFF.

SRP evaluated the BART Alternative operating strategies (OS-1 and OS-2) consisting of the interim operating strategy followed by election either to install and operate SCR on Unit 1 or to permanently retire Unit 1 as explained above for the BTB test. The evaluation covered six scenarios, including the Baseline scenario (current conditions), the BART control strategy (2016 EPA BART Reconsideration for $NO_x$ and 2012 ADEQ BART for $SO_2$ and PM), and the interim operating strategy composed of four Unit 1 seasonal curtailment options (IS1, IS2, IS3 and IS4). Detailed modeling information is provided in Appendix A, TSD, Section 5.

Prong 1

The first prong of the BTB test examines the differences in visibility impacts (delta dv) between the Baseline and each of the seasonal curtailment options under the interim operating strategy in the BART Alternative

[9] http://www.camx.com/

[10] Revision to the Guideline on Air Quality Models: Enhancement to the AERMOD Dispersion Modeling System and Incorporation of Approaches to Address Ozone and Fine Particulate Matter – Appendix W. 40 CFR Part 51. 80 Fed. Reg. 45340 (July 29, 2015).

operating strategy (Baseline – BART Alternative). The BART Alternative operating strategy passes the prong 1 test if the difference in visibility impact is positive or zero for all Class I areas for the W20% and B20% days. Table 2 shows the minimum differences in visibility impacts across all Class I areas between the Baseline and the alternative strategies during the interim operating strategy period. Since the minimum differences are all positive, all four seasonal curtailment options under the interim operating strategy exhibit visibility improvements compared to current conditions at all Class I areas. Therefore, under the BART Alternative with the specified interim operating strategy "visibility does not decline in any Class I area" and hence the interim operating strategy passes the first prong of the BTB test.

**Table 2: Minimum Delta Deciview Difference between Interim Operating Strategy under BART Alternatives and Baseline at Class I Areas (Baseline – BART Alternative)**

| Interim Operating Strategy | Average Best 20% Days | | Average Worst 20% Days | | Annual Average | |
|---|---|---|---|---|---|---|
| | Absolute (dv) | Relative | Absolute (dv) | Relative | Absolute (dv) | Relative |
| IS1 | 0.0002 | 18.14% | 0.000002 | 0.11% | 0.0005 | 19.45% |
| IS2 | 0.00002 | 3.65% | 0.0001 | 7.30% | 0.0004 | 13.75% |
| IS3 | 0.0001 | 11.55% | 0.0003 | 13.67% | 0.0006 | 18.73% |
| IS4 | 0.00004 | 6.06% | 0.0002 | 9.86% | 0.0004 | 15.36% |

Prong 2

For the second prong of the BTB test, the BART Alternative must demonstrate that it will achieve an overall improvement in visibility, averaged across all affected Class I areas compared to the BART control strategy. If the BART Alternative shows lower visibility impacts than the BART control strategy when averaged over all Class I areas for both the B20% and W20% days in the modeled year (even if the differences are marginal), the alternative passes the second prong of the BTB test.

Table 3 displays the differences in visibility impacts (delta dv) between the BART control strategy and the BART Alternative (BART- BART Alternative) for each Class I area for each time averaging method (B20% days, W20% days and annual) during the interim operating strategy period. In accordance with the regulatory language requiring a comparison of the average differences over all affected Class I areas, Table 3 provides the average differences over all affected Class I areas for the B20%, the W20% days and all days. As indicated in Table 3, for each of the four seasonal curtailment options in the interim operating strategy and for each averaging method, positive visibility impact benefits are obtained. Positive visibility impact benefits indicate that the BART Alternative provides an "overall improvement in visibility" compared to the BART control strategy, and hence the interim operating strategy passes the second prong of the BTB test.

**Table 3: Average Delta Deciview Differences between Interim Operating Strategy under BART Alternatives and BART Control Strategy over Class I Areas (BART-BART Alternative)**

| Interim Operating Strategy | Average Best 20% Days | | Average Worst 20% Days | | Annual Average | |
|---|---|---|---|---|---|---|
| | Absolute (dv) | Relative | Absolute (dv) | Relative | Absolute (dv) | Relative |
| IS1 | 0.0017 | 21.79% | 0.00003 | 0.63% | 0.0006 | 7.88% |
| IS2 | 0.0002 | 2.50% | 0.0001 | 1.26% | 0.0001 | 1.04% |
| IS3 | 0.0004 | 3.62% | 0.0003 | 9.13% | 0.0005 | 7.90% |
| IS4 | 0.0003 | 0.35% | 0.00001 | 2.00% | 0.0001 | 2.09% |

### *2.3.3 Timing of Emissions Reductions*

The interim operating strategy under the BART Alternative will take effect on the same compliance date established by EPA's BART FIP, December 5, 2017. This date is within the period of the first long-term strategy for regional haze. Beginning on this date, under the BART Alternative approved by ADEQ, SRP will remain obligated to maintain continuous compliance with one of the BART Alternative.

Under BART Alternative OS-1, seasonal curtailments followed by SCR on Unit 1, the final BART Alternative strategy (SCR installation and operation) will take effect later than the period of the first long-term strategy for regional haze. However, the additional emissions reductions associated with the final BART Alternative strategy (use of SCR on Unit 1) are not necessary to demonstrate that the CGS BART Alternative operating strategy would achieve greater reasonable progress than BART. This is because, as described in sub-section 2.3.2 above, the interim operating strategy by itself passes the two-prong test under 40 CFR 51.308(e)(3). Therefore, under OS-1, the interim operating strategy will provide visibility improvement compared to the BART control strategy, followed by an indefinite number of years of operation with the same emissions limitations as under the 2016 EPA BART Reconsideration. Thus, implementation of OS-1 will result in overall greater reasonable progress than BART and all necessary reductions will occur during the first long-term planning period under Arizona's regional haze requirements, consistent with 40 CFR § 51.308(e)(2)(iii).

Under BART Alternative OS-2, seasonal curtailments followed by Unit 1 shutdown, the final BART Alternative strategy (early retirement) will take effect no later than December 31, 2029. If SRP chooses OS-2, it must notify ADEQ and EPA of its decision to do so, and the early retirement of Unit 1 by no later than December 31, 2029 would become an enforceable term of the SIP. This is beyond the period of the first long-term strategy for regional haze. However, the additional emission reductions associated with the final compliance strategy are not necessary to demonstrate that the CGS BART alternative operating strategy would achieve greater reasonable progress than BART. This is because, as described in section 2.3.2 above, the interim operating strategy by itself passes the two-prong test under 40 CFR 51.308(e)(3). Therefore, under OS-2, the interim operating strategy will provide visibility improvement compared to the BART control strategy. Following the interim operating strategy, the final BART Alternative strategy (Unit 1 shutdown) would achieve greater emission reductions than the emission reductions that would be achieved under the BART control strategy. Thus, in all events, implementation of OS-2 will result in overall greater reasonable progress than BART and all necessary reductions will occur during the first long-term planning period under Arizona's regional haze requirements, consistent with 40 CFR § 51.308(e)(2)(iii).

### *2.3.4 Emissions Reductions During Interim Operating Strategy*

Information on emissions reductions under the BART Alternative is presented below. In Table 4, ADEQ compares estimated emissions under the baseline (without additional controls), BART control strategy (2016 EPA BART Reconsideration for NOx and 2012 ADEQ BART for $SO_2$ and PM), and BART Alternative operating strategies under the interim operating strategy (Table 4). Detailed emission calculations are provided in Appendix A, TSD, Section 4.

**Table 4: Annual Emission Reductions Associated with BART and Interim Operating Strategy (part of BART Alternative OS-1 and OS-2) as Compared to the 2014 Baseline Emissions**

| Strategy Comparison with Baseline* | NOx Reduction | | $SO_2$ Reduction | | PM Reduction** | |
|---|---|---|---|---|---|---|
| | (tons/year) | Percentage | (tons/year) | Percentage | (tons/year) | Percentage |
| BART Control Strategy | -4,096 | 63% | 0 | 0% | 0 | 0% |
| IS1 | -2,738 | 42% | -684 | 26% | -257 | 26% |
| IS2 | -1,453 | 22% | -649 | 24% | -136 | 14% |
| IS3 | -832 | 13% | -1,125 | 42% | -79 | 8% |
| IS4 | -972 | 15% | -820 | 31% | -79 | 8% |

**Reductions in emissions presented here are for both CGS units.*

***This PM metric includes only filterable PM emissions and does not include condensable PM emissions such as the $H_2SO_4$ and other PM emissions that would result from installation and operation of SCR at Unit 1 under the BART Control Strategy.*

As shown in Table 4, SRP's BART Alternative provides significant reductions in emissions of NOx, $SO_2$, and PM as compared to the 2014 baseline. Although the $NO_x$ reductions from the interim operating strategies would be less than the 63% reduction under the BART control strategy, each of the interim operating strategies would produce significant $SO_2$ and PM emissions reductions. $SO_2$ emissions reductions from the CGS units would range from 24% to 42%, and PM emissions reductions would range from 8% to 26%. This is because, under the BART Alternative, during the interim operating strategy period, SRP would reduce $SO_2$ emissions from both of the CGS units through (i) annual operation at a lower emissions rate under three of the interim operation strategies and/or (ii) seasonal curtailment of CGS Unit 1. In addition, under the interim operating strategies, SRP would reduce PM emissions through seasonal curtailment of CGS Unit 1.

Administrative and technical procedures for implementing the BART Alternative and associated monitoring and enforcement procedures are presented in the significant permit revision to the Title V permit for the facility included as Appendix B.

### *2.3.5 Surplus Emissions Reductions Associated with BART Alternative*

The base year for regional haze SIPs is 2002.[11] The emissions reductions resulting from the BART Alternative will be surplus to those reductions resulting from measures adopted to meet requirements of the Clean Air Act as of 2002.

### *2.3.6 Supplemental Analysis of IMPROVE Monitoring Data*

The relative contribution of $NO_x$, $SO_2$, and PM emissions reductions to visibility improvement is another

[11] See Memorandum from Lydia Wegman and Peter Tsirigotis, 2002 Base Year Emission Inventory SIP Planning: 8-hr Ozone, $PM_{2.5}$, and Regional Haze Programs, November 8, 2002.

important factor for determining the BART Alternative operating strategies. ADEQ discussed the relative contribution of $NO_x$ and $SO_2$ emissions to visibility impairment in the BART alternative Technical Support Document for AEPCO. Specifically, ADEQ noted in the AEPCO BART report that the $SO_2$-attributed visibility extinction is generally more than three times the $NO_x$-attributed visibility extinction.[12] For the CGS case, ADEQ further reviewed ammonium sulfate and ammonium nitrate data for all CGS-affected Class I areas over 2004-2014.[13] ADEQ found that the ratios of $SO_2$-attributed visibility extinction to $NO_x$-attributed visibility extinction averaged over all Class I areas are 3.7, 4.2 and 4.2 for the 20% best days, the 20% worst days, and all days, respectively.

ADEQ further reviewed the trends of $SO_2$-attributed visibility extinction and $NO_x$-attributed visibility extinction during 2004-2014 at Petrified Forest NP, the nearest Class I area to CGS. Moreover, ADEQ investigated how the $NO_x$- or $SO_2$-attributed visibility extinction data responded to the emission reductions of $NO_x$ and $SO_2$ from CGS and Arizona Public Service Company's Cholla facility ("Cholla"), two significant $NO_x$ and $SO_2$ stationary sources near the Petrified Forest NP area. ADEQ found that significant emission reductions of $SO_2$ from both facilities have resulted in the decrease of $SO_2$-attributed visibility extinction during 2004-2014. In contrast, $NO_x$-attributed visibility extinction appears to be independent of $NO_x$ emissions of CGS or Cholla. Although significant reductions of $NO_x$ emissions also occurred at both facilities during this period, the $NO_x$-attributed visibility extinctions did not reflect the benefits that would be expected to have resulted from the $NO_x$ emission controls. Based on the actual IMPROVE monitoring data, ADEQ believes that $SO_2$ emissions reductions would produce greater visibility improvements than $NO_x$ emissions reductions at CGS-affected Class I areas. The BART Alternative would realize a greater degree of visibility improvement than the BART control strategy due to significant reductions in $SO_2$ emissions under the interim operating strategy.

Detailed supplemental data analysis is presented in Appendix A, TSD, Section 5.7.

## 3.0 DEMONSTRATING NONINTERFERENCE UNDER CLEAN AIR ACT SECTION 110(l)

As described in the preceding sections, this revision to Arizona's Regional Haze program incorporates changes to the BART determination and control strategies for CGS. The revised control strategies are intended to replace those contained in the BART Control Strategy (Arizona's February 28, 2011 Arizona RH SIP and EPA's BART FIP, as modified by the 2016 EPA BART Reconsideration). Revisions to a submitted Arizona RH SIP must not interfere with the requirements of the CAA, as described in CAA Section 110(l):

> (l) *PLAN REVISIONS - Each revision to an implementation plan submitted by a State under this Act shall be adopted by such State after reasonable notice and public hearing. The Administrator shall not approve a revision of a plan if the revision would interfere with any applicable requirement concerning attainment and reasonable further progress (as defined in section 171), or any other applicable requirement of this Act.*[14]

This section demonstrates that this SIP revision will not interfere with the ability of the area to attain and maintain the NAAQS or any other requirement of the CAA. Based on the EPA's Draft Guidance on Demonstration of Noninterference under section 110(l), the "other applicable requirements" for this SIP

[12] "AEPCO Apache Generating Station BART Alternative Control Review Technical Support Document," ADEQ, April 15, 2014.
[13] http://vista.cira.colostate.edu/improve/Data/IMPROVE/summary_data.htm
[14] 42 U.S.C. § 7410(l), 2012; CAA § 110.

revision include: [15]

- Regional Haze under sections 169A and 169B of the CAA;
- Prevention of Significant Deterioration ("PSD");
- Maximum Achievable Control Technology ("MACT") for Air Toxics; and
- New Source Performance Standards ("NSPS").

Regarding compliance with PSD requirements, this SIP revision refers to the technical support document for the Significant Permit Revision (Appendix C: Technical Support Document for SPR #63088) that details the best available control technology ("BACT") determination for $H_2SO_4$, $PM_{10}$, and $PM_{2.5}$ as well as the NAAQS and PSD increment modeling for $PM_{10}$ and $PM_{2.5}$. This document will focus on the demonstration of noninterference with NAAQS and noninterference with Regional Haze regulations.

## 3.1 Demonstrating Noninterference with Attainment of the National Ambient Air Quality Standards (NAAQS)

As indicated above, a state must accompany each revision to an air quality SIP with a demonstration that the SIP revision will not interfere with attainment or maintenance of the NAAQS or with applicable requirements for reasonable further progress ("RFP"). In determining noninterference, ADEQ examined emissions expectations during 2015-2035, including annual emissions expectations during the 2017 to 2029 period, for the relevant pollutants (PM, $SO_2$, and $NO_x$) under the BART Alternative (Appendix A, TSD, Section 4.3). ADEQ also went one step further to examine potential impacts the revised control measures may have on the attainment and maintenance of the ozone NAAQS.

ADEQ's analysis and findings are described below, starting with the relevant regulatory background in Section 3.1.1. Sections 3.1.2, 3.1.3, 3.1.4, and 3.1.5 evaluate and discuss potential impacts on the NAAQS for PM, $SO_2$, $NO_2$, and ozone, respectively.

### *3.1.1 Regulatory Background*

Title I of the CAA requires EPA to set NAAQS for pollutants that are designated harmful to public health or the environment. It must set both primary and secondary standards for each regulated pollutant that is designated by the Agency. Primary standards must specify threshold levels that ensure the protection of public health, whereas secondary standards are designed to protect public welfare (i.e., decreased visibility, and damage to animals, crops, vegetation, and buildings). To date, EPA has established primary and secondary NAAQS for six air pollutants, commonly referred to as criteria pollutants, which are: carbon monoxide ("CO"), lead ("Pb"), nitrogen dioxide ("$NO_2$"), ground-level ozone ("$O_3$"), particulate matter ("PM"), and sulfur dioxide ("$SO_2$"). EPA is required by the CAA to periodically evaluate and revise the air quality standards, when necessary, to ensure the protection of the public's health and welfare.

CAA Section 107(d) directs each state to make recommendations of designation of, and EPA to designate, areas within that state's jurisdiction as either: 1) meeting the NAAQS ("attainment"), 2) not meeting the NAAQS ("nonattainment"), or 3) cannot be classified ("unclassifiable"). EPA will designate an area "nonattainment" when the air quality data shows that those locations are violating or contributing to violations in a nearby area of a NAAQS for a criteria pollutant. A state is required to create a nonattainment SIP describing its plan for achieving attainment of the NAAQS by the applicable deadline, as well as RFP towards attainment of the NAAQS in the interim. Once an area reaches attainment status, the state is then required to develop and submit a maintenance SIP for approval prior to re-designation of the area to

[15] http://www.4cleanair.org/Oldmembers/members/committee/criteria/110STAPPA.pdf

attainment.

EPA will designate an area as "attainment" or "unclassifiable" when the air quality data shows that those areas are not violating the NAAQS or there is not enough data to determine violations exist. Areas designated as attainment or unclassifiable are not required to create attainment plans since those areas have not been determined to violate the relevant NAAQS. Instead, attainment areas must show noninterference with the continued attainment and maintenance of the NAAQS as part of the initial infrastructure SIP, which is submitted within three years after the NAAQS is promulgated. If air quality monitoring data later shows that an attainment area is in violation of the NAAQS following a prior designation as attainment, it will be re-designated as nonattainment and then will be required to develop an attainment plan.

CGS is located in Apache County. The area is currently designated as attainment or unclassifiable for CO, Pb, $NO_2$, $O_3$ (2008 NAAQS), $PM_{2.5}$ (1997, 2006, and 2012 NAAQS), $PM_{10}$, and $SO_2$ (1971 NAAQS).[16] Although designations have not yet been made for the 2010 $SO_2$ NAAQS, the area was recommended as attainment or unclassifiable for that NAAQS under CAA Section 107(d)(1)(A).[17] In addition, designations have not yet been made for the 2015 $O_3$ NAAQS. Table 5 shows the current designation status of the area for each criteria pollutant listed in 40 CFR § 81.303.[18]

**Table 5: Attainment Status for Apache County, Arizona**

| Pollutant | Primary/Secondary | Averaging Time | Designation |
|---|---|---|---|
| Carbon Monoxide | Primary (1971) | 8-hour | Unclassifiable/Attainment |
| | | 1-hour | Unclassifiable/Attainment |
| Lead | Primary and Secondary (2008) | Rolling 3 Month Average | Unclassifiable/Attainment |
| Nitrogen Dioxide | Primary (2010) | 1-hour | Unclassifiable/Attainment |
| | Primary and Secondary (1971) | Annual | Cannot be classified or better than national standards |
| Ozone | Primary and Secondary (2015) | 8-hour | Yet to be designated |
| | Primary and Secondary (2008) | 8-hour | Unclassifiable/Attainment |
| $PM_{2.5}$ | Primary (2012) | Annual | Unclassifiable/Attainment |
| | Secondary (1997) | Annual | Unclassifiable/Attainment |
| | Primary and Secondary (2006) | 24-hour | Unclassifiable/Attainment |
| $PM_{10}$ | Primary and Secondary (1987) | 24-hour | Unclassifiable |
| Sulfur Dioxide | Primary (2010) | 1-hour | Not yet designated |
| | Primary (1971) | 24-hour | Better than national standards |
| | Primary (1971) | Annual | Better than national standards |
| | Secondary (1971) | 3-hour | Better than national standards |

[16] *See* EPA, *The Green Book Nonattainment Areas for Criteria Pollutants*, at http://www.epa.gov/airquality/greenbook/ (last visited June 22, 2016).
[17] *See generally* ADEQ, *Air Quality Division: Plans*, at http://www.azdeq.gov/environ/air/plan/pm2.5.html and http://www.azdeq.gov/environ/air/plan/so2.html.
[18] 40 CFR § 81.303, 2013.

### *3.1.2 Noninterference with Attainment of NAAQS for $PM_{10}$ and $PM_{2.5}$*

For the BART Alternative OS-1, where a SCR system will be installed and operated on Unit 1, the PM emissions control strategies in the SIP are generally consistent with those of the 2011 AZ SIP except that they include a seasonal curtailment period, resulting in lower annual PM emissions during 2017-2029. The BART Alternative OS-2 also includes a seasonal curtailment period from 2017 to the date of unit closure. The shutdown of Unit 1 would significantly reduce facility-wide PM emissions, resulting in additional long-term environmental benefits. For either of the options, the PM annual emissions would be equal to or lower than the existing emissions for any period.

The CGS facility is located in Apache County, Arizona. The area is currently designated as attainment or unclassifiable for $PM_{10}$ and $PM_{2.5}$, and there are no nonattainment or maintenance SIPs that would rely on emission reductions at CGS to ensure continued attainment of the NAAQS. The BART Alternative OS-2 would result in significant emission reductions of $PM_{10}$ and primary $PM_{2.5.}$ Under the BART Alternative OS-1, the installation of a SCR system would result in significant increases in emissions of $H_2SO_4$ and thus emissions of $PM_{10}$ and primary $PM_{2.5}$ by December 31, 2029. However, the dispersion modeling analysis indicates that these emissions increases will comply with the NAAQS for $PM_{10}$ and $PM_{2.5}$ (Appendix C: Technical Support Document for SPR #63088). Moreover, both options would achieve significant emission reductions of $SO_2$ and $NO_x$ (as discussed later in Sections 3.1.3 and 3.1.4), which is an effective strategy for reducing secondary $PM_{2.5}$ formation. Therefore, the BART Alternative will not result in any interference with attainment or maintenance of the $PM_{10}$ and $PM_{2.5}$ NAAQS or with RFP requirements.

### *3.1.3 Noninterference with Attainment of NAAQS for $SO_2$*

For the BART Alternative OS-1 with SCR installation on Unit 1, the $SO_2$ emissions control strategies are generally consistent with or more stringent than those of the 2011 AZ SIP and moreover include a seasonal curtailment period, which will result in lower annual emissions during the period of the interim operating strategy. The BART Alternative OS-2 also includes a seasonal curtailment period from December 2017 to the date of unit closure. The shutdown of Unit 1 would significantly reduce facility-wide $SO_2$ emissions, resulting in additional long-term environmental benefits. For either of the options, the $SO_2$ annual emissions would be equal to or lower than the existing emissions for all periods.

Apache County is designated as "better than national standard" for the 1971 $SO_2$ NAAQS. Although designations have not yet been made for the 2010 $SO_2$ NAAQS, the area was recommended as attainment/unclassifiable under CAA Section 107(d)(1)(A). There are no nonattainment or maintenance SIPs that rely on emission reductions at CGS to ensure continued attainment of the NAAQS. Because the BART Alternative for CGS will result in $SO_2$ emissions that are equal to or lower than the Arizona RH SIP during all periods, the BART Alternative will not interfere with attainment or maintenance of the $SO_2$ NAAQS or with RFP requirements.

### *3.1.4 Noninterference with Attainment of NAAQS for $NO_2$*

Under the BART Alternative OS-1 with SCR installation on Unit 1, the implementation of the interim operating strategy would moderately or slightly reduce $NO_x$ emissions during 2017-2029 due to seasonal curtailment. From the year 2030 onwards, the installation of a SCR system at Unit 1 would achieve significant additional emission reductions of $NO_x$. The BART Alternative OS-2 includes a seasonal curtailment period from late 2017 to the date of unit closure. The shutdown of Unit 1 would significantly reduce facility-wide $NO_x$ emissions, resulting in additional long-term environmental benefits. For either of the options, the $NO_x$ annual emissions would be lower than the existing emissions for all periods.

Apache County is currently designated as attainment/unclassifiable for the $NO_2$ NAAQS, and there are no nonattainment or maintenance SIPs that rely on emission reductions at CGS to ensure continued attainment

of the NAAQS. Since the control strategies at CGS will result in $NO_x$ emission reductions relative to the existing operating conditions of the facility, they will not interfere with attainment or maintenance of the $NO_2$ NAAQS.

The $NO_x$ emissions during 2017-2029 under the BART Alternative are higher than those under the EPA FIP or BART Reconsideration. While the BART Alternative is less stringent than the EPA FIP for $NO_x$ controls during 2017-2029, Section 110(l) of the CAA does not require a BART alternative to be more stringent for emission controls for each criteria pollutant in every instance, and at every point in time, to supersede a prior BART determination. Rather, Section 110(l) of the CAA addresses whether the SIP revisions will interfere with attainment of the NAAQS or RFP. Apache County does not rely on the EPA FIP for CGS to ensure continued attainment of the $NO_2$ NAAQS or to meet any RFP requirements. The EPA FIP does not represent existing control measures that have been implemented for attainment or maintenance of the NAAQS. Facility-wide emissions of NOx at CGS will continue to be reduced under the BART Alternative compared to current levels. The SIP revision will improve current air quality.

### *3.1.5 Noninterference with Attainment of NAAQS for Ozone*

Ozone is formed when volatile organic compounds, $NO_x$ and oxygen combine in the atmosphere in the presence of sunlight. Apache County is designated attainment/unclassifiable for the 2008 ozone NAAQS. There is no evidence that Apache County will violate the 2015 NAAQS, and the proposed boundaries of the nonattainment area for the 2015 ozone NAAQS issued by ADEQ on May 31, 2016 do not include Apache County.[19] There are no nonattainment or maintenance SIPs that might rely on emission reductions at CGS to ensure continued attainment of the NAAQS or to meet RFP requirements. As explained above, the BART Alternative is less stringent for $NO_x$ (a precursor of ozone) than the EPA FIP during 2017-2029. However, Apache County does not rely on the EPA FIP for CGS to ensure continued attainment of the ozone NAAQS or to meet any RFP requirements. Therefore, the BART Alternative will not interfere with attainment or maintenance of the NAAQS for ozone.

## 3.2 Demonstrating Noninterference with Regional Haze Program Requirements

To address the problem of regional haze, EPA adopted the Regional Haze Rule in 1999. This rule requires states to adopt regional haze plans to incrementally improve visibility in all Class 1 areas over the next 60 years. The first regional haze plan must include Reasonable Progress Goals ("RPG") for each Class I area for the year 2018, also known as the "2018 milestone year."

The CAA requires the installation and operation of BART as expeditiously as practicable, but in no event later than five years after the date of approval of a SIP or promulgation of a FIP.[20] Therefore, if it remains in place unchanged, the EPA FIP for CGS will take effect in December 2017. Arizona's RH SIP also included a long-term strategy for making reasonable progress toward restoring visibility at Class I areas to natural conditions by 2064. EPA's rules define long-term as ten years, and Arizona's long-term strategy, submitted to EPA in 2011, includes emission reductions and visibility improvements that are expected by 2018.

As presented in Appendix A, TSD, Section 5, the BART Alternative (including the interim operating strategy) would achieve greater overall visibility benefits on average as compared to the BART Control Strategy. BART Alternative OS-1 (SCR installation) would achieve greater visibility improvement than BART during implementation of the interim operating strategy and would achieve emission reductions

[19] http://legacy.azdeq.gov/calendar/draft_rpt_naaqs.pdf (last visited on July 12, 2016)
[20] 42 U.S.C. § 7491, 2012; CAA § 169A.

identical to the BART Control Strategy once SCR is installed and operating. BART Alternative OS-2 (shutdown) would achieve greater visibility improvement than BART during implementation of the interim operating strategy and would achieve greater long-term visibility benefits than the BART Control Strategy at and subsequent to the time of the Unit 1 shutdown. Therefore, the BART Alternative operating strategies will not interfere with the requirements of the Regional Haze program.

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# APPENDIX A

# Technical Support Document for Regional Haze State Implementation Plan Revision for the Salt River Project Coronado Generating Station

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# Technical Support Document for Regional Haze State Implementation Plan Revision for the Coronado Generating Station

**July 19, 2016**

**Arizona Department of Environmental Quality**

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# 1. Introduction

This document provides technical support (Technical Support Document or TSD) for a source-specific revision to the Arizona Regional Haze State Implementation Plan (Arizona RH SIP) that establishes best available retrofit technology (BART) for Unit 1 at Salt River Project Agricultural Improvement and Power District's (SRP) Coronado Generating Station (CGS).

CGS consists of two pulverized coal-fired, electric utility boilers (Units 1 and 2), which generate approximately 762 megawatts (MW) (net) of electricity. Units 1 and 2 were completed and started operation in 1979-1980. CGS generates electricity for sale and the SIC code for this operation is 4911. Units 1 and 2 are dry-bottom turbo-fired boilers with a net rated output of 380 MW and 382 MW, respectively, primarily firing low-sulfur western coals. Both units are Regional Haze Program - BART eligible units per 40 CFR § 51.301. ADEQ determined that CGS units may reasonably be anticipated to cause or contribute to visibility impairment at a Class I area and, as such, are subject to BART.

On February 28, 2011, ADEQ submitted to EPA the state's initial Regional Haze SIP for the first planning period of the regional haze program. This submission included BART determinations for CGS Units 1 and 2. On December 5, 2012, EPA issued a final rule approving in part and disapproving in part ADEQ's Regional Haze SIP.[1] EPA also promulgated a federal implementation plan (FIP) for the CGS units with an oxides of nitrogen (NOx) emission limit of 0.065 pounds per million British thermal unit (lb/MMBtu), applicable across both CGS units on a 30-boiler-operating-day average basis. The final compliance date for the BART FIP NOx limit is December 5, 2017 (five years from the date of publication of the FIP) and involves installation and operation of selective catalytic reduction (SCR) systems for control of NOx emissions on both CGS units. Unit 2 was equipped with SCR in 2014, as required by a consent decree between SRP and the United States.[2]

SRP filed a petition for administrative reconsideration of the NOx BART determination for CGS with EPA in February 2013. EPA granted reconsideration of the NOx emission limit and compliance methodology (i.e., the methodology used to calculate compliance with the plant-wide average) in April 2013. On March 31, 2015, EPA proposed revisions to the NOx BART determination for CGS units.[3] The proposal established a Unit 1 BART NOx limit of 0.065 lb/MMBtu and a Unit 2 BART NOx limit of 0.080 lb/MMBtu (2016 EPA BART Reconsideration). Both limits are to be met on a 30-boiler-operating-day average. EPA did not propose to change the initial compliance date for the NOx BART limits, which remains December 5, 2017. EPA has taken final action on the reconsideration proposal, which was published in the Federal Register on April 13, 2016, approving the unit-specific BART NOx limit of 0.065 lb/MMBtu for Unit 1 and unit-specific NOx BART limit of 0.080 lb/MMBtu for Unit 2 (2016 EPA BART Reconsideration).

In June 2014, EPA released its proposed Carbon Pollution Emission Guidelines for Existing Electric Utility Generating Units, commonly referred to as the Clean Power Plan (CPP). This rule package was finalized in August 2015.[4] In the rule, EPA had given states until September 2018 to submit final plans outlining how they will meet the requirements set forth by EPA in the final CPP. On February 9, 2016, the U.S. Supreme Court granted a stay, halting implementation of the CPP pending the resolution of legal challenges to the program in court. This action has created additional uncertainty for SRP with respect to the nature and timing of its compliance obligations for the CGS units.

[1] 77 Fed. Reg. 72512 (Dec. 5, 2012).
[2] United States v. Salt River Project Agricultural Improvement and Power District, Civil Action No. 2:08-cv-1479- JAT (D. Ariz.), August 12, 2008.
[3] 80 Fed. Reg. 17010 (Mar. 31, 2015).
[4] The final rule was published at 80 Fed. Reg. 64,662 (Oct. 23, 2015).

On January 22, 2016, SRP submitted an Application for a Significant Permit Revision and a Regional Haze State Implementation Plan Revision for CGS to ADEQ. On July 19, 2016, SRP submitted addendums to the application. In this submittal, SRP requested that ADEQ adopt the BART Alternative as a revision to the Arizona Regional Haze SIP and submit the revision to EPA for approval.

# 2. BART Alternative Operating Strategies for CGS

To meet the requirements of the RHR, ADEQ evaluated a BART Alternative comprising two alternative operating strategies as better-than-BART (BTB) compliance options as follows.

## *2.1 Operating Strategy (OS-1): Seasonal Curtailments Followed by SCR on Unit 1*

This operating strategy requires SRP to comply with the Unit 1 interim BART Alternative operating strategy referred to as interim operating strategy (IS) followed by installation of an SCR system on Unit 1 no later than December 31, 2029 to achieve a NOx limit of 0.065 lb/MMBtu at Unit 1 on a 30-boiler-operating-day average. The interim operating strategy includes four separate seasonal curtailment periods for CGS Unit 1 coupled with options for operation at lower sulfur dioxide ($SO_2$) emissions rates below the BART limits at both units and a NOx emissions rate below the permit limit at Unit 1. In each year, the length of the required curtailment period for CGS Unit 1 is dependent on the NOx emissions performance of Unit 1 and the $SO_2$ emissions performance of Units 1 and 2.

## *2.2 Operating Strategy (OS-2): Seasonal Curtailments Followed by Unit 1 Shutdown*

Under this operating strategy, SRP would comply with the interim operating strategy followed by permanent cessation of operation of Unit 1 no later than December 31, 2029.

## *2.3 BART Alternative Implementation Schedule*

Under the BART Alternative, the interim operating strategy will take effect on December 5, 2017, the compliance date established by EPA's BART FIP. In the first year of implementation, Unit 1 will begin the interim operating strategy on December 5 and end according to the emissions performance of that year. In subsequent years, the interim operating strategy will begin and end according to the emission performance of the corresponding year. Once SRP achieves certainty regarding future operation of CGS Unit 1 under a final approved CPP state plan (if the CPP remains in effect), SRP will finalize its choice of BART Alternative operating strategy and will submit a notification to EPA and ADEQ regarding the same. This notification will be made no later than December 31, 2026.

The CPP is currently stayed by the Supreme Court, increasing uncertainty about the schedule for implementation of the rule and thus impacting SRP's ability to finalize plans regarding CGS. Based on the anticipated litigation schedule, there will likely not be a final decision in the CPP litigation until at least 2018. Assuming the CPP implementation schedule revision provides a day-for-day compliance deadline extension to account for the stay, initial compliance could be expected to begin in 2025, 1 year prior to the 2026 BART Alternative Option selection deadline. With additional pre-notification planning and recognizing the need to potentially take other preliminary steps prior to the notification deadline, SRP expects that it will have sufficient time to design and construct an SCR if it selects OS-1 and to make the necessary resource arrangements if it selects OS-2.

If SRP selects OS-1, SRP will apply the interim operating strategy until an SCR system is installed and operating, which will occur no later than December 31, 2029. If SRP selects OS-2, SRP will apply the interim operating strategy until the Unit 1 closure, which will occur no later than December 31, 2029.

Figure 1 shows an overview of the BART Alternative operating strategies for CGS.

**Figure 1: Overview of BART Alternative Operating Strategies for CGS Unit 1**

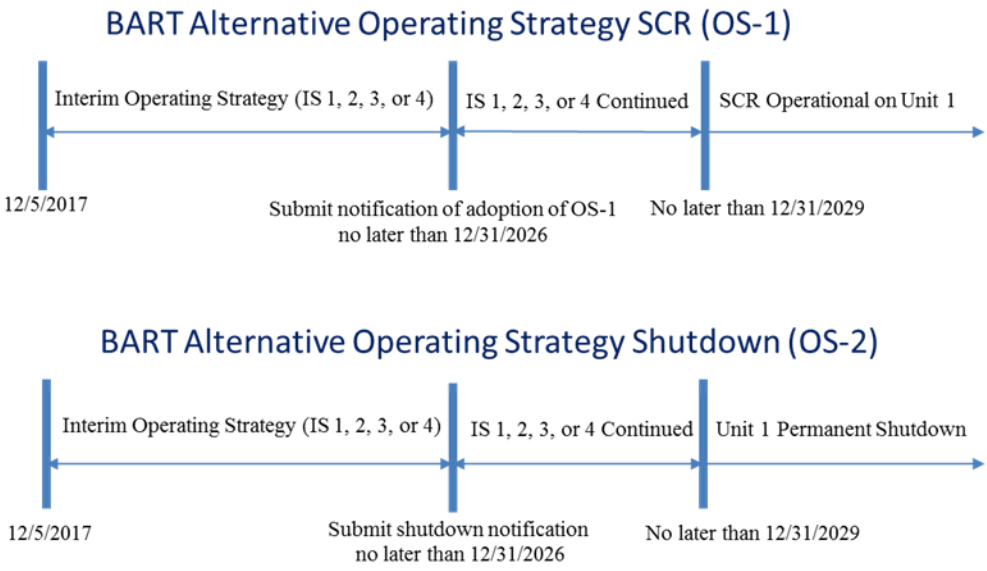



Table 1 lists the emission limits for Unit 1 and Unit 2 and the curtailment periods for Unit 1 for the four seasonal curtailment options under the interim operating strategy. For comparison purposes, the emission limits required by the 2016 EPA BART Reconsideration for NOx and the 2012 ADEQ BART for $SO_2$ as approved by EPA (hereinafter referred to as "BART control strategy") are also included in Table 1. The interim operating strategy and compliance methods are incorporated as a new Attachment "E" to the facility's Operating Permit #52639 revised by significant permit revision #63088.

**Table 1: Emission Limits for CGS under BART Alternative Operating Strategies**

| Control Strategy | | Unit 1 (lb/MMBtu) (30-boiler-operating-day average) | | Unit 2 $SO_2$ (lb/MMBtu) (30-boiler-operating-day average) | Unit 1 Curtailment Period |
|---|---|---|---|---|---|
| | | NOx | $SO_2$ | | |
| BART control strategy (2016 EPA BART Reconsideration for NOx and 2012 ADEQ BART for $SO_2$) | | 0.065 | 0.080 | 0.080 | N/A |
| BART Alternative Operating Strategy SCR Option (OS-1) | | | | | |
| Interim Operating Strategy | IS1 | 0.320 | 0.080 | 0.080 | Oct. 1-Apr. 15 |
| | IS2 | 0.320 | 0.070 | 0.070 | Oct. 21-Jan. 31 |
| | IS3 | 0.320 | 0.050 | 0.050 | Nov. 21-Jan. 20 |
| | IS4 | 0.310 | 0.060 | 0.060 | Nov. 21-Jan. 20 |
| Final BART Alternative Strategy | SCR Installation and Operation no later than December 31, 2029. | 0.065 | 0.080 | 0.080 | N/A |
| BART Alternative Operating Strategy Shutdown Unit 1 Option (OS-2) | | | | | |
| Interim Operating Strategy | IS1 | 0.320 | 0.080 | 0.080 | Oct. 1-Apr. 15 |
| | IS2 | 0.320 | 0.070 | 0.070 | Oct. 21-Jan. 31 |
| | IS3 | 0.320 | 0.050 | 0.050 | Nov. 21-Jan. 20 |
| | IS4 | 0.310 | 0.060 | 0.060 | Nov. 21-Jan. 20 |
| Final BART Alternative Strategy | Unit Closure no later than December 31, 2029. | 0.000 | 0.000 | 0.080 | N/A |

# 3. Applicable Regulatory Requirements and Elements of TSD

## *3.1 RHR Provisions for BART Alternatives*

The RHR contains provisions whereby a state may choose to implement measures as an alternative to BART if the state can demonstrate that the alternative measure achieves greater reasonable progress toward achieving natural visibility conditions than would be achieved through the installation, operation, and maintenance of BART. The requirements for alternative measures are established at 40 CFR 51.308(e)(2) and (3). As explained in the RHR, the state must demonstrate that all necessary emission reductions will take place during the first long term strategy period (i.e., by 2018) and that the emissions reductions resulting from the alternative measure will be surplus to those reductions resulting from measures adopted to meet requirements of the CAA as of the baseline date of the SIP.

40 CFR § 51.308(e)(2)(i) establishes five criteria for demonstrating that BART alternative measures will achieve greater reasonable progress than would have resulted from installation and operation of BART, as follows:

- A list of all BART-eligible sources. ADEQ included a list of all BART-eligible sources in the Arizona Regional Haze SIP;

- A list of all BART-eligible sources that would be covered by the BART alternative. The BART alternative covers emissions from CGS Units 1 and 2;

- An analysis of BART and associated emissions reductions from the units covered by the BART alternative;

- An analysis of projected emissions reductions through application of the BART alternatives; and

- A determination that the alternative "achieves greater reasonable progress than would be achieved through the installation and operation of BART at the covered sources." The determination is to be made based either on the relevant criteria in 40 CFR § 51.308(e)(3) or on the "clear weight of evidence" as provided in 40 CFR § 51.308(e)(2)(i)(E)

40 CFR § 51.308(e)(3) specifies two tests for determining whether the BART Alternative achieves greater reasonable progress than BART. If the distribution of emissions under the alternative measure is not substantially different than under BART, and the alternative measure results in greater emissions reductions, then the alternative measure may be deemed to achieve greater reasonable progress. However, if the distribution of emissions is significantly different, or if the alternative measure does not result in greater emissions reductions, then a dispersion modeling analysis to determine the differences in visibility between BART and the BART Alternative may be conducted for each impacted Class I area, for the worst and best 20% of days (W20% and B20% days). The modeling demonstrates "greater reasonable progress" if both of the following criteria are met:

- Visibility does not decline in any Class I area; and

- There is an overall improvement in visibility, determined by comparing the average differences between BART and the BART Alternative over all affected Class I areas.

ADEQ has determined that the BART Alternative operating strategies do not necessarily achieve greater emissions reductions than the 2016 EPA BART Reconsideration, because, although there will be greater $SO_2$ and PM emissions reductions under the alternative, there will be higher NOx emissions as compared to BART

for CGS. SRP opted to performed a dispersion modeling analysis to demonstrate that the BART alternative would result in "greater reasonable progress" consistent with the two-prong test above.

## 3.2 Section 110 (l) of the Clean Air Act

Section 110(l) of the Clean Air Act (CAA) indicates that EPA cannot approve a State Implementation Plan (SIP) revision if the revision would interfere with any applicable requirement concerning attainment and reasonable further progress (RFP), or any other applicable requirement of the CAA. Therefore, EPA will approve a SIP revision that removes or modifies control measure(s) in the SIP only after the State has demonstrated that such removal or modification will not interfere with attainment of the National Ambient air Quality Standards (NAAQS), Rate of Progress (ROP), RFP or any other applicable requirement of the CAA.

Specifically, section 110(l) states:

> "*Each revision to an implementation plan submitted by a State under this Act shall be adopted by such State after reasonable notice and public hearing. The Administrator shall not approve a revision of a plan if the revision would interfere with any applicable requirement concerning attainment and reasonable further progress (as defined in section 171), or any other applicable requirement of this Act*."

Section 110(l) applies to all requirements of the CAA and to all areas of the country, whether attainment, nonattainment, unclassifiable or maintenance for one or more of the six criteria pollutants: ozone, particulate matter (PM), nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$), carbon monoxide (CO), and lead (Pb). Section 110(l) is not limited in scope to those SIP revisions that only impact ambient air quality. Therefore, the demonstration of noninterference under section 110(l) should address not only NAAQS but all other applicable requirements. The EPA's Draft Guidance on Demonstration of Noninterference under section 110(l) lists many other applicable requirements such as Regional Haze under sections 169A and 169B of the CAA, Prevention of Significant Deterioration (PSD), Maximum Achievable Control Technology (MACT) for Air Toxics, New Source Performance Standards (NSPS), etc.[5]

Under the first BART Alternative operating strategy (OS-1), in which an SCR system is installed on Unit 1, PSD review will be triggered for collateral emissions increases for three pollutants: particulate matter less than 10 micrometers (µm) mean aerodynamic diameter ($PM_{10}$), particulate matter less than 2.5 µm mean aerodynamic diameter ($PM_{2.5}$), and sulfuric acid mist ($H_2SO_4$). Regarding compliance with the PSD requirement, this TSD refers to the technical supporting document for significant permit revision #63088 (Appendix C of SIP document) that details the best available control technology (BACT) determination for $H_2SO_4$, $PM_{10}$, and $PM_{2.5}$ as well as the NAAQS and PSD increment modeling for $PM_{10}$ and $PM_{2.5}$. This TSD will focus on the demonstration of noninterference with NAAQS and noninterference with Regional Haze regulations under sections 169A and 169B of the CAA.

## 3.3 Elements of TSD

To address the regulatory requirements as presented above, this TSD includes the following two elements:

- **Annual Emissions Analysis (Section 4)**. This section compares estimated emissions under baseline, BART control strategy, and BART Alternative operating strategies. The results are used to address the emission reduction provisions of 40 CFR § 51.308 as well as the demonstration of noninterference with NAAQS under Section 110(l) of CAA.

[5] http://www.4cleanair.org/Oldmembers/members/committee/criteria/110STAPPA.pdf

- **Visibility Impact Analysis (Section 5)**. This section compares the visibility impacts from CGS units on nearby Class I areas under baseline, BART control strategy, and the interim operating strategy under the two BART Alternative operating strategies. In particular, this section evaluates each of the interim operating strategies to demonstrate that each of these strategies achieves greater overall visibility benefits on average as compared to BART for CGS, consistent with 40 CFR § § 51.308(e)(2)(i) and 40 CFR § 51.308(e)(3). This section also demonstrates that the control strategies for CGS are consistent with the long-term goals and plans of the RHR and will not interfere with regional haze requirements under sections 169A and 169B of the CAA.

# 4. Annual Emissions

This section presents and compares estimated emissions under the baseline (without additional controls), the BART control strategy, and the interim operating strategy under the BART Alternative operating strategies. The results are used to address the emission reduction requirements under 40 CFR § 51.308 as well as the demonstration of noninterference with NAAQS under Section 110(l) of the CAA.

## *4.1 Scenarios for Emissions Evaluation*

Six scenarios were evaluated. Two of the scenarios are the baseline and the BART control strategy as follows:

- **2014 Baseline**. This scenario reflects 2008 consent decree (CD) controls, which include new wet flue gas desulfurization (FGD) and low NOx burners (LNB) with over-fired air (OFA) on both units, and SCR on Unit 2.

- **BART Control Strategy (2016 EPA BART Reconsideration for NOx and 2012 ADEQ BART for $SO_2$ and PM)**. This scenario adjusts the NOx limitation to reflect 2016 EPA BART reconsideration. This scenario is consistent with 2012 ADEQ BART for $SO_2$ and PM, reflecting wet FGD controls for $SO_2$ and hot-side ESP controls for PM for both CGS units. Compared to the 2014 Baseline scenario, this scenario adjusts the NOx emission limit for Unit 1.

In addition, there are the following four seasonal curtailment options under the interim operating strategy for the BART Alternative:

- **IS1.** This scenario is identical to the 2014 Baseline scenario except that it includes a seasonal curtailment period from October 1 to April 15 for Unit 1.

- **IS2.** Compared to the 2014 Baseline scenario, this scenario incorporates operation at a lower $SO_2$ emissions rate for both units and a seasonal curtailment period from October 21 to January 31 for Unit 1.

- **IS3.** Compared to the 2014 Baseline scenario, this scenario incorporates operation at a lower $SO_2$ emissions rate for both units and a seasonal curtailment period from November 21 to January 20 for Unit 1. IS3 has a lower $SO_2$ emissions rate for both units and a shorter seasonal curtailment period than does IS2.

- **IS4.** Compared to the 2014 Baseline scenario, this scenario incorporates operation at a lower $SO_2$ emissions rate for both units, a lower NOx emissions rate for Unit 1, and a seasonal curtailment period from November 21 to January 20 for Unit 1. IS4 has a slightly higher $SO_2$ emissions rate for both units and a lower NOx emissions rate for Unit 1 than does IS3, and the same seasonal curtailment period as IS3.

Annual NOx, $SO_2$, and PM emissions were calculated using the operating parameters in Table 2. For comparison purposes, all scenarios were assumed to have the same average heat input rate and the same percentage for the annual (non-curtailed) utilization factor. For the interim operating strategy, utilization factors are based on the seasonal curtailment options of Unit 1 operations.

Average daily heat inputs for CGS Units 1 and 2 were derived from the Clean Air Markets Division (CAMD) heat input data for the period of 2008 to 2010, for operational hours on a daily basis.[6] This data set was also used to calculate the annual utilization rate using the hours of operation for each unit and the total number of

[6] Data available at the Clean Air Market Divisions website: http://ampd.epa.gov/ampd.

hours in the period.

The 2014 baseline emission factors are from the 2008 CD.[7] The BART control strategy reflects the 2016 EPA BART Reconsideration for NOx[8] and the 2012 ADEQ BART for $SO_2$ and PM for the two units.[9] The emission factors for IS 1-4 are previously presented in Table 1.

**Table 2: Parameters Used for Emissions Estimation for Baseline, BART and Interim Operating Strategy**

| Scenario | Unit | Pollutant | Average EF (lb/MMBtu) | Average Heat Input (MMBtu/hr) | Annual Utilization Rate |
|---|---|---|---|---|---|
| 2014 Baseline | Unit 1 | NOx | 0.320 | 3,986 | 92% |
| | | $SO_2$ | 0.080 | 3,986 | 92% |
| | | PM | 0.030 | 3,986 | 92% |
| | Unit 2 | NOx | 0.080 | 4,018 | 97% |
| | | $SO_2$ | 0.080 | 4,018 | 97% |
| | | PM | 0.030 | 4,018 | 97% |
| BART Control Strategy | Unit 1 | NOx | 0.065 | 3,986 | 92% |
| | | $SO_2$ | 0.080 | 3,986 | 92% |
| | | PM | 0.030 | 3,986 | 92% |
| | Unit 2 | NOx | 0.080 | 4,018 | 97% |
| | | $SO_2$ | 0.080 | 4,018 | 97% |
| | | PM | 0.030 | 4,018 | 97% |
| IS1 (Unit 1 curtailment period Oct 1 to April 15) | Unit 1 | NOx | 0.320 | 3,986 | 43% |
| | | $SO_2$ | 0.080 | 3,986 | 43% |
| | | PM | 0.030 | 3,986 | 43% |
| | Unit 2 | NOx | 0.080 | 4,018 | 97% |
| | | $SO_2$ | 0.080 | 4,018 | 97% |
| | | PM | 0.030 | 4,018 | 97% |
| IS2 (Unit 1 curtailment period Oct 21 to Jan 31) | Unit 1 | NOx | 0.320 | 3,986 | 66% |
| | | $SO_2$ | 0.070 | 3,986 | 66% |
| | | PM | 0.030 | 3,986 | 66% |
| | Unit 2 | NOx | 0.080 | 4,018 | 97% |
| | | $SO_2$ | 0.070 | 4,018 | 97% |
| | | PM | 0.030 | 4,018 | 97% |
| IS3 (Unit 1 curtailment period Nov 21 to Jan 20) | Unit 1 | NOx | 0.320 | 3,986 | 77% |
| | | $SO_2$ | 0.050 | 3,986 | 77% |
| | | PM | 0.030 | 3,986 | 77% |
| | Unit 2 | NOx | 0.080 | 4,018 | 97% |
| | | $SO_2$ | 0.050 | 4,018 | 97% |
| | | PM | 0.030 | 4,018 | 97% |
| IS4 (Unit 1 curtailment period Nov 21 to Jan 20) | Unit 1 | NOx | 0.310 | 3,986 | 77% |
| | | $SO_2$ | 0.060 | 3,986 | 77% |
| | | PM | 0.030 | 3,986 | 77% |
| | Unit 2 | NOx | 0.080 | 4,018 | 97% |
| | | $SO_2$ | 0.060 | 4,018 | 97% |
| | | PM | 0.030 | 4,018 | 97% |

[7] United States v. Salt River Project Agricultural Improvement and Power District, Civil Action No. 2:08-cv-1479- JAT (D. Ariz.), August 12, 2008.
[8] 81 Fed. Reg. 21735 (Apr. 13, 2016).
[9] 77 Fed. Reg. 72512 (Dec. 5, 2012).

## *4.2 Annual Emissions Estimation and Comparison*

Table 3 presents the estimates of annual emissions of PM, NOx, and $SO_2$ under varied operating scenarios.

**Table 3: Annual Emissions for 2014 Baseline, BART, and BART Alternatives**

| Scenario | Unit | Pollutant | Annual Emission (tons/year ) |
|---|---|---|---|
| 2014 Baseline | Unit 1 | NOx | 5,140 |
| | | $SO_2$ | 1,285 |
| | | PM | 482 |
| | Unit 2 | NOx | 1,366 |
| | | $SO_2$ | 1,366 |
| | | PM | 512 |
| BART Control Strategy | Unit 1 | NOx | 1,044 |
| | | $SO_2$ | 1,285 |
| | | PM | 482 |
| | Unit 2 | NOx | 1,366 |
| | | $SO_2$ | 1,366 |
| | | PM | 512 |
| IS1 (Unit 1 curtailment period Oct 1 to April 15) | Unit 1 | NOx | 2,402 |
| | | $SO_2$ | 601 |
| | | PM | 225 |
| | Unit 2 | NOx | 1,366 |
| | | $SO_2$ | 1,366 |
| | | PM | 512 |
| IS2 (Unit 1 curtailment period Oct 21 to Jan 31) | Unit 1 | NOx | 3,687 |
| | | $SO_2$ | 807 |
| | | PM | 346 |
| | Unit 2 | NOx | 1,366 |
| | | $SO_2$ | 1,195 |
| | | PM | 512 |
| IS3 (Unit 1 curtailment period Nov 21 to Jan 20) | Unit 1 | NOx | 4,302 |
| | | $SO_2$ | 672 |
| | | PM | 403 |
| | Unit 2 | NOx | 1,366 |
| | | $SO_2$ | 854 |
| | | PM | 512 |
| IS4 (Unit 1 curtailment period Nov 21 to Jan 20) | Unit 1 | NOx | 4,167 |
| | | $SO_2$ | 807 |
| | | PM | 403 |
| | Unit 2 | $NO_x$ | 1,366 |
| | | $SO_2$ | 1,024 |
| | | PM | 512 |

Table 4 summarizes the combined Unit 1 and Unit 2 annual emissions for PM, NOx, and $SO_2$.

**Table 4: Combined Unit 1 and Unit 2 Annual Emissions (tons/year)**

| Operating Strategies | $NO_X$ | $SO_2$ | PM | Total |
|---|---|---|---|---|
| 2014 Baseline | 6,506 | 2,651 | 994 | 10,151 |
| BART Control Strategy | 2,410 | 2,651 | 994 | 6,055 |
| IS1 | 3,768 | 1,966 | 737 | 6,472 |
| IS2 | 5,053 | 2,002 | 858 | 7,912 |
| IS3 | 5,667 | 1,526 | 915 | 8,109 |
| IS4 | 5,533 | 1,831 | 915 | 8,279 |

Table 5 compares the annual emission reductions for the interim operating strategy and the BART control strategy relative to the 2014 baseline emissions. As indicated in Table 5, 2016 EPA BART Reconsideration would result in a total NOx emission reduction below the 2014 baseline emissions of 63% or the 4,096 tons/year due to the implementation of SCR on Unit 1. Although the NOx reductions from the interim operating strategy would be less than the 63% reduction under the 2016 EPA BART Reconsideration, the BART Alternative would produce significant $SO_2$ and PM emissions reductions. $SO_2$ emissions reductions from the CGS units would range from 24% to 42%, and PM emissions reductions would range from 8% to 26%. This is because, under the BART Alternative, during the interim operating strategy implementation period, SRP would reduce $SO_2$ emissions from both of the CGS units through (i) annual operation at a lower $SO_2$ emissions rate and/or (ii) seasonal curtailment of CGS Unit 1. In addition, under the interim operating strategy, SRP would reduce PM emissions from both units through seasonal curtailment of CGS Unit 1.

**Table 5: Annual Emission Reductions Associated with the BART and Interim Operating Strategy (Part of BART Alternative) as Compared to the 2014 Baseline Emissions**

| Strategy Comparison | NOx Reduction | | $SO_2$ Reduction | | PM Reduction | |
|---|---|---|---|---|---|---|
| | (tons/year) | Percentage | (tons/year) | Percentage | (tons/year) | Percentage |
| BART Control Strategy | -4,096 | 63% | 0 | 0% | 0 | 0% |
| IS1 | -2,738 | 42% | -684 | 26% | -257 | 26% |
| IS2 | -1,453 | 22% | -649 | 24% | -136 | 14% |
| IS3 | -832 | 13% | -1,125 | 42% | -79 | 8% |
| IS4 | -972 | 15% | -820 | 31% | -79 | 8% |

Based on the above data, the following conclusions can be made:

- The BART Alternative provides significant reductions in emissions of NOx, $SO_2$, and PM as compared to the 2014 baseline. The emissions reductions resulting from the BART Alternative would be surplus to those reductions resulting from measures adopted to meet requirements of the Clean Air Act as of the baseline date of the SIP.

- The total tonnage of emissions reductions under all four seasonal curtailment options under the interim operating strategy is less than that under the 2016 EPA BART Reconsideration, but the 2016 EPA BART Reconsideration realizes emissions reductions solely from NOx control while the BART Alternative realizes reductions in NOx, $SO_2$, and PM. SRP performed a dispersion modeling analysis to demonstrate that the BART Alternative would provide overall improvement in visibility compared to the BART control strategy.

As the BART Alternative would result in greater $SO_2$ emission reductions (as well as PM emission reductions) but lower NOx emission reductions when compared with the BART control strategy, the modeling analysis evaluates the trade-offs of visibility benefits between $SO_2$ emission reductions and NOx emission reductions. Section 5 presents detailed modeling analyses for visibility impacts.

## *4.3 Long-Term Annual Emissions under the BART Alternative*

As previously discussed, the BART Alternative operating strategies include an interim operating strategy followed by either SCR installation on Unit 1 or Unit 1 shutdown. To better understand the changes of annual emissions under BART Alternative, ADEQ examined the emissions expectations during 2015-2035 for the relevant pollutants (PM, $SO_2$, and NOx). ADEQ further evaluated the potential impact of the control strategies on the attainment and maintenance of NAAQS. It should be noted that the long-term annual emissions estimates were based on the emission limits imposed rather than the actual emissions.

To simplify the calculations, the following assumptions were made:

- The BART Alternative will take effect on December 5, 2017;
- SRP will commit to the final BART Alternative operating strategy no later than December 31, 2026;
- Under OS-1, the "SCR installation" scenario, an SCR system will be installed and operated at Unit 1 by December 31, 2029; and
- Under OS-2, the "shutdown" scenario, SRP will permanently cease operation of Unit 1 no later than December 31, 2029.

### 4.3.1 Long-Term Annual Emissions of PM

Figure 2 shows long-term annual emissions of PM at CGS over the period from 2015 through 2035. It should be noted that the PM metric includes only filterable PM emissions and does not include condensable PM emissions such as the $H_2SO_4$ and other PM emissions that would result from installation and operation of SCR at Unit 1 under the BART Control Strategy.

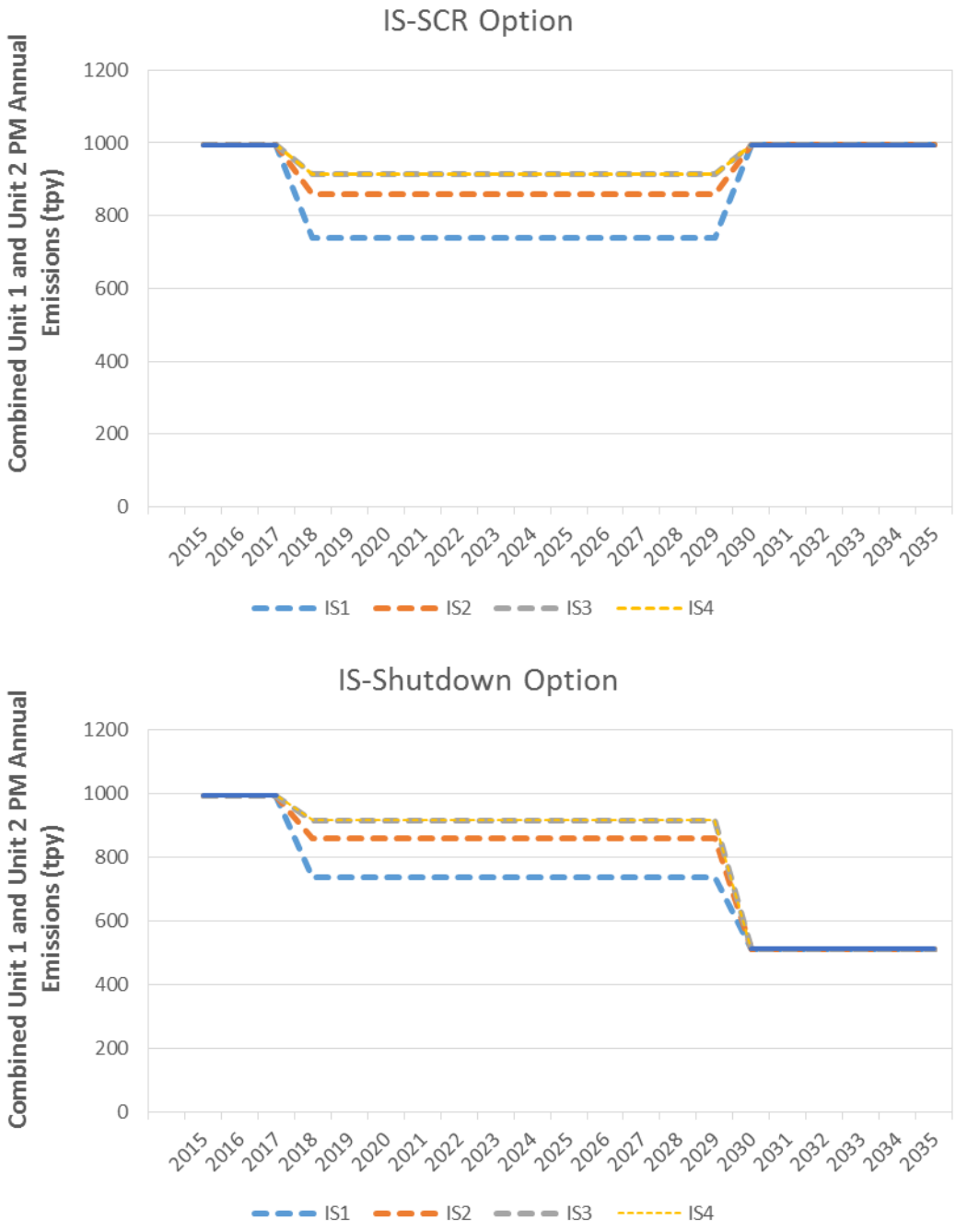
For OS-1 under the BART Alternative, the PM emissions control strategies are generally consistent with those of the 2011 AZ SIP except that they include a seasonal curtailment period, resulting in lower annual emissions during 2017-2029. OS-2 under the BART Alternative also includes a seasonal curtailment period from 2017 to the date of the unit closure, which would be no later than December 31, 2029. The permanent shutdown of Unit 1 would significantly reduce facility-wide PM emissions, resulting in additional long-term environmental benefits. For either of the operating strategies under the BART Alternative, the PM annual emissions would be equal to or lower than the existing emissions for any periods.

CGS is located in Apache County, Arizona. The area is designated as attainment or unclassifiable for $PM_{10}$ and $PM_{2.5}$ (1997, 2006, and 2012 NAAQS),[10] and there are no nonattainment or maintenance SIPs that would rely on emission reductions at CGS to ensure continued attainment of the NAAQS. OS-2 would result in significant reductions of $PM_{10}$ and primary $PM_{2.5}$ emissions (and, by December 31, 2029, elimination of all PM emissions from Unit 1). For OS-1, the installation of an SCR system would result in significant increases in emissions of $H_2SO_4$ and thus emissions of $PM_{10}$ and primary $PM_{2.5}$. However, the dispersion modeling analysis indicates that these emissions increases will not cause or contribute to a violation of the NAAQS or PSD increment for $PM_{10}$ and $PM_{2.5}$ (see Appendix C: TSD for SPR #63088). Moreover, both strategies would achieve significant emission reductions of $SO_2$ and NOx (as discussed later in Sections 4.3.2 and 4.3.3), which is an effective

[10] EPA, The Green Book Nonattainment Areas for Criteria Pollutants, at http://www.epa.gov/airquality/greenbook/(last visited Mar. 24, 2015).

strategy for reducing secondary $PM_{2.5}$ formation. Therefore, the BART Alternative will not result in any interference with attainment or maintenance of the $PM_{10}$ or $PM_{2.5}$ NAAQS.

**Figure 2: Annual Emissions of PM over 2015-2035 under BART Alternative**



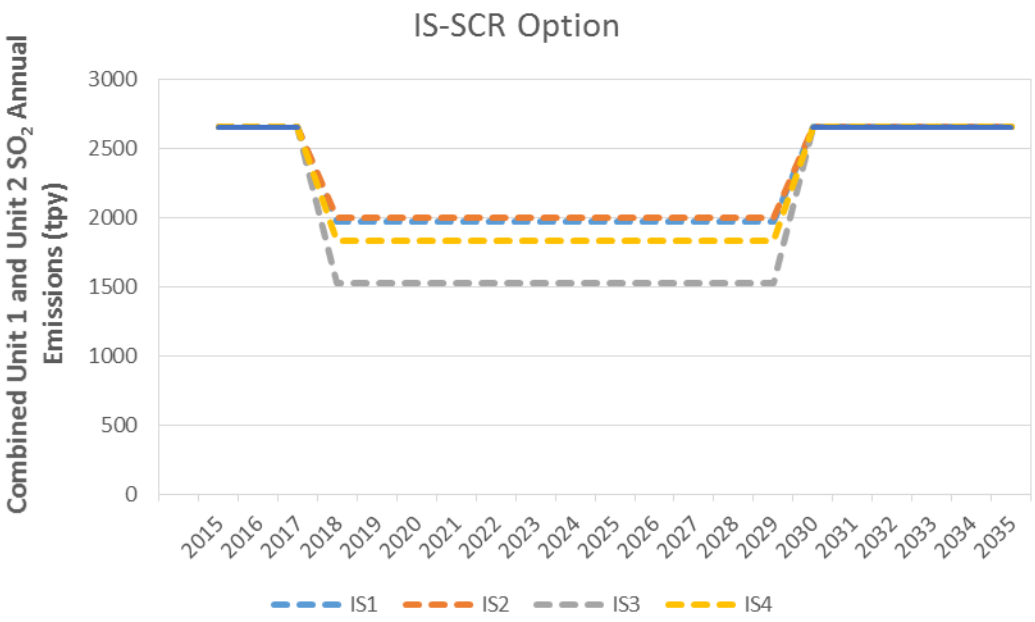
### 4.3.2 Long-Term Annual Emissions of $SO_2$

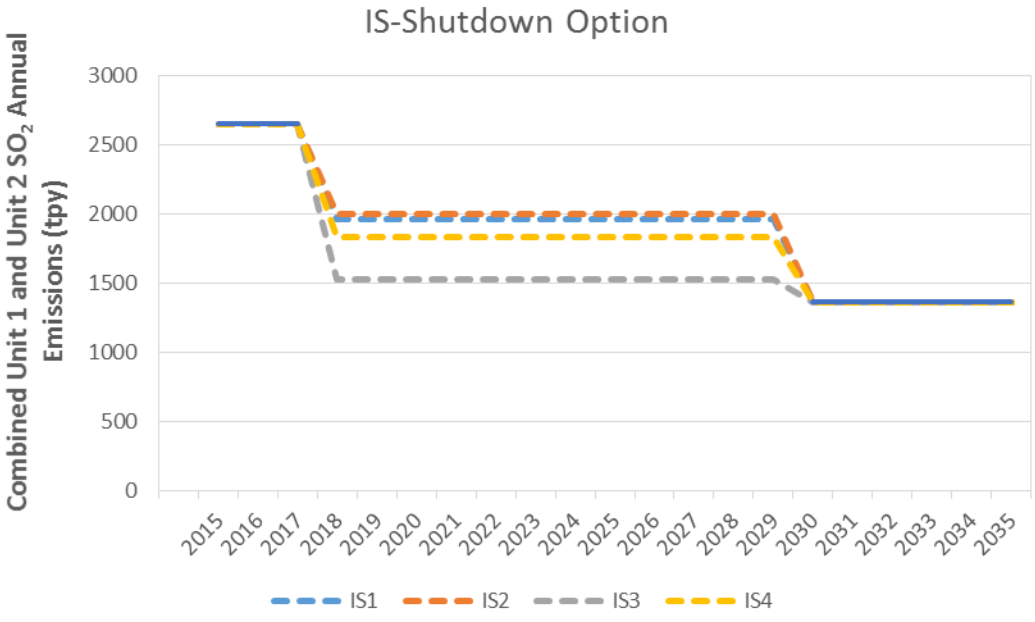
Figure 3 shows long-term annual emissions of $SO_2$ at CGS over 2015-2035. For OS-1 under the BART Alternative, the $SO_2$ emissions control strategies are generally consistent with those of the 2011 AZ SIP except that they include a seasonal curtailment period, resulting in lower annual $SO_2$ emissions during 2017-2029. OS-2 under the BART Alternative also includes a seasonal curtailment period from 2017 to the date of the unit closure, which would occur no later than December 31, 2029. In addition, three of the four interim operating strategies involve a reduction in the $SO_2$ emission rate at both Unit 1 and Unit 2. The permanent shutdown of Unit 1 would significantly reduce facility-wide $SO_2$ emissions, resulting in additional long-term environmental benefits. For either of the operating strategies under the BART Alternative, the $SO_2$ annual emissions would be equal to or lower than the existing emissions for any periods.

Apache County is designated as attainment or unclassifiable for the 1971 $SO_2$ NAAQS (see Footnote 10). Although designations have not yet been made for the 2010 $SO_2$ NAAQS, the area was recommended by the state as attainment or unclassifiable under CAA Section 107(d)(1)(A).[11] There are no nonattainment or maintenance SIPs that would rely on emission reductions at CGS to ensure continued attainment of the NAAQS. Therefore, the BART Alternative for CGS will not interfere with attainment or maintenance of the $SO_2$ NAAQS.

[11] *See generally* ADEQ, *Air Quality Division: Plans*, at http://www.azdeq.gov/environ/air/plan/so2.html.

**Figure 3: Annual Emissions of $SO_2$ over 2015-2035 under BART Alternative**



### 4.3.3 Long-Term Annual Emissions of $NO_x$

Figure 4 shows long-term annual emissions of $NO_x$ at CGS over 2015-2035. For OS-1 under the BART Alternative, the implementation of seasonal curtailment would moderately or slightly reduce $NO_x$ emissions during 2017-2029 due to a seasonal curtailment period for Unit 1. Beginning in 2030 onwards, the installation of a SCR system at Unit 1 would achieve significant additional NOx emission reductions. OS-2 under the BART Alternative also includes a seasonal curtailment period from 2017 to the date of the unit closure, which would occur no later than December 31, 2029. The permanent shutdown of Unit 1 would significantly reduce facility-wide NOx emissions, resulting in additional long-term environmental benefits. For either of the operating strategies under the BART Alternative, the NOx annual emissions would be lower than the existing emissions for any periods.

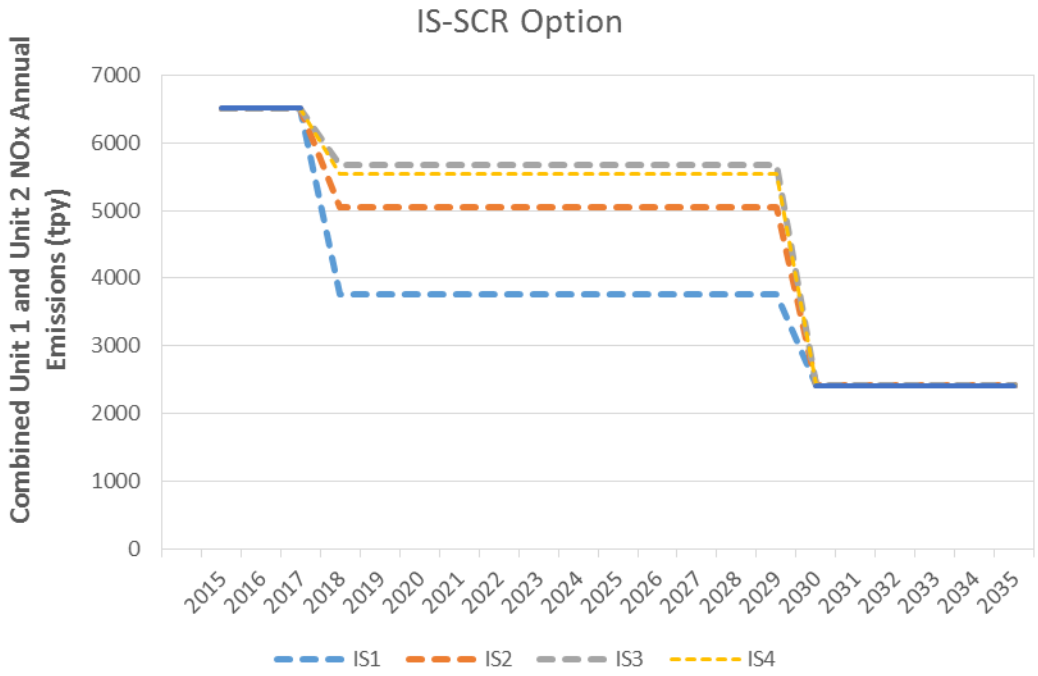
Apache County is designated as attainment or unclassifiable for the $NO_2$ NAAQS (see Footnote 10), and there are no nonattainment or maintenance SIPs that would rely on emission reductions at CGS to ensure continued attainment of the NAAQS. Since the BART Alternative will result in NOx emission reductions relative to the existing operating conditions of the facility, the BART Alternative will not interfere with attainment or maintenance of the $NO_2$ NAAQS.

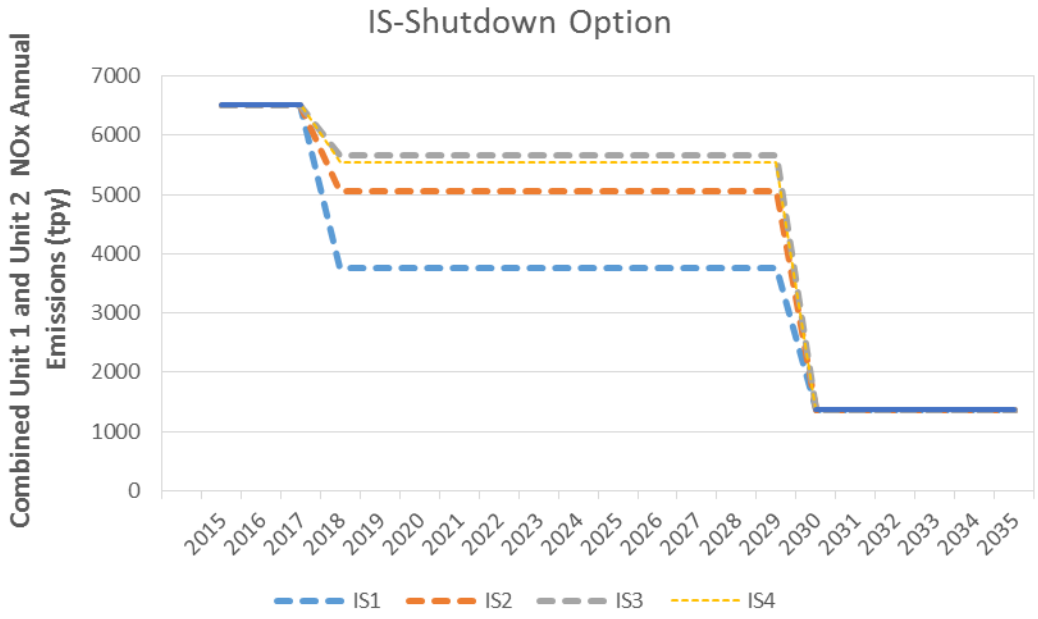
NOx emissions under the BART Alternative are higher than those under the 2016 EPA BART Reconsideration during the 2017-2029 period. While the BART Alternative is less stringent than the 2016 EPA BART Reconsideration with respect to NOx controls during the 2017-2029 period, section 110(l) of the CAA does not require a BART Alternative to be more stringent for emission controls for each criteria pollutant in every instance, and at every point in time, to be approvable and to supersede a prior BART determination. Rather, Section 110(l) of the CAA addresses whether the SIP revisions will interfere with attainment of the NAAQS or RFP. Apache County does not rely on the EPA FIP for CGS to ensure continued attainment of the $NO_2$ NAAQS or to meet any RFP requirements. The 2016 EPA BART Reconsideration does not represent existing control measures that have been implemented for attainment or maintenance of the NAAQS. As shown in Figure 4, facility-wide emissions of NOx at CGS will be reduced under the BART Alternative compared to current levels.

NOx is one of the most important precursors of ozone. Apache County is designated attainment/unclassifiable for the 2008 ozone NAAQS. There is no evidence that Apache County will violate the 2015 NAAQS and the proposed nonattainment-area boundaries for the 2015 ozone NAAQS issued by ADEQ on May 31, 2016 do not include Apache County.[12] Although the BART Alternative is less stringent for NOx than the EPA FIP during 2017-2029, Apache County does not rely on the EPA FIP for CGS to ensure continued attainment of the ozone NAAQS or to meet any RFP requirements. Therefore, the BART Alternative will not interfere with attainment or maintenance of the NAAQS for ozone.

[12] http://legacy.azdeq.gov/calendar/draft_rpt_naaqs.pdf (last visited on July 12, 2016).

**Figure 4: Annual Emissions of NOx over 2015-2035 under BART Alternative**



# 5. Modeled Visibility Impacts

SRP performed a dispersion modeling analysis to demonstrate "greater reasonable progress." This section quantifies the visibility benefits of the BART Alternative compared to the BART control strategy (2016 EPA BART Reconsideration for NOx and 2012 ADEQ BART for $SO_2$ and PM).

## *5.1 Model Selection*

### 5.1.1 CALPUFF versus Photochemical Grid Models (PGMs)

In 2005, EPA recommended that the states use the CALPUFF model for implementation of the BART requirements under the Regional Haze Rule.[13] Since 2005, states have used CALPUFF in hundreds of BART determinations. However, there are fundamental differences between BART analyses and the "Better than BART" demonstration for BART alternatives. BART analyses with CALPUFF are targeted towards assessing the maximum (or 98$^{th}$ percentile) impacts of a single facility's sources on Class I areas without considering any other emission sources. For a "Better than BART" demonstration, however, the language of 40 CFR 51.308(e) addresses "greater reasonable progress" that would resulted from BART alternatives compared to BART. To demonstrate "greater reasonable progress," a full photochemical grid model (PGM) that includes modeling of all emissions in the modeling domain may be more appropriate in many circumstances than CALPUFF.

From a scientific perspective, CALPUFF uses a rather simple chemistry mechanism while PGMs use a significantly more complex chemistry mechanism. In July 2015, EPA proposed revisions to its modeling guidelines that would delist CALPUFF as the EPA-preferred long range transport model, mainly due to the fact that CALPUFF has highly simplified chemical transformation algorithms that have been shown to have bias in sulfate and nitrate formation.[14] Instead, EPA proposed to recommend PGMs for applications involving secondary $PM_{2.5}$ formation, including visibility impairment due to sulfate and nitrate.

Due to the reasons above, a PGM rather than CALPUFF was used for CGS Better-than-BART modeling.

### 5.1.2 Comprehensive Air-Quality Model with Extensions (CAMx)

The Comprehensive Air-Quality Model with extensions (CAMx) was selected for the CGS Better-than-BART demonstration.[15] The reasons are:

- CAMx is one of the two PGMs referred to in EPA's latest modeling guidelines and guidance[16] that satisfies all the requirements for simulating secondary $PM_{2.5}$ formation.

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[13] CFR Part 51 Regional Haze Regulations and Guidelines for Best Available Retrofit Determinations. http://www.gpo.gov/fdsys/pkg/FR- 2005-07-06/pdf/05-12526.pdf

[14] Revision to the Guideline on Air Quality Models: Enhancement to the AERMOD Dispersion Modeling System and Incorporation of Approaches to Address Ozone and Fine Particulate Matter – Appendix W. 40 CFR Part 51. http://www.epa.gov/ttn/scram/11thmodconf/9930-11- OAR_AppendixW_Proposal.pdf

[15] http://www.camx.com/

[16] Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$ and Regional Haze. http://www.epa.gov/ttn/scram/guidance/guide/Draft_O3-PM- RH_Modeling_Guidance-2014.pdf

- CAMx includes full science chemistry algorithms for secondary $PM_{2.5}$ formation (e.g., sulfate and nitrate) that is important in this application. Given that the CGS BART Alternative modeling involves assessment of visibility benefits from reductions in $SO_2$ emissions (in the alternative strategies) versus visibility benefits from reduced NOx emissions (in the BART control strategy), accurate and unbiased treatment of sulfate and nitrate formation chemistry is needed.

- The databases that, in part, are necessary to perform the CAMx modeling analysis are available and adequate. The CAMx modeling for CGS extensively used a 2008 modeling database that was originally developed as part of the Western Regional Air Partnership (WRAP) West-wide Jump-Start Air Quality Modeling Study [17] and then adopted by the Western Air Quality Study.[18] The 2008 modeling database is complete and comprehensive.

- CAMx includes a subgrid-scale Plume-in-Grid (PiG) chemically reactive Gaussian puff model to treat the near-source plume dispersion, dynamics and chemistry within point-source plume, which is critical for CGS modeling. It also includes a mature, fully tested and evaluated Particulate Source Apportionment Technology (PSAT) tool for separately tracking the particulate matter impacts associated with emissions from CGS.

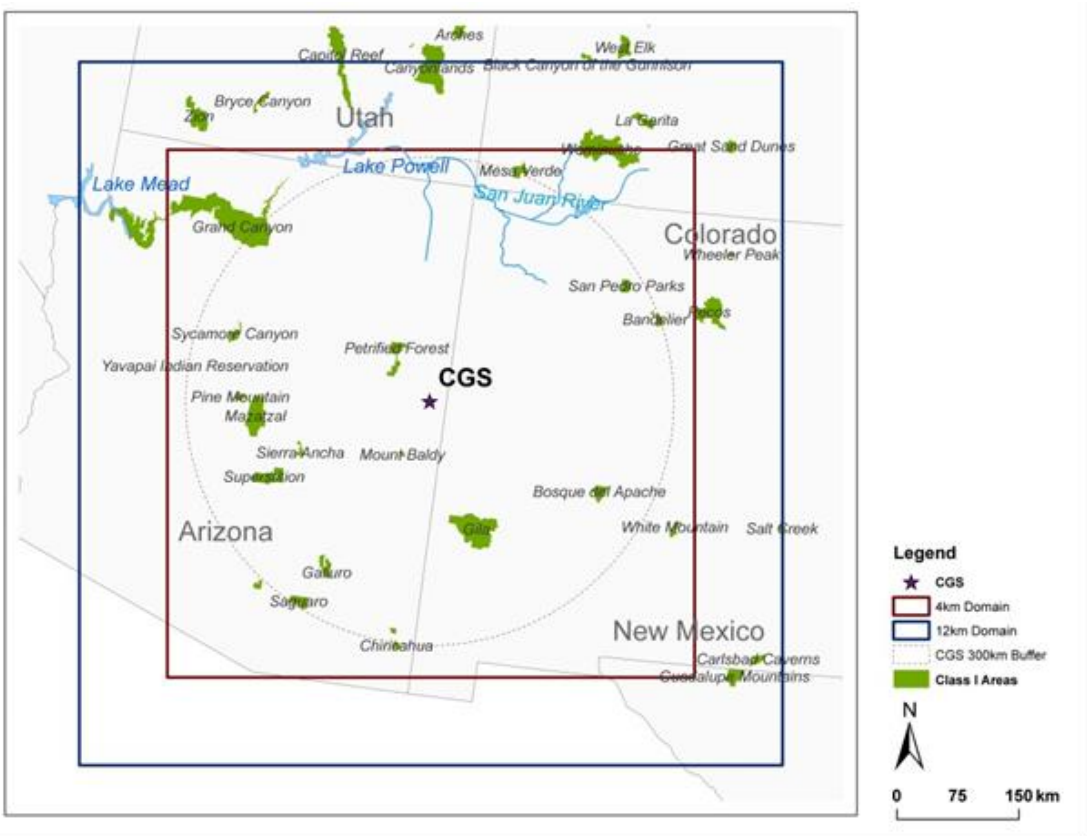
- The model performance evaluation for CAMx has shown that the model is not inappropriately biased for regulatory application (see Section 5.4).

## *5.2 Modeling Domain*

The model domain setup must consider source-receptor couples, influence of boundary conditions, adequate resolution in key areas, and resource/time constraints. The CAMx CGS modeling domain is shown in Figure 5. The modeling domain is a nested 12 km and 4 km horizontal resolution modeling domain centered on CGS. The 4 km domain covers an area out to 300 km from CGS, which provides sufficient resolution to estimate the visibility impacts from CGS on all Class I areas within 300 km of CGS.

[17] http://www.wrapair2.org/WestJumpAQMS.aspx;
http://www.wrapair2.org/pdf/WestJumpAQMS_FinRpt_Finalv2.pdf
[18] http://views.cira.colostate.edu/tsdw/

**Figure 5: CGS CAMx 12/4 km Resolution Modeling Domains with Circle of Radius 300 km Centered on CGS**




## *5.3 Model Inputs*

CAMx inputs were developed using independent third-party models and processing tools that characterize meteorology, emissions, land cover, radiative/photolysis properties, and initial/boundary conditions (IC/BCs). For model performance evaluation purposes, the CAMx modeling for CGS used a 2008 modeling database that was originally developed as part of the Western Regional Air Partnership (WRAP) West-wide Jump-Start Air Quality Modeling Study and then adopted by the Western Air Quality Study. For detailed model inputs and associated technical memorandums, please refer to the WestJumpAQMS website:

http://www.wrapair2.org/WestJumpAQMS.aspx#.

For the "Better-than-BART" demonstration, the CAMx modeling for CGS used a future year (2020) emissions CAMx modeling database instead of the 2008 emissions CAMx modeling database. Moreover, the "Better-than-BART" CAMx simulations used initial/boundary conditions based on the 2020 emissions inventory as well. For other model inputs such as meteorology, the 2008 modeling database was still used.

### 5.3.1 Model Inputs for Meteorology, Photolysis, and Geographic and Initial/Boundary Conditions

Table 6 provides a summary of the key model inputs for meteorology, photolysis, and geographic and initial/boundary conditions for the CAMx modeling for CGS. More details about meteorology are provided below.

For the WestJumpAQMS study, the Weather Research Forecast (WRF3 Version 3.3.1) Advanced Research WRF (WRF-ARW) was applied for the 2008 calendar year on 36 km continental U.S. (CONUS), 12 km western U.S. (WESTUS) and 4 km Intermountain West Domain (IMWD) modeling domains.[19] WRF is a next-generation mesoscale prognostic meteorological model routinely used for urban- and regional-scale photochemical, fine particulate and regional haze regulatory modeling studies. WRF-ARW has become the new standard model used in place of the older Mesoscale Meteorological Model (MM5) for regulatory air quality applications in the U.S. It is suitable for use in a broad spectrum of applications across scales ranging from hundreds of meters to thousands of kilometers.

The WestJumpAQMS 2008 WRF model performance was evaluated against surface wind, temperature and mixing ratio observations and maps of precipitation analysis fields based on observations prepared by the Climate Prediction Center (CPC). It was concluded that the WestJumpAQMS 2008 WRF application exhibited reasonably good model performance that was as good as or better than other recent prognostic model applications used in air quality planning and it was therefore reasonable to proceed with its use for inputs for CGS photochemical grid modeling.

[19] http://www.wrapair2.org/pdf/WestJumpAQMS_2008_Annual_WRF_Final_Report_February29_2012.pdf

**Table 6: Model Inputs for Meteorology, Photolysis, and Geographic and Initial/Boundary Conditions**

| Components of Model Inputs | Data Fields | Models & Pre-Processers | Configuration |
|---|---|---|---|
| Meteorology | 3-dimensional gridded fields of meteorological parameters | Weather Research and Forecast (WRF)[20] | WRF was used in WestJumpAQMS to generate the CAMx meteorological input files for the 2008 calendar year; WRF was configured with a 36/12/4 km nested domain structure using the LCP projection parameters; WRF was run with 37 vertical layers up to 50 mb (approximately 19 km above sea level) that were collapsed to 25 CAMx layers. |
| Geographic | Gridded surface characteristics | GIS Processing and MERGE_ LULAI | CGS 12 and 4 km resolution land use files were based on USGS Geographic Information Retrieval and Analysis System (GIRAS) data, which contain the fraction of land cover in each of the 26 land use categories in the Zhang deposition scheme [21]used by CAMx; monthly leaf area indices in each grid cell were prepared for the Zhang deposition scheme. |
| Photolysis | Gridded ozone column codes and photolysis rates lookup table | O3MAP, The Tropospheric Ultraviolet and Visible (TUV) radiative transfer model[22] | Global and daily ozone column data were obtained from the database of space-based measurements from the Ozone Monitoring Instrument (OMI) on the Aura satellite and processed for the 12 and 4 km domains using the O3MAP program. The TUV model developed by NCAR used ozone column outputs and appropriate chemical mechanism to calculate the photolysis rates. |
| Initial and Boundary Conditions | Gridded initial concentrations, gridded lateral/top boundary concentrations | MOZART global chemistry model[23] | For model performance evaluation, CAMx initial and boundary conditions for CGS 12/4 km domain were prepared by extracting hourly atmospheric concentrations of all modeled pollutants from the WestJumpAQMS 36 km CONUS and 12 km WESTUS 3-dimensional CAMx model outputs.<br><br>The Better-than-BART CAMx simulations used IC/BCs from 3-dimensional model outputs of a 36 km CAMx simulation based on the 2020 EPA emissions inventory with updates. |

[20] http://www.wrf-model.org/index.php
[21] Zhang, et al., 2001. Atmos. Environ., 35, 549-560; Zhang, et al, 2003. Atmos. Chem. Phys., 3, 2067–2082.
[22] https://www2.acom.ucar.edu/modeling/tropospheric-ultraviolet-and-visible-tuv-radiation-model
[23] https://www2.acom.ucar.edu/gcm/mozart

| Components of Model Inputs | Data Fields | Models & Pre-Processers | Configuration |
|---|---|---|---|
| Chemistry | Chemical mechanism and associated species properties and reaction types and rates | | Revision 2 of the Carbon Bond Version 6 chemical mechanism (CB6r2 ) defined in the CAMx control file. |

### 5.3.2 Model Inputs for Emissions

**Emission inputs for model performance evaluation**

For model performance evaluation purposes, the emissions were taken directly from the WestJumpAQMS emissions inventory and are referred to as the Actual 2008 Base Case emissions. The primary source for the 2008 base case emissions was Version 2.0 of the National Emission Inventory (NEIV2.0).[24] Table 7 provides a summary of emission sources used to develop the 2008 actual base case emissions.

For major (≥ 25 MWe) electric generating units (EGUs) including CGS, emissions of $SO_2$ and NOx were hour-specific Continuous Emissions Monitor (CEM) measurement data from the EPA Clean Air Markets Division (CAMD). The temporal variability of other pollutant emissions besides $SO_2$ and NOx were estimated using the hourly CEM heat input data to allocate the annual emissions from the NEIv2.0 to each hour of the year.

**Table 7: Emission Sources Used to Develop the 2008 Actual Base Case Emissions for Model Performance Evaluation**

| Emissions Component | Configuration | Details |
|---|---|---|
| Oil and Gas Emissions | Update WRAP Phase III 2006 to 2008 | Seven WRAP Phase III Basins in CO, NM, UT and WY plus add 2008 Permian Basin O&G Emissions |
| Area Source Emissions | 2008 NEIv2.0 | Western state updates, then SMOKE processing of http://www.epa.gov/ttn/chief/net/2008inventory.html |
| On-Road Mobile Sources | MOVES | MOVES 2008 emissions run in inventory mode |
| Point Sources | 2008 CEM and Non-CEM Sources | Use 2008 day-specific hourly measured CEM for $SO_2$ and NOx emissions for CEM sources, 2008 NEIv2.0 for other pollutants and non-CEM sources |
| Off-Road Mobile Sources | 2008 NEIv2.0 | Based on EPA NONROAD model http://www.epa.gov/oms/nonrdmdl.htm |
| Wind Blown Dust Emissions | WRAP Wind Blown Dust (WBD) | WRAP WBD Model with 2008 WRF meteorology adjusted to be consistent with 2002 WBD modeling |
| Ammonia Emissions | 2008 NEIv2.0 | Based on CMU Ammonia Model. Review and update spatial allocation if appropriate. |

[24] http://www.epa.gov/ttn/chief/net/2008inventory.html

| Emissions Component | Configuration | Details |
|---|---|---|
| Biogenic Sources | MEGAN | Enhanced version of MEGAN Version 2.1 from WRAP Biogenics study http://www.wrapair2.org/pdf/WGA_BiogEmisInv_FinalReport_Ma rch20_2012.pdf |
| Fires | 2008 DEASCO3 | 2008 DEASCO3 fire inventory used. https://wraptools.org/pdf/ei_methodology_20130930.pdf |
| Temporal Adjustments | Seasonal, day, hour | Based on latest collected information |
| Chemical Speciation | CB6r2 Chemical Speciation | Revision 2 of the Carbon Bond Version 6 chemical mechanism |
| Gridding | Spatial Surrogates based on land use | Develop new spatial surrogates using 2010 census data and other data |
| Quality Assurance | SMOKE QA Tools; PAVE, VERDI plots; Summary reports | Follow WRAP emissions QA/QC plan. |

**Emission inputs for "Better-than-BART" demonstration**

For "Better-than-BART" demonstration purposes, the CAMx modeling used a future year (2020) emissions modeling database instead of the 2008 base case emissions database.

The regional inventory that was used to develop the future year emissions scenario for the Better-than-BART CAMx modeling is based on the 2020 EPA emissions inventory used for the PM NAAQS Rule (available at http://www.epa.gov/ttn/chief/emch). The 2020 EPA emissions inventory represents projected emissions with promulgated Federal and State control measures, as well as projected economic changes and fuel usage for EGU and mobile sectors. Oil and gas emissions were updated from the 2020 EPA inventory to account for additional reasonably foreseeable development (RFD). The RFD is defined as: i) air emissions from the undeveloped portions of authorized NEPA projects and Resource Management Plans (RMPs), and ii) air emissions from not-yet-authorized NEPA projects (if emissions are quantified when emissions modeling commences). These sources are in addition to regional sources present in the 2020 EPA emissions inventory. For the future year emissions scenarios, the following emission categories were assumed to remain unchanged from the 2008 base case emissions scenario:

- Biogenic emissions;
- Fire emissions;
- Lightning emissions;
- Sea salt emissions; and
- Windblown dust emissions.

Table 8 presents six separate CGS emissions scenarios, including baseline, BART control strategy, and four seasonal curtailment options (IS1, IS2, IS3 and IS4) under the interim operating strategy for the BART Alternative. As shown in Table 8, the emission factors for $SO_2$ and NOx emissions rates (lb/MMBtu) vary among different scenarios. The emissions of PM were specified following the NPS Particulate Matter Speciation recommendations for dry-bottom pulverized coal-fired boilers equipped with FGD and ESP controls.[25] The CGS unit 1 and 2 daily and hourly heat input data were analyzed from EPA's Acid Rain database for the 5 year

[25] https://www.nature.nps.gov/air/permits/ect/index.cfm

period (2006-2010), centered on the BART analysis 2008 baseline year, to develop monthly and hourly emission scalars that reflect the typical seasonal and diurnal variations in heat input rates and resulting mass emission rates. The full load mass emission rates in Table 8 were then multiplied by the monthly and diurnally varying emission scalars to calculate time varying mass emission rates that were input to the CAMx model. During the Unit 1 shutdown periods for the alternative strategies, the emissions for Unit 1 were set to zero.

**Table 8: CGS Emission Rates for Baseline, BART and Four Seasonal Curtailment Options under Interim Operating Strategy**

| Scenario | Unit | lb/MMBtu | | Emissions in pounds per hour** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $SO_2$ Emission Factor | NOx Emission Factor | $SO_2$ | SO4 | NOx | $HNO_3$ | $NO_3$ | PMF | PMC | EC | SOA |
| Baseline | 1 | 0.08 | 0.32 | 377.5 | 1.89 | 1,510.1 | 0 | 0 | 59.03 | 80.27 | 2.3 | 0 |
| | 2 | 0.08 | 0.08 | 377.5 | 12.4 | 377.5 | 0 | 0 | 59.03 | 80.27 | 2.3 | 0 |
| BART Control Strategy * | 1 | 0.08 | 0.065 | 377.5 | 12.4 | 306.7 | 0 | 0 | 59.03 | 80.27 | 2.3 | 0 |
| | 2 | 0.08 | 0.08 | 377.5 | 12.4 | 377.5 | 0 | 0 | 59.03 | 80.27 | 2.3 | 0 |
| IS1 | 1 | 0.08 | 0.32 | 377.5 | 1.89 | 1,510.1 | 0 | 0 | 59.03 | 80.27 | 2.3 | 0 |
| | 2 | 0.08 | 0.08 | 377.5 | 12.4 | 377.5 | 0 | 0 | 59.03 | 80.27 | 2.3 | 0 |
| IS2 | 1 | 0.07 | 0.32 | 330.3 | 1.89 | 1,510.1 | 0 | 0 | 59.03 | 80.27 | 2.3 | 0 |
| | 2 | 0.07 | 0.08 | 330.3 | 12.4 | 377.5 | 0 | 0 | 59.03 | 80.27 | 2.3 | 0 |
| IS3 | 1 | 0.05 | 0.32 | 236.0 | 1.89 | 1,510.1 | 0 | 0 | 59.03 | 80.27 | 2.3 | 0 |
| | 2 | 0.05 | 0.08 | 236.0 | 12.4 | 377.5 | 0 | 0 | 59.03 | 80.27 | 2.3 | 0 |
| IS4 | 1 | 0.06 | 0.31 | 283.1 | 1.89 | 1,462.9 | 0 | 0 | 59.03 | 80.27 | 2.3 | 0 |
| | 2 | 0.06 | 0.08 | 283.1 | 12.4 | 377.5 | 0 | 0 | 59.03 | 80.27 | 2.3 | 0 |

**2016 EPA BART Reconsideration for NOx and 2012 ADEQ BART for PM and $SO_2$.*
*** These emission rates represent full load mass emission rates based on the maximum heat input rate of 4,719 MMBtu/hr for each unit.*

## *5.4 Model Performance Evaluation*

The model performance evaluation (MPE) for CGS CAMx 2008 12/4 km Actual Base Case simulation focused on the model's ability to simulate $PM_{2.5}$ total mass, $PM_{2.5}$ individual species mass, and species specific visibility extinctions since the focus of this study is to assess visibility impacts only. This MPE relied on WestJumpAQMS and Western Air Quality Study (WAQS) CAMx 2008 base case MPE results, which are documented in the WestJumpAQMS final report [26] and the WAQS report.[27]

This section presents a summary of the evaluation of CGS 2008 12/4 km Actual Base Case simulation for visibility.

[26] http://wrapair2.org/pdf/WestJumpAQMS_FinRpt_Finalv2.pdf
[27] http://views.cira.colostate.edu/tsdw/Documents/

### 5.4.1 Model Performance Evaluation Approach

CGS CAMx 2008 12/4 km Actual Base Case was evaluated by comparing the model's $PM_{2.5}$ and visibility predictions at Interagency Monitoring of Protected Visual Environments (IMPROVE) sites in the CGS 4 km domain. The sites include: Bandelier (BAND1); Chiricahua (CHIR1); Grand Canyon (GRCA2); Mesa Verde (MEVE); Petrified Forest (PEFO1); Saguaro (SAGU1); San Pedro Parks (SAPE1); Sierra Ancha (SIAN1); and Sycamore Canyon (SYCA1).

The predicted and observed $PM_{2.5}$ species and $NO_2$ concentrations were converted to visibility extinction using the latest IMPROVE equation and Class I area-specific relative humidity adjustment factors [f(RH)] following the procedures in the 2010 Federal Land Managers' Air Quality Related Values Work Group (FLAG) report.[28] The total and species-specific $PM_{2.5}$ mass and visibility extinction model performance statistics were compared against established PM Performance Goals and Criteria as well as the more stringent ozone Performance Goals. Table 9 presents the PM Performance Goals and Criteria.

**Table 9: PM Model Performance Goals and Criteria**

| Fractional Bias (FB) | Fractional Error (FE) | Comments |
|---|---|---|
| ≤ ±15% | ≤ 35% | Ozone model performance goal that would be considered very good model performance for PM species |
| ≤ ±30% | ≤ 50% | PM model performance goal, considered good PM performance |
| ≤ ±60% | ≤ 75% | PM model performance Criteria, considered average PM performance. Exceeding this level of performance for PM species with significant mass may be cause for concern. |

### 5.4.2 Model Performance Evaluation Results

**Bias and Error Statistics**

Table 10 summarizes bias and error statistics averaged across IMPROVE monitoring sites in the 4 km CGS domain.

As indicated in Table 10, the annual average total visibility extinction achieves the most stringent ozone performance goal. The seasonal visibility model performance shows good performance for the warmer months and an overestimation bias for the cooler months. The monthly average total visibility extinction achieves the PM model performance criteria for all 12 months and achieves the PM model performance goal for 9 months. The overestimation bias in the winter months falls between the PM Performance Goals and Criteria.

The ammonium sulfate (AmmSO4) performance is fairly good with 9 of 12 months achieving the PM Performance Criteria. The PM Performance Criteria is not achieved in three winter months due to the overestimated bias.

The ammonium nitrate (AmmNO3) performance is fairly good with 9 of 12 months achieving the PM Performance Criteria. The PM Performance Criteria is not achieved for two winter months due to the overestimation bias and in one summer month due to the underestimation bias.

[28] http://www.nature.nps.gov/air/Pubs/pdf/flag/FLAG_2010.pdf

**Table 10: Bias and Error Statistics Averaged across IMPROVE Monitoring Sites in the 4 km CGS Domain**

| Parameters | Bias and Error | Comments |
|---|---|---|
| Annual average total visibility extinction | Bias = 14%; Error = 34% | Achieve ozone model performance goal |
| Monthly average total visibility extinction | Bias ≤ ±60%) and error ≤ 75% for all 12 months of the year | Achieve PM model performance criteria |
| | Bias ≤ ±30%) and error ≤ 55% for 9 months of the year (March-November) | Achieve PM model performance goal |
| | Bias > 30% for winter months (December - February) | Overestimation bias |
| Ammonium sulfate | Bias ≤ ±60% and error ≤ 75% for 9 months of the year (March-November) | Achieve PM model performance criteria |
| | Bias > ±60% for winter months (December-February) | Overestimation bias |
| Ammonium nitrate | Bias ≤ ±60% and error ≤ 75% for 9 months of the year (March-July; September - December) | Achieve PM model performance criteria |
| | Bias > ±60% and/or Fractional error > 75% | Underestimation bias for Summer (August) and Overestimation bias for Winter (January and February) are fairly typical of PGMs. |

## Annual Average and Quarterly Average Speciated Extinction Performance by Monitor

Figure 6 displays stacked bar charts of annual and quarterly average total extinction at each IMPROVE site with the stacked bars showing each $PM_{2.5}$ component of extinction. For most sites, the observed and predicted annual average total extinction are similar, although the modeled annual average total extinction tends to be the same or slightly higher than the observed value. The modeled annual average extinction overestimation is primarily due to overstated extinction across several species in Q1 and Q4. The model extinction performance in Q2 and Q3 is quite good at all monitoring sites.

Annual average $AmmSO_4$ extinction agrees well at all IMPROVE sites. The quarterly average $AmmSO_4$ extinction performance in Q2 and Q3 is quite good at all monitoring sites. The model tends to overestimate AmmSO4 extinction in Q1 and Q4.

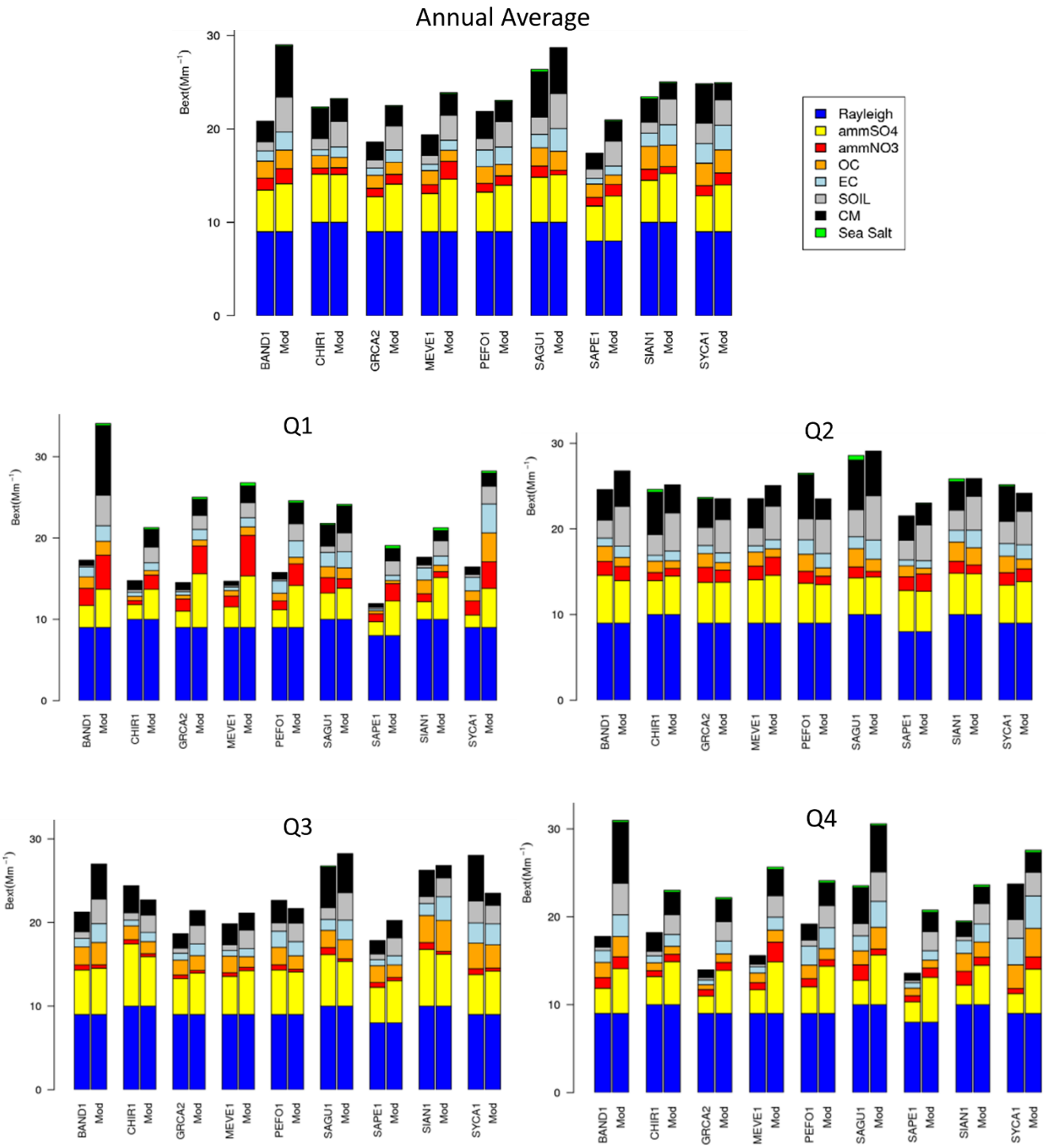
Annual average $AmmNO_3$ extinction agrees well at all IMPROVE sites. The model tends to underestimate the summer low values while it overestimates the winter high values, which is typical of $AmmNO_3$ performance with a PGM.

## Conclusions

The main objective of CGS Better-than-BART visibility modeling is to evaluate the trade-offs of visibility benefits between reducing CGS's NOx versus $SO_2$ emissions. Given that the visibility performance for $AmmSO_4$ and $AmmNO_3$ is fairly good and mostly unbiased, with what bias that does occur (slight winter overestimation) being common with respect to $AmmSO_4$ and $AmmNO_3$, and given that CAMx incorporates

state-of-the-science sulfate and nitrate formation chemistry algorithms, the CAMx 2008 12/4 km CGS modeling platform should provide an accurate and reliable database for evaluating the interim operating strategy.

**Figure 6: Predicted and Observed Annual and Seasonal Average Total Extinction ($Mm^{-1}$)**



## *5.5 CAMx CGS Better-than-BART Modeling*

CAMx was applied for CGS Baseline emissions, CGS BART Control Strategy emissions, and emissions for the four seasonal curtailment options under the interim operating strategy of the CGS BART Alternative using the 12/4 km modeling domain, 2008 meteorological conditions and 2020 future case emissions for all other sources. The CAMx Particulate Source Apportionment Technology (PSAT) Probing Tool was used to separately track contributions of particulate matter and reactive gaseous nitrogen (RGN) concentrations (which include $NO_2$) due to $SO_2$, NOx, and PM emissions from CGS units.

### 5.5.1 Particulate Source Apportionment Tool (PSAT) and Its Configuration

The PSAT source apportionment tool uses reactive tracers (also called tagged species) that run in parallel to the host model to determine the contributions to PM from user-selected Source Groups. For CGS CAMx source apportionment modeling, the Source Groups consist of the two CGS units and all other natural and anthropogenic emissions.

The CAMx PSAT particulate source apportionment method has five different families of tracers that can be invoked separately or together to track source apportionment for the following particulate species: (i) Sulfate ($SO_4$); (ii) Nitrate and Ammonium ($NO_3$ and $NH_4$); (iii) Primary PM; (iv) Secondary Organic Aerosol (SOA); and (v) Mercury. Because PSAT needs to track the PM source apportionment from the PM precursor emissions to the PM species, the number of tracers needed to track a Source Group's source apportionment depends on the complexity of the chemistry and number of PM and intermediate species involved. For CGS CAMx source apportionment modeling, the PSAT $SO_4$, $NO_3$/$NH_4$, and Primary PM families of source apportionment tracers were used. The PSAT SOA family of source apportionment was not used because CGS EGU units do not emit any VOC species that are SOA precursors.

Emissions of $SO_2$, NOx, and primary PM from CGS units were tagged for treatment by the PSAT tool for each of the emission scenarios. For CGS baseline and CGS BART Control Strategy simulations, CAMx was run with 3 source groups: CGS unit 1; CGS unit 2; and all other emissions sources. For the interim operating strategy IS1 simulation, CAMx was run with 16 source groups. One source group represented non-CGS emissions, another represented CGS unit 2 emissions and the other 14 source groups represented the CGS unit 1 emissions for different time periods as follows:

- January and February combined (1 group);
- March and April ~ 15 day periods each (4 groups);
- May, June, July, August as individual months (4 groups);
- September and October ~ 15 day periods each (4 groups) and
- November and December combined (1 group).

For the other three interim operating strategy simulations (IS2, IS3, and IS4), CAMx was run with 18 source groups. One source group represented non-CGS emissions, another represented CGS unit 2 emissions and the other 16 source groups represented the CGS unit 1 emissions for different time periods as follows:

- January 1 to March 10 (~ 10 day periods) (7 groups);
- March 11 to June 30 (1 groups);
- July 1 to October 20 (1 groups); and
- October 21 – December 31 (~ 10 day periods (7 groups).

Performing the CAMx simulations for the four interim operating strategies with CGS unit 1 tagged separately for different periods enables evaluation of the CGS alternative visibility impacts using different CGS unit 1

shutdown assumptions without having to rerun CAMx.

### 5.5.2 Post-Processing CGS CAMx Modeling Results

Visibility impacts attributed to CGS for baseline, BART and the BART Alternative operating strategies were calculated at all Class I areas within the modeling domain.

The method to determine the visibility impacts based on the CAMx outputs was similar to that of CALPUFF. Basically, the CAMx PSAT tool quantified the incremental concentration contributions of PM species due to CGS emissions and then the IMPROVE extinction equation was applied to calculate the visibility impacts, following the procedures as discussed in the FLAG Phase I 2010 report.[29] Please refer to the FLAG 2010 report for detailed descriptions of the IMPROVE extinction equation as well as FLAG-recommended procedures for determining visibility impacts in Class I areas. The change in light extinction due to CGS emissions was calculated for each day for each grid cell that intersects a Class I area within 300 km of CGS. The average visibility impact over a 3x3 grid cell array centered at (i) the IMPROVE monitor associated with the Class I area or (ii) the centroid of the Class I area (if there was no associated IMPROVE site) was used to represent the visibility impact at that Class I area.

The IMPROVE equation species include:

- Sulfate ($SO_4$);
- Nitrate ($NO_3$);
- Elemental Carbon (EC);
- Organic Mass (OM);
- Fine Soil (FS);
- Coarse Mass (CM);
- Sea Salt; and
- $NO_2$.

To utilize the IMPROVE equation, the CAMx PSAT source apportionment runs provide incremental concentration contributions due to CGS emissions for the following species:

- Sulfate ($SO_4$);
- Nitrate ($NO_3$);
- Elemental Carbon (EC);
- Primary Organic Aerosol (POA, used for Organic Mass);
- Fine Crustal (FCRS) and Other (FPRM) primary $PM_{2.5}$ emissions (used for Fine Soil);
- Coarse Crustal (CCRS) and Other (CPRM) coarse ($PM_{2.5-10}$) PM species (used for Coarse Mass); and
- Reactive Gaseous Nitrogen (RGN, used for $NO_2$).

CGS incremental sulfate and nitrate concentrations were assumed to be completely neutralized by ammonium.

The PSAT source apportionment algorithm does not separately track $NO_2$ concentrations but instead tracks total reactive nitrogen (RGN) that consists mainly of NO, $NO_2$ and other smaller mass reactive nitrogen species (e.g., $N_2O_5$, $NO_3$ radical, etc.). CGS incremental concentrations of the PSAT RGN species were used to represent light extinction due to $NO_2$. This may overstate CGS visibility impairment associated with $NO_2$. In

[29] http://www.nature.nps.gov/air/Pubs/pdf/flag/FLAG_2010.pdf

terms of the Better-than-BART test, this assumption is conservative in that it overstates the visibility reductions in the EPA BART control strategy relative to the visibility reductions in the BART Alternative since the EPA BART control strategy has more NOx emission reductions. In any event, the vast majority of visibility impairment attributed to emissions from CGS is due to ammonium sulfate. Ammonium nitrate and the treatment of $NO_2$ in the visibility calculations have only a minimal impact.

In addition, the PSAT tool did not track the sea salt concentrations (sodium and particulate chloride) in the CGS visibility assessment because sea salt concentrations are negligible in the inland area and there are no sodium or chloride emissions associated with the CGS units.

### 5.5.3 CGS Visibility Impacts

The CAMx results were processed for the observed best (clearest) 20 percent (B20%) days, worst (haziest) 20 percent (W20%) days, and all days of the modeled year (2008) for each Class I area. These 20% clearest and 20% haziest days were determined based on the observational data from the IMPROVE sites in 2008.[30]

Table 11 presents CGS visibility impacts from CGS Baseline emissions averaged over the B20% days, W20% days, and all days in 2008. Table 12 reports CGS visibility impacts from CGS BART Control Strategy emissions averaged over the B20% days, W20% days, and all days. Table 13, Table 14, Table 15, and Table 16 report CGS visibility impacts from the four seasonal curtailment options under the interim operating strategy pursuant to the BART Alternative (IS1, IS2, IS3, and IS4 respectively) averaged over the B20% days, W20% days, and all days in 2008.

For B20% days, CGS Baseline impacts range from 0.0006 dv to 0.0224 dv over all class I areas. The corresponding CGS BART Control Strategy impacts range from 0.0004 dv to 0.0184 dv and the impacts from the various seasonal curtailment options range from 0.0004 dv to 0.0166 dv. For W20% days, CGS Baseline impacts range from 0.0013 dv to 0.0172 dv over all class I areas. The corresponding CGS BART Control Strategy impacts range from 0.0012 dv to 0.0138 dv, and the impacts from the various seasonal curtailment options range from 0.0010 dv to 0.0155 dv. For the annual average, CGS Baseline impacts range from 0.0023 dv to 0.0406 dv over all class I areas. The corresponding CGS BART Control Strategy impacts range from 0.0019 dv to 0.0346 dv, and the impacts from the various seasonal curtailment options range from 0.0017 dv to 0.0338 dv. For any of the emissions scenarios (Baseline, BART Control Strategy, and interim operating strategy), the annual highest predicted visibility impacts occur at Petrified Forest National Park, the nearest class I area to CGS.

As shown in Tables 11 to 16, the modeled visibility impacts using CAMx are much lower in magnitude than typical modeled visibility values in BART analyses with CALPUFF. There are fundamental differences in modeling visibility impacts between CAMx and CALPUFF, which makes CAMx and CALPUFF results not directly comparable. First, under a typical BART analysis with CALPUFF, the ammonia and other pre-cursors are more fully available to react with the facility's emissions and generate haze-causing pollutants. Comparatively, CAMx is a full photochemical model with all the other sources quantified and added to the modeling, such that emissions from other sources react with available pre-cursors such as ammonia. This limits the amount of ammonia (and other pre-cursors) that are available to react with the CGS emissions that are being assessed. Second, a typical BART analysis with CALPUFF is focused on the highest impact (maximum or 98th percentile) from a facility regardless of the monitored values at the Class I area, whereas the CAMx analysis is focused on the 20% best and 20% worst monitored days regardless of whether the facility was having an impact during those days. Finally, CALPUFF uses a rather simple chemistry mechanism while CAMx uses a technically sophisticated chemistry mechanism. It is unclear how this last factor ultimately

[30] http://vista.cira.colostate.edu/improve/Data/data.htm

impacts the differences in model estimates between these two models, as the two chemistry approaches are vastly different.

**Table 11: CGS Visibility Conditions with Baseline Emissions**

| | Delta Dv | | |
|---|---|---|---|
| | **Average Best 20% Days**** | **Average Worst 20% Days**** | **Annual Average** |
| **Class I Area** | **Absolute (dv)** | **Absolute (dv)** | **Absolute (dv)** |
| Bandalier NM | 0.0063 | 0.0170 | 0.0096 |
| Bosque | 0.0063 | 0.0049 | 0.0104 |
| Chiricahua NM | 0.0081 | 0.0015 | 0.0040 |
| Chiricahua Wild | 0.0092 | 0.0015 | 0.0041 |
| Galiuro Wild | 0.0051 | 0.0016 | 0.0031 |
| Gila Wild | 0.0151 | 0.0030 | 0.0140 |
| Grand Canyon NP | 0.0006 | 0.0030 | 0.0044 |
| Mazatzal Wild | 0.0167 | 0.0039 | 0.0053 |
| Mesa Verde NP | 0.0013 | 0.0063 | 0.0071 |
| Mount Baldy Wild | 0.0209 | 0.0172 | 0.0226 |
| Petrified Forest NP | 0.0087 | 0.0147 | 0.0406 |
| Pine Mountain Wild | 0.0133 | 0.0025 | 0.0052 |
| Saguro NP | 0.0041 | 0.0013 | 0.0023 |
| San Pedro Parks Wild | 0.0080 | 0.0134 | 0.0126 |
| Sierra Ancha Wild | | | 0.0087 |
| Superstition Wild | 0.0224 | 0.0027 | 0.0060 |
| Sycamore Canyon Wild | 0.0058 | 0.0037 | 0.0050 |
| **Maximum** | **0.0224** | **0.0172** | **0.0406** |
| **Cumulative (sum)** | **0.1521** | **0.0982** | **0.1649** |
| **Average** | **0.0095** | **0.0061** | **0.0097** |
| **Minimum** | **0.0006** | **0.0013** | **0.0023** |

*** Best and Worst Days of Monitored visibility, from MATS (IMPROVE) database, some sites/years lack data.*

**Table 12: CGS Visibility Conditions with BART Control Strategy Emissions (2016 EPA BART Reconsideration for NOx and 2012 AZ BART for $SO_2$ and PM)**

| | Delta Dv | | |
|---|---|---|---|
| | **Average Best 20% Days**** | **Average Worst 20% Days**** | **Annual Average** |
| **Class I Area** | **Absolute (dv)** | **Absolute (dv)** | **Absolute (dv)** |
| Bandalier NM | 0.0050 | 0.0138 | 0.0077 |
| Bosque | 0.0052 | 0.0040 | 0.0085 |
| Chiricahua NM | 0.0060 | 0.0014 | 0.0033 |
| Chiricahua Wild | 0.0069 | 0.0014 | 0.0034 |
| Galiuro Wild | 0.0041 | 0.0014 | 0.0025 |
| Gila Wild | 0.0121 | 0.0026 | 0.0113 |
| Grand Canyon NP | 0.0004 | 0.0024 | 0.0039 |
| Mazatzal Wild | 0.0127 | 0.0033 | 0.0043 |
| Mesa Verde NP | 0.0011 | 0.0055 | 0.0064 |
| Mount Baldy Wild | 0.0171 | 0.0137 | 0.0175 |
| Petrified Forest NP | 0.0081 | 0.0117 | 0.0346 |
| Pine Mountain Wild | 0.0103 | 0.0022 | 0.0045 |
| Saguro NP | 0.0034 | 0.0012 | 0.0019 |
| San Pedro Parks Wild | 0.0061 | 0.0107 | 0.0099 |
| Sierra Ancha Wild | | | 0.0075 |
| Superstition Wild | 0.0184 | 0.0022 | 0.0051 |
| Sycamore Canyon Wild | 0.0043 | 0.0032 | 0.0045 |
| **Maximum** | **0.0184** | **0.0138** | **0.0346** |
| **Cumulative (sum)** | **0.1213** | **0.0806** | **0.1368** |
| **Average** | **0.0076** | **0.0050** | **0.0080** |
| **Minimum** | **0.0004** | **0.0012** | **0.0019** |

*** Best and Worst Days of Monitored visibility, from MATS (IMPROVE) database, some sites/years lack data.*

**Table 13: CGS Visibility Conditions with IS1 Seasonal Curtailment Option**

| | Delta Dv | | |
|---|---|---|---|
| | **Average Best 20% Days**** | **Average Worst 20% Days**** | **Annual Average** |
| **Class I Area** | **Absolute (dv)** | **Absolute (dv)** | **Absolute (dv)** |
| Bandalier NM | 0.0039 | 0.0118 | 0.0074 |
| Bosque | 0.0040 | 0.0039 | 0.0083 |
| Chiricahua NM | 0.0051 | 0.0015 | 0.0032 |
| Chiricahua Wild | 0.0057 | 0.0015 | 0.0033 |
| Galiuro Wild | 0.0035 | 0.0016 | 0.0024 |
| Gila Wild | 0.0092 | 0.0029 | 0.0109 |
| Grand Canyon NP | 0.0004 | 0.0029 | 0.0033 |
| Mazatzal Wild | 0.0105 | 0.0038 | 0.0039 |
| Mesa Verde NP | 0.0008 | 0.0050 | 0.0054 |
| Mount Baldy Wild | 0.0128 | 0.0145 | 0.0174 |
| Petrified Forest NP | 0.0050 | 0.0124 | 0.0316 |
| Pine Mountain Wild | 0.0083 | 0.0024 | 0.0038 |
| Saguro NP | 0.0033 | 0.0011 | 0.0017 |
| San Pedro Parks Wild | 0.0048 | 0.0094 | 0.0096 |
| Sierra Ancha Wild | | | 0.0062 |
| Superstition Wild | 0.0137 | 0.0022 | 0.0041 |
| Sycamore Canyon Wild | 0.0037 | 0.0032 | 0.0037 |
| **Maximum** | **0.0137** | **0.0145** | **0.0316** |
| **Cumulative (sum)** | **0.0949** | **0.0801** | **0.1260** |
| **Average** | **0.0059** | **0.0050** | **0.0074** |
| **Minimum** | **0.0004** | **0.0011** | **0.0017** |

***Best and Worst Days of Monitored visibility, from MATS (IMPROVE) database, some sites/years lack data.*

**Table 14: CGS Visibility Conditions with IS2 Seasonal Curtailment Option**

| | Delta Dv | | |
|---|---|---|---|
| | **Average Best 20% Days**** | **Average Worst 20% Days**** | **Annual Average** |
| **Class I Area** | **Absolute (dv)** | **Absolute (dv)** | **Absolute (dv)** |
| Bandalier NM | 0.0042 | 0.0127 | 0.0078 |
| Bosque | 0.0051 | 0.0038 | 0.0089 |
| Chiricahua NM | 0.0071 | 0.0014 | 0.0034 |
| Chiricahua Wild | 0.0080 | 0.0014 | 0.0036 |
| Galiuro Wild | 0.0038 | 0.0015 | 0.0026 |
| Gila Wild | 0.0112 | 0.0027 | 0.0118 |
| Grand Canyon NP | 0.0006 | 0.0027 | 0.0035 |
| Mazatzal Wild | 0.0136 | 0.0036 | 0.0044 |
| Mesa Verde NP | 0.0010 | 0.0047 | 0.0053 |
| Mount Baldy Wild | 0.0137 | 0.0139 | 0.0187 |
| Petrified Forest NP | 0.0066 | 0.0120 | 0.0328 |
| Pine Mountain Wild | 0.0110 | 0.0023 | 0.0044 |
| Saguro NP | 0.0037 | 0.0011 | 0.0019 |
| San Pedro Parks Wild | 0.0057 | 0.0094 | 0.0101 |
| Sierra Ancha Wild | | | 0.0072 |
| Superstition Wild | 0.0166 | 0.0022 | 0.0048 |
| Sycamore Canyon Wild | 0.0056 | 0.0030 | 0.0043 |
| **Maximum** | **0.0166** | **0.0139** | **0.0328** |
| **Cumulative (sum)** | **0.1175** | **0.0787** | **0.1356** |
| **Average** | **0.0073** | **0.0049** | **0.0080** |
| **Minimum** | **0.0006** | **0.0011** | **0.0019** |

*** Best and Worst Days of Monitored visibility, from MATS (IMPROVE) database, some sites/years lack data.*

**Table 15: CGS Visibility Conditions with IS3 Seasonal Curtailment Option**

| | Delta Dv | | |
|---|---|---|---|
| | **Average Best 20% Days**** | **Average Worst 20% Days**** | **Annual Average** |
| **Class I Area** | **Absolute (dv)** | **Absolute (dv)** | **Absolute (dv)** |
| Bandalier NM | 0.0042 | 0.0120 | 0.0071 |
| Bosque | 0.0047 | 0.0034 | 0.0081 |
| Chiricahua NM | 0.0067 | 0.0011 | 0.0031 |
| Chiricahua Wild | 0.0075 | 0.0011 | 0.0032 |
| Galiuro Wild | 0.0035 | 0.0012 | 0.0023 |
| Gila Wild | 0.0108 | 0.0023 | 0.0110 |
| Grand Canyon NP | 0.0005 | 0.0023 | 0.0032 |
| Mazatzal Wild | 0.0142 | 0.0031 | 0.0042 |
| Mesa Verde NP | 0.0009 | 0.0047 | 0.0049 |
| Mount Baldy Wild | 0.0141 | 0.0148 | 0.0183 |
| Petrified Forest NP | 0.0066 | 0.0113 | 0.0326 |
| Pine Mountain Wild | 0.0112 | 0.0018 | 0.0041 |
| Saguro NP | 0.0031 | 0.0010 | 0.0017 |
| San Pedro Parks Wild | 0.0058 | 0.0103 | 0.0094 |
| Sierra Ancha Wild | | | 0.0069 |
| Superstition Wild | 0.0157 | 0.0023 | 0.0045 |
| Sycamore Canyon Wild | 0.0050 | 0.0028 | 0.0038 |
| **Maximum** | **0.0157** | **0.0148** | **0.0326** |
| **Cumulative (sum)** | **0.1146** | **0.0757** | **0.1287** |
| **Average** | **0.0072** | **0.0047** | **0.0076** |
| **Minimum** | **0.0005** | **0.0010** | **0.0017** |

*** Best and Worst Days of Monitored visibility, from MATS (IMPROVE) database, some sites/years lack data.*

**Table 16: CGS Visibility Conditions with IS4 Seasonal Curtailment Option**

| | Delta Dv | | |
|---|---|---|---|
| | **Average Best 20% Days**** | **Average Worst 20% Days**** | **Annual Average** |
| **Class I Area** | **Absolute (dv)** | **Absolute (dv)** | **Absolute (dv)** |
| Bandalier NM | 0.0042 | 0.0127 | 0.0076 |
| Bosque | 0.0049 | 0.0036 | 0.0086 |
| Chiricahua NM | 0.0069 | 0.0013 | 0.0033 |
| Chiricahua Wild | 0.0078 | 0.0013 | 0.0034 |
| Galiuro Wild | 0.0037 | 0.0013 | 0.0025 |
| Gila Wild | 0.0111 | 0.0025 | 0.0115 |
| Grand Canyon NP | 0.0006 | 0.0025 | 0.0035 |
| Mazatzal Wild | 0.0140 | 0.0033 | 0.0044 |
| Mesa Verde NP | 0.0010 | 0.0052 | 0.0054 |
| Mount Baldy Wild | 0.0139 | 0.0155 | 0.0191 |
| Petrified Forest NP | 0.0068 | 0.0116 | 0.0338 |
| Pine Mountain Wild | 0.0110 | 0.0020 | 0.0044 |
| Saguro NP | 0.0034 | 0.0011 | 0.0018 |
| San Pedro Parks Wild | 0.0059 | 0.0109 | 0.0099 |
| Sierra Ancha Wild | | | 0.0073 |
| Superstition Wild | 0.0164 | 0.0024 | 0.0048 |
| Sycamore Canyon Wild | 0.0055 | 0.0031 | 0.0041 |
| **Maximum** | **0.0164** | **0.0155** | **0.0338** |
| **Cumulative (sum)** | **0.1169** | **0.0804** | **0.1356** |
| **Average** | **0.0073** | **0.0050** | **0.0080** |
| **Minimum** | **0.0006** | **0.0011** | **0.0018** |

*** Best and Worst Days of Monitored visibility, from MATS (IMPROVE) database, some sites/years lack data.*

## *5.6 Better-than-BART Test*

### 5.6.1 Evaluation Criteria

The requirements for demonstrating an alternative control strategy is better than a BART control strategy are outlined in EPA's BART rules.[31] The rules describe a two-pronged test that can be used to demonstrate that the alternative control strategy is better than the BART control strategy (i.e., "Better-than-BART" or "BTB"):

*"The modeling would demonstrate 'greater reasonable progress' if both of the following two criteria are met:*

- *(i) Visibility does not decline in any Class I area, and*

- *(ii) There is an overall improvement in visibility, determined by comparing the average differences between BART and the alternative over all affected Class I areas."*

To pass Prong 1 of the Better-than-BART test, the alternative control strategy must not reduce visibility in any Class I area. For any Class I area, the visibility impacts based on the Baseline scenario may be used to represent current visibility conditions. Therefore, if the alternative control strategy results in visibility that is better than the visibility attributed to the Baseline scenario at each affected Class I area for both the B20% and W20% days, then the alternative control strategy satisfies Prong 1 of the Better-than-BART test.

For Prong 2 of the Better-than-BART test, the alternative control strategy must achieve an overall improvement in visibility averaged across all affected Class I areas compared to visibility in those area under the BART control strategy. To facilitate the comparison between the BART control strategy and the alternative control strategy, the difference in visibility for the two strategies is calculated. If the alternative control strategy shows better visibility impacts than the BART control strategy when averaged over all Class I areas for both the B20% and W20% days in the modeled year (even if the differences are marginal), the alternative control strategy passes Prong 2 of the Better-than-BART test.

### 5.6.2 Better-than-BART Test - Prong 1

Table 17 displays the results of Prong 1 of the Better-than-BART test for the four seasonal curtailment options under the interim operating strategy in the BART Alternative. This prong examines the differences in deciviews of visibility conditions (delta dv) between the Baseline and the BART Alternative (Baseline – BART Alternative). As shown in Table 17, all differences are positive, which indicates that the BART Alternative exhibits visibility improvements at each affected Class I area during the interim operating strategy. Therefore, the BART Alternative shows that "visibility does not decline in any Class I area" and hence the BART Alternative passes Prong 1 of the Better-than-BART test.

### 5.6.3 Better-than-BART Test - Prong 2

Table 18 displays the differences in visibility (delta dv) between the BART Control Strategy and the BART Alternative (BART- BART Alternative) for each affected Class I area for each time averaging method (B20%

[31] CFR Part 51 Regional Haze Regulations and Guidelines for Best Available Retrofit Determinations. http://www.gpo.gov/fdsys/pkg/FR- 2005-07-06/pdf/05-12526.pdf

days, W20% days, and annual) during the interim operating strategy. Table 19 provides the average differences and percentage differences over all affected Class I areas for the B20% days, the W20% days, and all days. As Table 19 indicates, each of the four seasonal curtailment options in the interim operating strategy for each averaging method produces more visibility benefits than the BART Control Strategy. The BART Alternative thus provides an "overall improvement in visibility" compared to the BART control strategy and satisfies Prong 2 of the Better-than-BART test.

**Table 17: Prong 1 Test - Delta Dv Differences of Visibility Conditions between Baseline and Interim Operating Strategy under BART Alternative (Baseline-BART Alternative)**

| Class I Area | Average Best 20% Days | | | | Average Worst 20% Days | | | | Annual Average | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | IS1 | IS2 | IS3 | IS4 | IS1 | IS2 | IS3 | IS4 | IS1 | IS2 | IS3 | IS4 |
| Bandalier NM | 0.0023 | 0.0021 | 0.0021 | 0.0020 | 0.0052 | 0.0043 | 0.0050 | 0.0043 | 0.0022 | 0.0017 | 0.0024 | 0.0019 |
| Bosque | 0.0023 | 0.0012 | 0.0016 | 0.0015 | 0.0010 | 0.0011 | 0.0015 | 0.0013 | 0.0021 | 0.0015 | 0.0023 | 0.0018 |
| Chiricahua NM | 0.0030 | 0.0010 | 0.0014 | 0.0012 | 0.000002 | 0.0001 | 0.0004 | 0.0003 | 0.0008 | 0.0005 | 0.0009 | 0.0007 |
| Chiricahua Wild | 0.0034 | 0.0011 | 0.0016 | 0.0014 | 0.000002 | 0.0001 | 0.0004 | 0.0003 | 0.0008 | 0.0006 | 0.0009 | 0.0007 |
| Galiuro Wild | 0.0015 | 0.0012 | 0.0016 | 0.0013 | 0.00003 | 0.0001 | 0.0004 | 0.0003 | 0.0007 | 0.0004 | 0.0007 | 0.0006 |
| Gila Wild | 0.0060 | 0.0040 | 0.0044 | 0.0040 | 0.00004 | 0.0002 | 0.0007 | 0.0005 | 0.0032 | 0.0023 | 0.0030 | 0.0025 |
| Grand Canyon NP | 0.0002 | 0.00002 | 0.0001 | 0.00004 | 0.0001 | 0.0003 | 0.0006 | 0.0004 | 0.0011 | 0.0009 | 0.0012 | 0.0009 |
| Mazatzal Wild | 0.0062 | 0.0032 | 0.0025 | 0.0028 | 0.0001 | 0.0003 | 0.0008 | 0.0006 | 0.0014 | 0.0008 | 0.0010 | 0.0008 |
| Mesa Verde NP | 0.0006 | 0.0003 | 0.0004 | 0.0004 | 0.0013 | 0.0015 | 0.0015 | 0.0011 | 0.0017 | 0.0018 | 0.0022 | 0.0017 |
| Mount Baldy Wild | 0.0081 | 0.0072 | 0.0069 | 0.0070 | 0.0027 | 0.0033 | 0.0024 | 0.0017 | 0.0052 | 0.0039 | 0.0042 | 0.0035 |
| Petrified Forest NP | 0.0037 | 0.0021 | 0.0021 | 0.0020 | 0.0024 | 0.0027 | 0.0034 | 0.0031 | 0.0090 | 0.0078 | 0.0080 | 0.0068 |
| Pine Mountain Wild | 0.0050 | 0.0023 | 0.0021 | 0.0023 | 0.0001 | 0.0002 | 0.0007 | 0.0004 | 0.0014 | 0.0008 | 0.0011 | 0.0009 |
| Saguro NP | 0.0007 | 0.0004 | 0.0010 | 0.0007 | 0.0003 | 0.0002 | 0.0003 | 0.0002 | 0.0005 | 0.0004 | 0.0006 | 0.0004 |
| San Pedro Parks Wild | 0.0033 | 0.0023 | 0.0022 | 0.0021 | 0.0040 | 0.0040 | 0.0031 | 0.0025 | 0.0030 | 0.0024 | 0.0032 | 0.0026 |
| Sierra Ancha Wild | | | | | | | | | 0.0025 | 0.0015 | 0.0017 | 0.0014 |
| Superstition Wild | 0.0087 | 0.0058 | 0.0067 | 0.0060 | 0.0005 | 0.0005 | 0.0004 | 0.0003 | 0.0019 | 0.0012 | 0.0015 | 0.0013 |
| Sycamore Canyon Wild | 0.0021 | 0.0003 | 0.0008 | 0.0004 | 0.0005 | 0.0006 | 0.0008 | 0.0006 | 0.0013 | 0.0007 | 0.0013 | 0.0009 |

**Table 18: Prong 2 Test - Delta Dv Differences of Visibility Conditions between BART Control Strategy and Interim Operating Strategy under BART Alternative (BART-BART Alternative)**

| Class I Area | Average Best 20% Days | | | | Average Worst 20% Days | | | | Annual Average | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | IS1 | IS2 | IS3 | IS4 | IS1 | IS2 | IS3 | IS4 | IS1 | IS2 | IS3 | IS4 |
| Bandalier NM | 0.0011 | 0.0009 | 0.0009 | 0.0008 | 0.0020 | 0.0011 | 0.0018 | 0.0011 | 0.0003 | -0.0001 | 0.0005 | 0.0001 |
| Bosque | 0.0012 | 0.0001 | 0.0005 | 0.0003 | 0.0001 | 0.0001 | 0.0006 | 0.0004 | 0.0003 | -0.0003 | 0.0004 | -0.0001 |
| Chiricahua NM | 0.0009 | -0.0011 | -0.0007 | -0.0009 | -0.0002 | 0.0000 | 0.0002 | 0.0001 | 0.0000 | -0.0002 | 0.0001 | -0.0001 |
| Chiricahua Wild | 0.0012 | -0.0011 | -0.0006 | -0.0009 | -0.0002 | 0.0000 | 0.0003 | 0.0001 | 0.0001 | -0.0002 | 0.0002 | -0.0001 |
| Galiuro Wild | 0.0006 | 0.0003 | 0.0006 | 0.0004 | -0.0002 | -0.0001 | 0.0002 | 0.0000 | 0.0001 | -0.0001 | 0.0002 | 0.0000 |
| Gila Wild | 0.0029 | 0.0009 | 0.0013 | 0.0009 | -0.0003 | -0.0001 | 0.0003 | 0.0001 | 0.0004 | -0.0004 | 0.0003 | -0.0002 |
| Grand Canyon NP | 0.0001 | -0.0001 | -0.0001 | -0.0001 | -0.0005 | -0.0003 | 0.0000 | -0.0001 | 0.0005 | 0.0003 | 0.0007 | 0.0004 |
| Mazatzal Wild | 0.0022 | -0.0009 | -0.0015 | -0.0012 | -0.0005 | -0.0004 | 0.0002 | -0.0001 | 0.0005 | -0.0001 | 0.0001 | -0.0001 |
| Mesa Verde NP | 0.0004 | 0.0001 | 0.0002 | 0.0002 | 0.0006 | 0.0008 | 0.0008 | 0.0003 | 0.0011 | 0.0011 | 0.0016 | 0.0010 |
| Mount Baldy Wild | 0.0043 | 0.0034 | 0.0030 | 0.0032 | -0.0008 | -0.0003 | -0.0012 | -0.0018 | 0.0002 | -0.0012 | -0.0008 | -0.0016 |
| Petrified Forest NP | 0.0031 | 0.0015 | 0.0015 | 0.0013 | -0.0007 | -0.0004 | 0.0004 | 0.0000 | 0.0030 | 0.0018 | 0.0020 | 0.0008 |
| Pine Mountain Wild | 0.0020 | -0.0007 | -0.0009 | -0.0007 | -0.0001 | 0.0000 | 0.0004 | 0.0002 | 0.0007 | 0.0001 | 0.0003 | 0.0001 |
| Saguro NP | 0.0000 | -0.0003 | 0.0003 | 0.0000 | 0.0001 | 0.0000 | 0.0002 | 0.0001 | 0.0002 | 0.0000 | 0.0003 | 0.0001 |
| San Pedro Parks Wild | 0.0013 | 0.0003 | 0.0002 | 0.0002 | 0.0013 | 0.0013 | 0.0004 | -0.0002 | 0.0003 | -0.0003 | 0.0005 | -0.0001 |
| Sierra Ancha Wild | | | | | | | | | 0.0013 | 0.0003 | 0.0005 | 0.0002 |
| Superstition Wild | 0.0047 | 0.0018 | 0.0027 | 0.0020 | -0.0001 | -0.0001 | -0.0001 | -0.0003 | 0.0009 | 0.0003 | 0.0006 | 0.0003 |
| Sycamore Canyon Wild | 0.0006 | -0.0013 | -0.0008 | -0.0012 | 0.0000 | 0.0001 | 0.0003 | 0.0001 | 0.0008 | 0.0002 | 0.0007 | 0.0004 |
| **Average** | **0.0017** | **0.0002** | **0.0004** | **0.0003** | **0.00003** | **0.0001** | **0.0003** | **0.00001** | **0.0006** | **0.0001** | **0.0005** | **0.0001** |

**Table 19: Summary of Prong 2 Test Results (BART – BART Alternative)**

| Strategy | Average Delta Dv of Class I Areas | | | | | |
|---|---|---|---|---|---|---|
| | Average Best 20% Days | | Average Worst 20% Days | | Annual Average | |
| | Absolute (dv) | Relative | Absolute (dv) | Relative | Absolute (dv) | Relative |
| IS1 | 0.0017 | 21.8% | 0.00003 | 0.6% | 0.0006 | 7.9% |
| IS2 | 0.0002 | 2.5% | 0.0001 | 1.3% | 0.0001 | 1.0% |
| IS3 | 0.0004 | 3.6% | 0.0003 | 9.1% | 0.0005 | 7.9% |
| IS4 | 0.0003 | 0.3% | 0.00001 | 2.0% | 0.0001 | 2.1% |

## *5.7 Supplemental Analysis of IMPROVE Monitoring Data*

The relative contributions of NOx, $SO_2$, and PM emissions reductions to visibility improvement is an important factor for determining whether the BART Alternative is better than BART. The interim operating strategy tends to reduce $SO_2$ emissions to a somewhat greater extent than it does NOx emissions in comparison to the BART control strategy. Therefore, it is relevant to investigate the relative contributions of NOx and $SO_2$ emissions to visibility impairment based on IMPROVE monitoring measurements.

ADEQ discussed the relative contributions of NOx and $SO_2$ emissions to visibility impairment in the BART alternative Technical Support Document for the Apache Generating Station.[32] Specifically, ADEQ noted in the Apache BART report that the $SO_2$-attributed visibility extinction is generally more than three times the NOx-attributed visibility extinction. For the CGS case, ADEQ further reviewed ammonium sulfate and ammonium nitrate data for all CGS-affected Class I areas over 2004-2014.[33] Figure 7 compares visibility extinction due to $SO_2$-attibuted ammonium sulfate and visibility extinction due to NOx-attributed ammonium nitrate averaged over 2004-2014 for each CGS-affected Class I area. The ratio of the $SO_2$-attributed visibility extinction to NOx-attributed visibility extinction ranges from 2.2 to 6.3, from 2.6 to 8.7, and from 3.0 to 7.8 for the 20% best days, the 20% worst days, and all days, respectively. The ratios averaged over all Class I areas are 3.7, 4.2 and 4.2 for the 20% best days, the 20% worst days, and all days, respectively. As one of the most significant contributors to aerosol light extinction, ammonium sulfate typically accounts for 15-30 percent of total light extinction for CGS-affected Class I areas. Ammonium nitrate plays a lesser role in aerosol light extinction, typically accounting for only 4-8 percent of total light extinction for CGS-affected Class I areas.

In addition, ADEQ reviewed the trends of $SO_2$-attributed visibility extinction and NOx-attributed visibility extinction at Petrified Forest NP during 2004-2014 (Figure 8). As the nearest Class I area to CGS, Petrified Forest NP has the highest visibility impacts from CGS among all CGS affected Class I areas based on the CAMx modeling. As illustrated in Figure 8, the $SO_2$-attributed visibility extinction at Petrified Forest NP has improved (i.e., has declined) for the 20% best days, 20% worst days, and all days during 2004-2014. Comparatively, the NOx-attributed visibility extinction appears not to have declined, especially for the 20% worst days. To provide insights about the different trends of NOx- or $SO_2$-attributed visibility extinction,

[32] "AEPCO Apache Generating Station BART Alternative Control Review Technical Support Document," ADEQ, April 15, 2014.
[33] http://vista.cira.colostate.edu/improve/Data/IMPROVE/summary_data.htm

ADEQ examined the annual emissions of $SO_2$ and NOx from CGS as well as from the Arizona Public Service Company's Cholla facility (Cholla) during 2004-2014.[34] CGS and Cholla are significant NOx and $SO_2$ stationary sources in the vicinity of the Petrified Forest NP. ADEQ's analysis attempted to address how the NOx- or $SO_2$-attributed visibility extinction data responded to the emission reductions of NOx and $SO_2$ at the two sources.

Figure 9 displays $SO_2$ and NOx annual emissions of CGS and Cholla versus concurrent sulfate and nitrate visibility extinctions during 2004-2014. It is evident from Figure 9 that there is a strong positive correlation between $SO_2$ emissions and sulfate visibility extinctions. Significant reductions of $SO_2$ emissions from both facilities have resulted in the decrease of sulfate visibility extinction during 2004-2014. On the contrary, nitrate visibility extinction appears to be independent of NOx emissions from CGS and Cholla. Although significant reductions of NOx emissions also occurred at both facilities during this period, the nitrate visibility extinctions did not appear to respond to an appreciable extent to the NOx emission reductions. ADEQ believes that the Petrified Forest NP area is ammonia-limited, where all of the sulfate is neutralized but the formation of ammonium nitrate is limited by a scarcity of remaining ammonium. Moreover, the formation of aerosol ammonium nitrate is in accordance with thermodynamic equilibrium. In the summer, even if additional ammonia is available in excess of what is needed to neutralize the sulfate, high temperatures may not be favorable for the formation of ammonium nitrate.

Based on the discussion above, ADEQ believes that $SO_2$ emissions reductions would produce greater visibility improvements than would NOx emissions reductions for CGS-affected Class I areas. The BART Alternative operating strategies would tend to realize a greater degree of visibility improvement than the BART control strategy due in part to significant reductions in $SO_2$ emissions under the interim operating strategy.

[34] https://ampd.epa.gov/ampd/

**Figure 7: Ammonium Sulfate Visibility Extinction and Ammonium Nitrate Visibility Extinction ($Mm^{-1}$) averaged over 2004-2014 at all CGS-Affected Class I Areas**

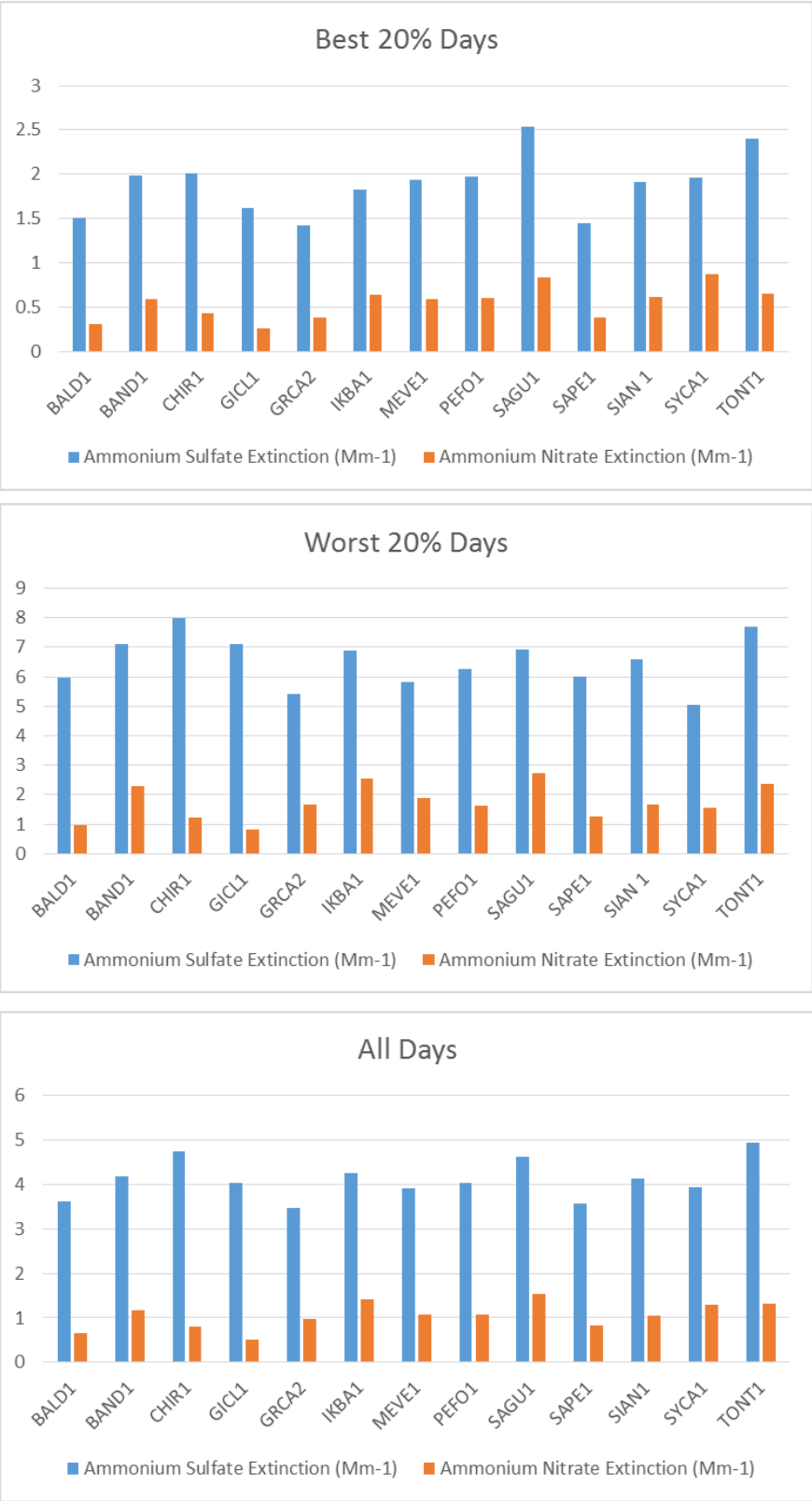
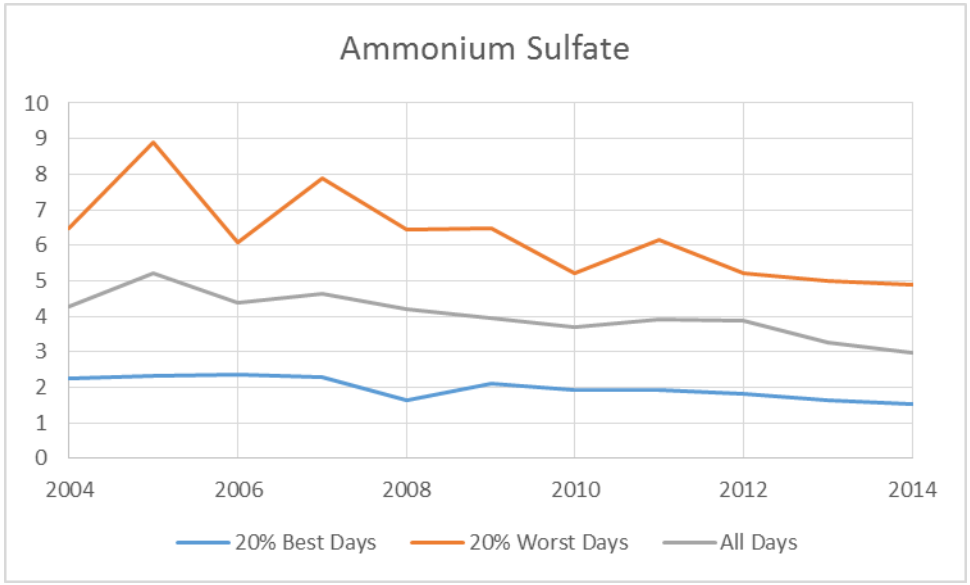


**Figure 8: Trends of Ammonium Sulfate Visibility Extinction and Ammonium Nitrate Visibility Extinction ($Mm^{-1}$) at Petrified Forest NP during 2004-2014**



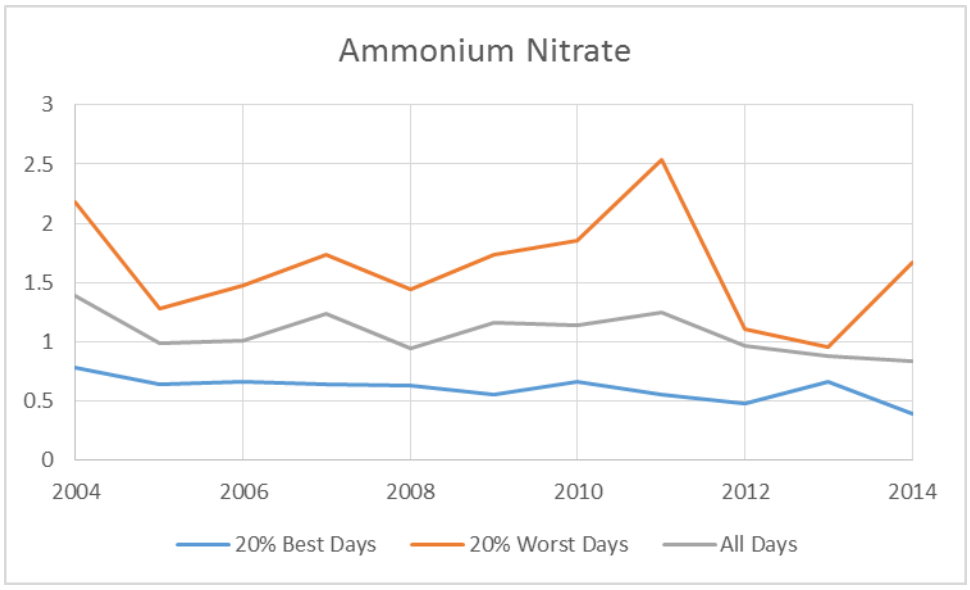
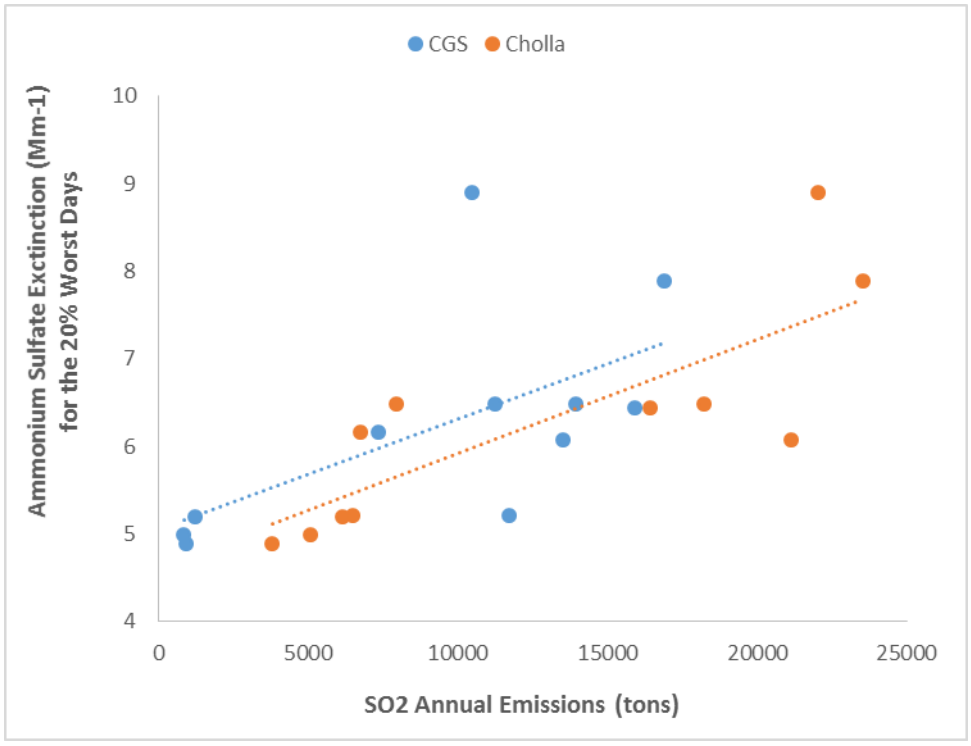
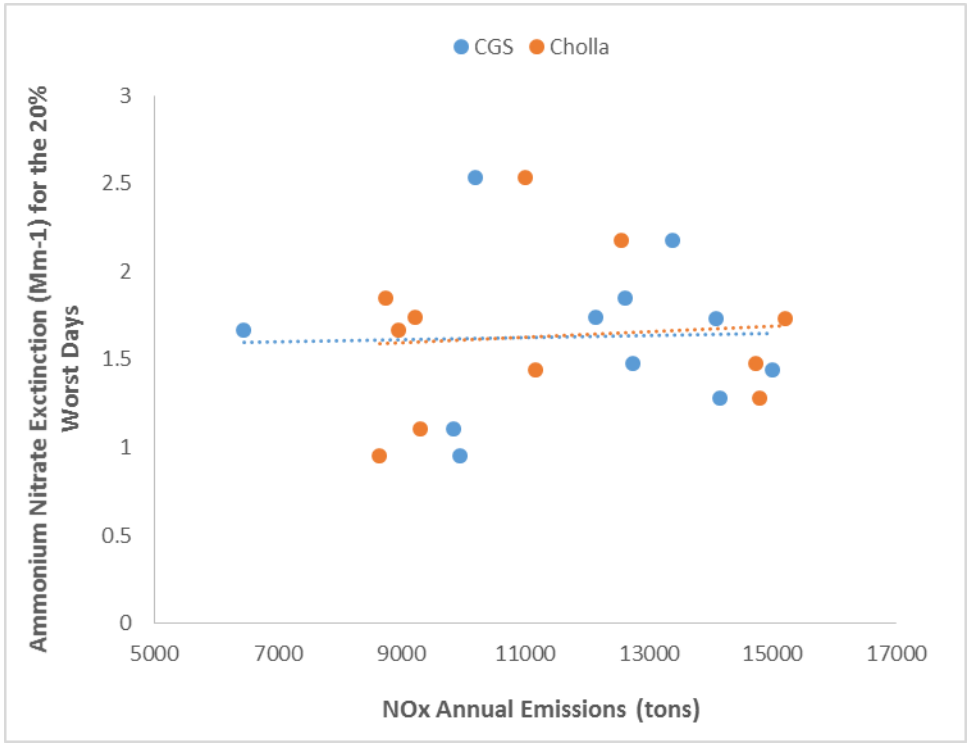



**Figure 9: Annual $SO_2$ and NOx Emissions from Cholla and CGS vs. Ammonium Sulfate and Ammonium Nitrate Visibility Extinction ($Mm^{-1}$) at Petrified Forest NP during 2004-2014**



## *5.8 Conclusion*

The IMPROVE monitoring data collected from CGS-affected Class I areas indicate that ammonium sulfate plays a more significant role in visibility impairment than ammonium nitrate. Moreover, an analysis of Petrified Forest NP monitoring data indicates that $SO_2$ emissions reductions would produce greater visibility improvements than would emissions reductions of NOx. Because the BART Alternative interim operating strategy would result in a larger amount of $SO_2$ emissions reductions and smaller amount of lesser NOx emissions reductions than would the BART control strategy, the CAMx modeling analysis evaluates visibility benefits of both $SO_2$ emissions reductions and NOx emissions reductions. The CAMx modeling demonstrates that all four seasonal curtailment options under the interim operating strategy pass Prong 1 and Prong 2 of the Better-than-BART test. These model results are consistent with monitoring data analyses. Therefore, ADEQ concludes that the BART Alternative achieves greater reasonable progress than the BART control strategy.

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# APPENDIX B

## Permit Revision to the Salt River Project Coronado Generating Station

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**PERMIT #64169 (As amended by Significant Revision #63088)**
**PLACE ID #4477**

| | |
|---|---|
| **PERMITTEE:** | **Salt River Project** |
| **FACILITY:** | **Coronado Generating Station** |
| **PERMIT TYPE:** | **Class I Air Quality Permit** |
| **DATE ISSUED:** | **November 29, 2016 (Revised on** December 14, 2016) |
| **EXPIRY DATE:** | **November 29, 2021** |

## SUMMARY

This Class I, Title V operating permit renewal is issued to Salt River Project (SRP), the Permittee, for the continued operation of their Coronado Generating Station located in Apache County, six miles northeast of St. Johns, Arizona off U.S Highway 191. This is a renewal of Air Quality Permit #52639.

SRP Coronado operates two coal-fired electric utility steam generating units. The two units have a combined electrical output capacity of 912 gross megawatts (MW). Electrostatic precipitators and wet flue gas desulfurization systems are operated to control particulate matter emissions and sulfur dioxide emissions, respectively. Low-$NO_x$ Burners and Overfire Air are used to control nitrogen oxide emissions on both Unit 1 and Unit 2. Selective Catalytic Reduction (SCR) on Unit 2 provides additional control for nitrogen oxide emissions.

An auxiliary boiler is used to provide auxiliary steam during startup if main boiler steam or turbine extraction steam is unavailable. Other operations at the plant include a main power building, coal mixing facilities, coal and ash handling facilities, ash disposal area, limestone handling equipment, process water treatment facilities, a forty-three mile railroad spur, water storage reservoirs, a 330 acre evaporation pond for non-recoverable waters, mechanically induced draft cooling towers, 500 kV and 69 kV switchyards and water supply from satellite well fields. The power plant commenced construction on July 25, 1974.

This permit is issued in accordance with Title 49, Chapter 3 of the Arizona Revised Statutes. All definitions, terms, and conditions used in this permit conform to those in the Arizona Administrative Code R18-2-101 et. seq. (A.A.C.) and 40 Code of Federal Regulations (CFR), except as otherwise defined in this permit. All terms and conditions in this permit are enforceable by the Administrator of the U.S. Environmental Protection Agency (EPA), except those terms and conditions that are specifically identified as "State Enforceable Only."

## SIGNIFICANT PERMIT REVISION NO. 63088 DESCRIPTION

This Significant Permit Revision No. 63088 to Operating Permit No. 64169 is issued to the Salt River Project Agricultural Improvement and Power District's (SRP) - Coronado Generating Station (CGS). CGS consists of two coal-fired electric generating units, Unit 1 and Unit 2. This significant permit revision (SPR) authorizes SRP to implement one of two Best Available Retrofit Technology (BART) Alternative operating strategies.

Timothy S. Franquist, Director
Air Quality Division

The Permittee shall decide, by December 31, 2022, whether to select:

- BART Alternative Operating Strategy-1 (OS-1): Install and commence operation of a Selective Catalytic Reduction System (SCR) on Unit 1 by December 31, 2025, or

- BART Alternative Operating Strategy-2 (OS-2): Shut down Unit 1 by December 31, 2025.

These two operating strategies are part of the BART Alternative as revised in the Regional Haze Program State Implementation Plan (SIP).

For the period starting on December 5, 2017, and ending no later than December 31, 2025, both of the BART Alternative operating strategies will include a Unit 1 interim operating strategy that will involve three seasonal curtailment options. These options entail varying durations of curtailment of Unit 1 and are dependent on the demonstrated nitrogen oxide ($NO_x$) emissions rate of Unit 1 and the sulfur dioxide ($SO_2$) emissions rates of Unit 1 and Unit 2. As part of the SIP revision, SRP has conducted visibility modeling to demonstrate that the BART Alternative represents an improvement in visibility in Class I areas over the BART required by the current Regional Haze FIP and 2016 EPA BART Reconsideration.

In addition, this significant permit revision constitutes a Prevention of Significant Deterioration construction permit authorizing the installation of a SCR system on Unit 1, as would be required if BART Alternative OS-1 is selected.

Attachment “E” is hereby added to Operating Permit No. 64169.

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# ATTACHMENT "A": GENERAL PROVISIONS

## I. PERMIT EXPIRATION AND RENEWAL

[ARS § 49-426.F, A.A.C. R18-2-304.C.2, and -306.A.1]

**A.** This permit is valid for a period of five years from the date of issuance.

**B.** The Permittee shall submit an application for renewal of this permit at least 6 months, but not more than 18 months, prior to the date of permit expiration.

## II. COMPLIANCE WITH PERMIT CONDITIONS

[A.A.C. R18-2-306.A.8.a and b]

**A.** The Permittee shall comply with all conditions of this permit including all applicable requirements of the Arizona Revised Statutes (A.R.S.) Title 49, Chapter 3, and the and air quality rules under Title 18, Chapter 2 of the Arizona Administrative Code. Any noncompliance is grounds for enforcement action; for permit termination, revocation and reissuance, or revision; or for denial of a permit renewal application. In addition, noncompliance with any federally enforceable requirement constitutes a violation of the Clean Air Act.

**B.** It shall not be a defense for a Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

## III. PERMIT REVISION, REOPENING, REVOCATION AND REISSUANCE, OR TERMINATION FOR CAUSE

[A.A.C. R18-2-306.A.8.c and -321.A.1 & 2]

**A.** The permit may be revised, reopened, revoked and reissued, or terminated for cause. The filing of a request by the Permittee for a permit revision, revocation and reissuance, termination, or of a notification of planned changes or anticipated noncompliance does not stay any permit condition.

**B.** The permit shall be reopened and revised under any of the following circumstances

1. Additional applicable requirements under the Clean Air Act become applicable to the Class I source. Such a reopening shall only occur if there are three or more years remaining in the permit term. The reopening shall be completed no later than 18 months after promulgation of the applicable requirement. No such reopening is required if the effective date of the requirement is later than the date on which the permit is due to expire, unless an application for renewal has been submitted pursuant to A.A.C. R18-2-322.B. Any permit revision required pursuant to this subparagraph shall comply with the provisions in A.A.C. R18-2-322 for permit renewal and shall reset the five-year permit term.

2. Additional requirements, including excess emissions requirements, become applicable to an affected source under the acid rain program. Upon approval by the Administrator, excess emissions offset plans shall be deemed to be incorporated into the Class I permit.

3. The Director or the Administrator determines that the permit contains a material mistake or that inaccurate statements were made in establishing the emissions standards or other terms or conditions of the permit.

4. The Director or the Administrator determines that the permit needs to be revised or revoked to assure compliance with the applicable requirements.

**C.** Proceedings to reopen and reissue a permit, including appeal of any final action relating to a permit reopening, shall follow the same procedures as apply to initial permit issuance and shall, except for reopenings under Condition III.B.1, affect only those parts of the permit for which cause to reopen exists. Such reopenings shall be made as expeditiously as practicable. Permit reopenings for reasons other than those stated in Condition III.B.1 shall not result in a resetting of the five-year permit term.

## IV. POSTING OF PERMIT

[A.A.C. R18-2-315]

**A.** The Permittee shall post this permit or a certificate of permit issuance where the facility is located in such a manner as to be clearly visible and accessible. All equipment covered by this permit shall be clearly marked with one of the following:

1. Current permit number; or

2. Serial number or other equipment ID number that is also listed in the permit to identify that piece of equipment.

**B.** A copy of the complete permit shall be kept on site.

## V. FEE PAYMENT

[A.A.C. R18-2-306.A.9 and -326]

The Permittee shall pay fees to the Director pursuant to ARS § 49-426(E) and A.A.C. R18-2-326.

## VI. ANNUAL EMISSION INVENTORY QUESTIONNAIRE

[A.A.C. R18-2-327.A and B]

**A.** The Permittee shall complete and submit to the Director an annual emissions inventory questionnaire. The questionnaire is due by March 31st or ninety days after the Director makes the inventory form available each year, whichever occurs later, and shall include emission information for the previous calendar year.

**B.** The questionnaire shall be on a form provided by the Director and shall include the information required by A.A.C. R18-2-327.

## VII. COMPLIANCE CERTIFICATION

[A.A.C. R18-2-309.2.a, -309.2.c-d, and 5.d]

**A.** The Permittee shall submit a compliance certification to the Director semiannually, which describes the compliance status of the source with respect to each permit condition. The first certification shall be submitted no later than May 15th, and shall report the compliance status of the source during the period between October 1st of the previous year and March 31st of the current year. The second certification shall be submitted no later than November

15th, and shall report the compliance status of the source during the period between April 1st and September 30th of the current year.

The compliance certifications shall include the following:

1. Identification of each term or condition of the permit that is the basis of the certification;

2. Identification of the methods or other means used by the Permittee for determining the compliance status with each term and condition during the certification period,

3. The status of compliance with the terms and conditions of the permit for the period covered by the certification, including whether compliance during the period was continuous or intermittent. The certification shall be based on the methods or means designated in Condition VII.A.2. The certifications shall identify each deviation and take it into account for consideration in the compliance certification;

4. For emission units subject to 40 CFR Part 64, the certification shall also identify as possible exceptions to compliance any period during which compliance is required and in which an excursion or exceedance defined under 40 CFR Part 64 occurred;

5. All instances of deviations from permit requirements reported pursuant to Condition XII.B; and

6. Other facts the Director may require to determine the compliance status of the source.

**B.** A copy of all compliance certifications shall also be submitted to the EPA Administrator.

**C.** If any outstanding compliance schedule exists, a progress report shall be submitted with the semi-annual compliance certifications required in Condition VII.A.

## VIII. CERTIFICATION OF TRUTH, ACCURACY AND COMPLETENESS

[A.A.C. R18-2-304.H]

Any document required to be submitted by this permit, including reports, shall contain a certification by a responsible official of truth, accuracy, and completeness. This certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

## IX. INSPECTION AND ENTRY

[A.A.C. R18-2-309.4]

Upon presentation of proper credentials, the Permittee shall allow the Director or the authorized representative of the Director to:

**A.** Enter upon the Permittee's premises where a source is located, emissions-related activity is conducted, or where records are required to be kept under the conditions of the permit;

**B.** Have access to and copy, at reasonable times, any records that are required to be kept under the conditions of the permit;

**C.** Inspect, at reasonable times, any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under the permit;

**D.** Sample or monitor, at reasonable times, substances or parameters for the purpose of assuring compliance with the permit or other applicable requirements; and

**E.** Record any inspection by use of written, electronic, magnetic and photographic media.

## X. PERMIT REVISION PURSUANT TO FEDERAL HAZARDOUS AIR POLLUTANT STANDARD

[A.A.C. R18-2-304.C]

If this source becomes subject to a standard promulgated by the Administrator pursuant to Section 112(d) of the Act, then the Permittee shall, within twelve months of the date on which the standard is promulgated, submit an application for a permit revision demonstrating how the source will comply with the standard.

## XI. ACCIDENTAL RELEASE PROGRAM

[40 CFR Part 68]

If this source becomes subject to the provisions of 40 CFR Part 68, then the Permittee shall comply with these provisions according to the time line specified in 40 CFR Part 68.

## XII. EXCESS EMISSIONS, PERMIT DEVIATIONS, AND EMERGENCY REPORTING

**A.** Excess Emissions Reporting

[A.A.C. R18-2-310.01.A and B]

1. Excess emissions shall be reported as follows:

   a. The Permittee shall report to the Director any emissions in excess of the limits established by this permit. Such report shall be in two parts as specified below:

      (1) Notification by telephone or facsimile within 24 hours of the time when the Permittee first learned of the occurrence of excess emissions including all available information from Condition XII.A.1.b.

      (2) Detailed written notification by submission of an excess emissions report within 72 hours of the notification pursuant to Condition XII.A.1.a.(1).

   b. The report shall contain the following information:

      (1) Identity of each stack or other emission point where the excess emissions occurred;

      (2) Magnitude of the excess emissions expressed in the units of the applicable emission limitation and the operating data and calculations used in determining the magnitude of the excess

emissions;

(3) Date, time and duration, or expected duration, of the excess emissions;

(4) Identity of the equipment from which the excess emissions emanated;

(5) Nature and cause of such emissions;

(6) If the excess emissions were the result of a malfunction, steps taken to remedy the malfunction and the steps taken or planned to prevent the recurrence of such malfunctions; and

(7) Steps taken to limit the excess emissions. If the excess emissions resulted from start-up or malfunction, the report shall contain a list of the steps taken to comply with the permit procedures.

2. In the case of continuous or recurring excess emissions, the notification requirements of this section shall be satisfied if the source provides the required notification after excess emissions are first detected and includes in such notification an estimate of the time the excess emissions will continue. Excess emissions occurring after the estimated time period, or changes in the nature of the emissions as originally reported, shall require additional notification pursuant to Condition XII.A.1.

[A.A.C. R18-2-310.01.C]

**B.** Permit Deviations Reporting

[A.A.C. R18-2-306.A.5.b]

The Permittee shall promptly report deviations from permit requirements, including those attributable to upset conditions as defined in the permit, the probable cause of such deviations, and any corrective actions or preventive measures taken. Prompt reporting shall mean that the report was submitted to the Director by certified mail, facsimile, or hand delivery within two working days of the time when emission limitations were exceeded due to an emergency or within two working days of the time when the owner or operator first learned of the occurrence of a deviation from a permit requirement.

**C.** Emergency Provision

[A.A.C. R18-2-306.E]

1. An "emergency" means any situation arising from sudden and reasonable unforeseeable events beyond the control of the source, including acts of God, that require immediate corrective action to restore normal operation, and that causes the source to exceed a technology-based emission limitation under the permit, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include noncompliance to the extent caused by improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.

2. An emergency constitutes an affirmative defense to an action brought for noncompliance with such technology-based emission limitations if Condition

XII.C.3 is met.

3. The affirmative defense of emergency shall be demonstrated through properly signed, contemporaneous operating logs, or other relevant evidence that:

   a. An emergency occurred and that the Permittee can identify the cause(s) of the emergency;

   b. The permitted facility was being properly operated at the time;

   c. During the period of the emergency, the Permittee took all reasonable steps to minimize levels of emissions that exceeded the emissions standards or other requirements in the permit; and

   d. The Permittee submitted notice of the emergency to the Director by certified mail, facsimile, or hand delivery within two working days of the time when emission limitations were exceeded due to the emergency. This notice shall contain a description of the emergency, any steps taken to mitigate emissions, and corrective action taken.

4. In any enforcement proceeding, the Permittee seeking to establish the occurrence of an emergency has the burden of proof.

5. This provision is in addition to any emergency or upset provision contained in any applicable requirement.

**D.** Compliance Schedule

[ARS § 49-426.I.5]

For any excess emission or permit deviation that cannot be corrected within 72 hours, the Permittee is required to submit a compliance schedule to the Director within 21 days of such occurrence. The compliance schedule shall include a schedule of remedial measures, including an enforceable sequence of actions with milestones, leading to compliance with the permit terms or conditions that have been violated.

**E.** Affirmative Defenses for Excess Emissions due to Malfunctions, Startup, and Shutdown

[A.A.C. R18-2-310]

1. Applicability

   This rule establishes affirmative defenses for certain emissions in excess of an emission standard or limitation and applies to all emission standards or limitations except for standards or limitations:

   a. Promulgated pursuant to Sections 111 or 112 of the Act;

   b. Promulgated pursuant to Titles IV or VI of the Clean Air Act;

   c. Contained in any Prevention of Significant Deterioration (PSD) or New Source Review (NSR) permit issued by the U.S. EPA;

   d. Contained in A.A.C. R18-2-715.F; or

e. Included in a permit to meet the requirements of A.A.C. R18-2-406.A.5.

2. Affirmative Defense for Malfunctions

Emissions in excess of an applicable emission limitation due to malfunction shall constitute a violation. When emissions in excess of an applicable emission limitation are due to a malfunction, the Permittee has an affirmative defense to a civil or administrative enforcement proceeding based on that violation, other than a judicial action seeking injunctive relief, if the Permittee has complied with the reporting requirements of A.A.C. R18-2-310.01 and has demonstrated all of the following:

a. The excess emissions resulted from a sudden and unavoidable breakdown of process equipment or air pollution control equipment beyond the reasonable control of the Permittee;

b. The air pollution control equipment, process equipment, or processes were at all times maintained and operated in a manner consistent with good practice for minimizing emissions;

c. If repairs were required, the repairs were made in an expeditious fashion when the applicable emission limitations were being exceeded. Off-shift labor and overtime were utilized where practicable to ensure that the repairs were made as expeditiously as possible. If off-shift labor and overtime were not utilized, the Permittee satisfactorily demonstrated that the measures were impracticable;

d. The amount and duration of the excess emissions (including any bypass operation) were minimized to the maximum extent practicable during periods of such emissions;

e. All reasonable steps were taken to minimize the impact of the excess emissions on ambient air quality;

f. The excess emissions were not part of a recurring pattern indicative of inadequate design, operation, or maintenance;

g. During the period of excess emissions there were no exceedances of the relevant ambient air quality standards established in Title 18, Chapter 2, Article 2 of the Arizona Administrative Code that could be attributed to the emitting source;

h. The excess emissions did not stem from any activity or event that could have been foreseen and avoided, or planned, and could not have been avoided by better operations and maintenance practices;

i. All emissions monitoring systems were kept in operation if at all practicable; and

j. The Permittee's actions in response to the excess emissions were

documented by contemporaneous records

3. Affirmative Defense for Startup and Shutdown

a. Except as provided in Condition XII.E.3.b, and unless otherwise provided for in the applicable requirement, emissions in excess of an applicable emission limitation due to startup and shutdown shall constitute a violation. When emissions in excess of an applicable emission limitation are due to startup and shutdown, the Permittee has an affirmative defense to a civil or administrative enforcement proceeding based on that violation, other than a judicial action seeking injunctive relief, if the Permittee has complied with the reporting requirements of A.A.C. R18-2-310.01 and has demonstrated all of the following:

(1) The excess emissions could not have been prevented through careful and prudent planning and design;

(2) If the excess emissions were the result of a bypass of control equipment, the bypass was unavoidable to prevent loss of life, personal injury, or severe damage to air pollution control equipment, production equipment, or other property;

(3) The air pollution control equipment, process equipment, or processes were at all times maintained and operated in a manner consistent with good practice for minimizing emissions;

(4) The amount and duration of the excess emissions (including any bypass operation) were minimized to the maximum extent practicable during periods of such emissions;

(5) All reasonable steps were taken to minimize the impact of the excess emissions on ambient air quality;

(6) During the period of excess emissions there were no exceedances of the relevant ambient air quality standards established in Title 18, Chapter 2, Article 2 of the Arizona Administrative Code that could be attributed to the emitting source;

(7) All emissions monitoring systems were kept in operation if at all practicable; and

(8) Contemporaneous records documented the Permittee's actions in response to the excess emissions.

b. If excess emissions occur due to a malfunction during routine startup and shutdown, then those instances shall be treated as other malfunctions subject to Condition XII.E.2.

4. Affirmative Defense for Malfunctions during Scheduled Maintenance

If excess emissions occur due to a malfunction during scheduled maintenance, then those instances will be treated as other malfunctions subject to Condition XII.E.2.

5. Demonstration of Reasonable and Practicable Measures

For an affirmative defense under Conditions XII.E.2 or 3, the Permittee shall demonstrate, through submission of the data and information required by Condition XII.E and A.A.C. R18-2-310.01, that all reasonable and practicable measures within the Permittee's control were implemented to prevent the occurrence of the excess emissions.

## XIII. RECORD KEEPING REQUIREMENTS

[A.A.C. R18-2-306.A.4]

**A.** The Permittee shall keep records of all required monitoring information including, but not limited to, the following:

1. The date, place as defined in the permit, and time of sampling or measurements;

2. The date(s) analyses were performed;

3. The name of the company or entity that performed the analyses;

4. A description of the analytical techniques or methods used;

5. The results of such analyses; and

6. The operating conditions as existing at the time of sampling or measurement.

**B.** The Permittee shall retain records of all required monitoring data and support information for a period of at least 5 years from the date of the monitoring sample, measurement, report, or application. Support information includes all calibration and maintenance records and all original strip-chart recordings or other data recordings for continuous monitoring instrumentation, and copies of all reports required by the permit.

**C.** All required records shall be maintained either in an unchangeable electronic format or in a handwritten logbook utilizing indelible ink.

## XIV. REPORTING REQUIREMENTS

[A.A.C. R18-2-306.A.5.a]

The Permittee shall submit the following reports:

**A.** Compliance certifications in accordance with Section VII.

**B.** Excess emission; permit deviation, and emergency reports in accordance with Section XII.

**C.** Other reports required by any condition of Attachment "B".

## XV. DUTY TO PROVIDE INFORMATION

[A.A.C. R18-2-304.G and -306.A.8.e]

**A.** The Permittee shall furnish to the Director, within a reasonable time, any information that the Director may request in writing to determine whether cause exists for revising, revoking and reissuing, or terminating the permit, or to determine compliance with the permit. Upon

request, the Permittee shall also furnish to the Director copies of records required to be kept by the permit. For information claimed to be confidential, the Permittee shall furnish an additional copy of such records directly to the Administrator along with a claim of confidentiality.

**B.** If the Permittee has failed to submit any relevant facts or has submitted incorrect information in the permit application, the Permittee shall, upon becoming aware of such failure or incorrect submittal, promptly submit such supplementary facts or corrected information.

## XVI. PERMIT AMENDMENT OR REVISION

[A.A.C. R18-2-318, -319, and -320]

The Permittee shall apply for a permit amendment or revision for changes to the facility which do not qualify for a facility change without revision under Section XVII, as follows:

**A.** Administrative Permit Amendment (A.A.C. R18-2-318);

**B.** Minor Permit Revision (A.A.C. R18-2-319); and

**C.** Significant Permit Revision (A.A.C. R18-2-320)

The applicability and requirements for such action are defined in the above referenced regulations.

## XVII. FACILITY CHANGE WITHOUT A PERMIT REVISION

[A.A.C. R18-2-317]

**A.** The Permittee may make changes at the permitted source without a permit revision if all of the following apply:

1. The changes are not modifications under any provision of Title I of the Act or under ARS § 49-401.01(24);

2. The changes do not exceed the emissions allowable under the permit whether expressed therein as a rate of emissions or in terms of total emissions;

3. The changes do not violate any applicable requirements or trigger any additional applicable requirements;

4. The changes satisfy all requirements for a minor permit revision under A.A.C. R18-2-319.A; and

5. The changes do not contravene federally enforceable permit terms and conditions that are monitoring (including test methods), record keeping, reporting, or compliance certification requirements.

**B.** The substitution of an item of process or pollution control equipment for an identical or substantially similar item of process or pollution control equipment shall qualify as a change that does not require a permit revision, if it meets all of the requirements of Conditions XVII.A and C.

**C.** For each change under Conditions XVII.A and B, a written notice by certified mail or hand delivery shall be received by the Director and the Administrator a minimum of 7 working

days in advance of the change. Notifications of changes associated with emergency conditions, such as malfunctions necessitating the replacement of equipment, may be provided less than 7 working days in advance of the change, but must be provided as far in advance of the change~~,~~ as possible or, if advance notification is not practicable, as soon after the change as possible.

**D.** Each notification shall include:

1. When the proposed change will occur;

2. A description of the change;

3. Any change in emissions of regulated air pollutants; and

4. Any permit term or condition that is no longer applicable as a result of the change.

**E.** The permit shield described in A.A.C. R18-2-325 shall not apply to any change made under this Section.

**F.** Except as otherwise provided for in the permit, making a change from one alternative operating scenario to another as provided under A.A.C. R18-2-306.A.11 shall not require any prior notice under this Section.

**G.** Notwithstanding any other part of this Section, the Director may require a permit to be revised for any change that, when considered together with any other changes submitted by the same source under this Section over the term of the permit, do not satisfy Condition XVII.A.

## XVIII. TESTING REQUIREMENTS

[A.A.C. R18-2-312]

**A.** The Permittee shall conduct performance tests as specified in the permit and at such other times as may be required by the Director.

**B.** Operational Conditions during Testing

Tests shall be conducted during operation at the maximum possible capacity of each unit under representative operational conditions unless other conditions are required by the applicable test method or in this permit. With prior written approval from the Director, testing may be performed at a lower rate. Operations during periods of start-up, shutdown, and malfunction (as defined in A.A.C. R18-2-101) shall not constitute representative operational conditions unless otherwise specified in the applicable standard.

**C.** Tests shall be conducted and data reduced in accordance with the test methods and procedures contained in the Arizona Testing Manual unless modified by the Director pursuant to A.A.C. R18-2-312.B.

**D.** Test Plan

At least 14 calendar days prior to performing a test, the Permittee shall submit a test plan

to the Director in accordance with A.A.C. R18-2-312.B and the Arizona Testing Manual. This test plan must include the following:

1. Test duration;

2. Test location(s);

3. Test method(s); and

4. Source operation and other parameters that may affect test results.

**E.** Stack Sampling Facilities

The Permittee shall provide, or cause to be provided, performance testing facilities as follows:

1. Sampling ports adequate for test methods applicable to the facility;

2. Safe sampling platform(s);

3. Safe access to sampling platform(s); and

4. Utilities for sampling and testing equipment.

**F.** Interpretation of Final Results

Each performance test shall consist of three separate runs using the applicable test method. Each run shall be conducted for the time and under the conditions specified in the applicable standard. For the purpose of determining compliance with an applicable standard, the arithmetic mean of the results of the three runs shall apply. In the event that a sample is accidentally lost or conditions occur in which one of the three runs is required to be discontinued because of forced shutdown, failure of an irreplaceable portion of the sample train, extreme meteorological conditions, or other circumstances beyond the Permittee's control, compliance may, upon the Director's approval, be determined using the arithmetic mean of the results of the other two runs. If the Director or the Director's designee is present, tests may only be stopped with the Director's or such designee's approval. If the Director or the Director's designee is not present, tests may only be stopped for good cause. Good cause includes: forced shutdown, failure of an irreplaceable portion of the sample train, extreme meteorological conditions, or other circumstances beyond the Permittee's control. Termination of any test without good cause after the first run is commenced shall constitute a failure of the test. Supporting documentation, which demonstrates good cause, must be submitted.

**G.** Report of Final Test Results

A written report of the results of all performance tests shall be submitted to the Director within 45 days after the test is performed. The report shall be submitted in accordance with the Arizona Testing Manual and A.A.C. R18-2-312.A.

## XIX. PROPERTY RIGHTS

[A.A.C. R18-2-306.A.8.d]

This permit does not convey any property rights of any sort, or any exclusive privilege.

## XX. SEVERABILITY CLAUSE

[A.A.C. R18-2-306.A.7]

The provisions of this permit are severable. In the event of a challenge to any portion of this permit, or if any portion of this permit is held invalid, the remaining permit conditions remain valid and in force.

## XXI. PERMIT SHIELD

Compliance with the conditions of this permit shall be deemed compliance with all applicable requirements identified in the portions of this permit subtitled "Permit Shield". The permit shield shall not apply to minor revisions pursuant to Condition XVI.B of this Attachment and any facility changes without a permit revision pursuant to Section XVII of this Attachment.

[A.A.C. R18-2-325]

## XXII. PROTECTION OF STRATOSPHERIC OZONE

[40 CFR Part 82]

If this source becomes subject to the provisions of 40 CFR Part 82, then the Permittee shall comply with these provisions accordingly.

## XXIII. APPLICABILITY OF NSPS/NESHAP GENERAL PROVISIONS

[40 CFR Part 60, Part 63]

For all equipment subject to a New Source Performance Standard or a National Emission Standard for Hazardous Air Pollutants, the Permittee shall comply with all applicable requirements contained in Subpart A of Title 40, Chapter 60 and Chapter 63 of the Code of Federal Regulations.

## XXIV. ACID RAIN

**A.** When provisions or requirements of the regulations incorporated pursuant to A.A.C. R18-2-333.A (Acid Rain) conflict with any of the applicable requirements, the regulations incorporated by A.A.C. R18-2-333.A shall apply and take precedence.

[A.A.C. R18-2-333]

**B.** No permit revision shall be required for increases in emissions that are authorized by allowances acquired pursuant to acid rain program, provided that such increases do not require a permit revision under any other applicable requirement.

[A.A.C. R18-2-306.A.6.a]

**C.** No limit shall be place on the number of allowances held by the source. The source may not, however, use allowances as defense to noncompliance with any other applicable requirement. [A.A.C. R18-2-306.A.6.c]

**D.** Any such allowance shall be accounted for according to the procedures established in regulations promulgated under Title IV of the Act. [A.A.C. R18-2-306.A.6.c]

**E.** All of the following are prohibited: [A.A.C. R18-2-306.A.6.d]

1. Annual emissions of sulfur dioxide in excess of the number of allowances to emit sulfur dioxide held by the owners of the operations of the unit or the designed representative of the owners or the operators as of the applicable allowance transfer deadline;

2. Exceedances of applicable emissions rates;

3. The use of any allowance prior to the year for which it was allocated; and

4. Contravention of any other provision of the permit.

## ATTACHMENT "B": SPECIFIC CONDITIONS

## I. FACILITY WIDE LIMITATIONS

**A.** The Permittee shall have on site or on call a person certified in EPA Reference Method 9 unless all Method 9 observations or instantaneous visual observations required by this permit are conducted as Alternative Method-082 (Digital Camera Operating Technique). The Permittee shall certify the camera and the associated software in accordance with ALT-082 procedures. Any Method 9 test or instantaneous visual survey required by this permit can be conducted as ALT-082. The results of a Method 9 observation or any individual instantaneous visual observation conducted as ALT-082 shall be obtained within 30 minutes of completing the Method 9 observation or individual instantaneous visual observation.

[A.A.C. R18-2-306.A.3.c]

**B**. The Permittee shall record any change in fuel type including:

1. Type of fuel change;
2. Date of the fuel change; and
3. Time of the fuel change.

[A.A.C. R18-2-306.A.3.c]

**C.** The Permittee shall maintain a log of all adjustments, replacements, and maintenance performed on all air pollution control equipment.

[Permit #30732, Attachment "B", Condition I.D]

**D.** At the time the compliance certifications required by Section VII of Attachment "A" are submitted, the Permittee shall submit reports of all monitoring activities required by Attachment "B" performed during the six month compliance term.

[A.A.C. R18-2-306.A.5.a]

## II. UNIT 1 AND UNIT 2 BOILERS

**A.** Applicability

This section applies to the Unit 1 and Unit 2 boilers listed in Equipment List, Attachment "C" of this permit.

**B.** Definitions

1. *Unit Operating Day*- A Unit Operating Day for Unit 1 means any calendar day on which Unit 1 fires fossil fuel. A Unit Operating Day for Unit 2 means any calendar day on which Unit 2 fires fossil fuel.

[Significant Revision #46236- Condition II.A.2]

2. *Startup* – Startup means the setting into operation of Coronado Generating Station (CGS) Unit 1or Unit 2 for any purpose.

[40 CFR 60.2]

3. *Shutdown* - Shutdown means the cessation of operation of Coronado Generating

Station (CGS) Unit 1or Unit 2 for any purpose.

[40 CFR 60.2]

4. *Malfunction* - Malfunction means any sudden, infrequent; and not reasonably preventable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner. Failures that are caused in part by poor maintenance or careless operation are not malfunctions.

[40 CFR 60.2]

**C.** Operational Limitations

1. Fuel Limitation

   a. Coal;

   b. Fuel Oil;

   c. Co-firing of coal and fuel oil, and

   d. Unprocessed wood (biomass)

[A.A.C. R18-2-306.A.2]

2. The Permittee shall maintain a file of all measurements, including continuous monitoring system, monitoring device, and performance testing measurements; all continuous monitoring system performance evaluations; all continuous monitoring system or monitoring device calibration checks; adjustments and maintenance performed on these systems or devices; and all other information required by this section recorded in a permanent form suitable for inspection. The file shall be retained for at least two years following the date of such measurements, maintenance, reports and records.

[40 CFR 60.7(f)]

3. Excess Emissions and Monitoring System Performance Reports

   The Permittee shall submit excess emissions and monitoring system performance (MSP) reports to the Department and EPA Region IX semi-annually for each six-month period in the calendar year. All semiannual reports shall be postmarked by the 30$^{th}$ day following the end of each six-month period. Periods of excess emissions as defined in the applicable sections and monitoring systems (MS) downtime shall be reported. Each excess emissions and MSP report shall include the following:

   a. The magnitude of excess emissions computed, any conversion factor(s) used; the date and time of commencement and completion of each time period of excess emissions, and the process operating time during the reporting period.

   b. Specific identification of each period of excess emissions that occurs during startups, shutdowns, and malfunctions of the affected facility. The nature and cause of any malfunction (if known), the corrective action taken or preventative measures adopted.

c. The date and time identifying each period during which the continuous monitoring system was inoperative except for zero and span checks and the nature of the system repairs or adjustments.

d. When no excess emissions have occurred or the continuous monitoring systems have not been inoperative, repaired, or adjusted, such information shall be stated in the report.

[40 CFR 60.45(g) & 60.7(c)]

4. In addition to Condition II.C.3, the Permittee shall report emissions exceeding an emission limitation or standard as deviations in accordance with Condition XII.B, Attachment "A" of this permit.

[A.A.C. R18-2-306.A.5.b]

5. Emission Rates for Performance Testing

When conducting the required performance tests, the Permittee shall determine compliance with the PM, $SO_2$, and $NO_X$ emissions standards as follows:

a. Emission Rates using $O_2$ as Diluent Gas

The emission rate (E) of PM, $SO_2$, and $NO_X$ shall be computed for each run using the following equation:

$$E = CF_d \frac{(20.9)}{(20.9 - \%O_2)}$$

Where:

E = Emission rate of pollutant, ng/J (lb/million Btu).

C = Concentration of pollutant, ng/dscm (lb/dscf).

$\%O_2$ = Oxygen concentration, percent dry basis.

$F_d$ = Factor as determined from Method 19.

[40 CFR 60.46(b)(1)]

b. Emission Rates using $CO_2$ as Diluent Gas

As an alternate to the reference method, the emission rate (E) of PM, $SO_2$, and $NO_x$, may be determined by using the $F_c$ factor in the following equation:

$$E = CF_c \frac{100}{\%CO_2}$$

Where:

E = emission rate of pollutant, ng/J (lb/million Btu).

C = concentration of pollutant, ng/dscm (lb/dscf).

$\%CO_2$ = carbon dioxide concentration, percent dry basis.

$F_c$ = factor as determined from Method 19.

[40 CFR 60.46(d)(1)]

**D.** Particulate Matter and Opacity

1. Emission Limitations/Standards

a. The Permittee shall not cause to be discharged into the atmosphere from the stack of each unit any gases which contain particulate matter in excess of 43 nanograms per joule heat input (0.10 lb per million Btu) derived from fossil fuel.

[40 CFR 60.42(a)(1)]

b. *The Permittee shall not emit filterable particulate matter (PM) in excess of 0.030 lbs./MMBtu, as determined by performance tests.*

[Significant Revision #46236 Condition II.C.1.b.(2) and A.A.C. R18-2-406.A.4]
[Material Permit Conditions are defined by underline and italics]

c. *The Permittee shall not emit filterable particulate matter (PM) and particulate matter below 10 micron size ($PM_{10}$) in excess of 0.030 lbs./MMBtu, as determined by performance tests.*

[Significant Revision #46236 Condition II.C.1.b.(3) and A.A.C. R18-2-406.A.4]
[Material Permit Conditions are defined by underline and italics]

d. *The opacity of emissions from the stack of each unit shall not be greater than 20 percent except for one six-minute period per hour of not more than 27 percent opacity.* Periods of startup, shutdown, or malfunction, as defined in Conditions II.B.2, 3, and 4 respectively, are excluded from the opacity standard. Opacity readings of portions of plumes which contain condensed, uncombined water vapor shall not be used for the purposes of determining compliance with opacity standards.

[40 CFR 60.42(a)(2), 60.11(c), 60.11(e)(1), and A.A.C. R18-2-331.A.3.f]
[Material Permit Conditions are defined by underline and italics]

e. Excess opacity emissions for Units 1 and Unit 2 are defined as any six-minute period during which the average opacity of emissions exceeds 20 percent opacity, except that one six-minute average per hour of up to 27 percent opacity need not be reported.

[40 CFR 60.45(g)(1)]

2. Air Pollution Control Requirements

a. *At all times including periods of startup, shutdown, and malfunction, the Permittee shall to the extent practicable*, maintain, and *operate each Hot Side Electrostatic Precipitator (HS-ESP) in a manner consistent with good air pollution control practices for minimizing particulate matter emissions.*

[40 CFR 60.11(d) and A.A.C. R18-2-331.A.3.e]
[Material Permit Conditions are defined by underline and italics]

b. *The Permittee shall operate each existing HS-ESP on Unit 1 and Unit 2 at all times when the Unit is in operation to maximize PM reductions to the extent practicable, provided that such operation of the HS-ESP is consistent with technological limitations, manufacturer's specifications,*

*and good engineering and maintenance practices for the HS-ESP.*

[Significant Revision #46236 Condition II.C.2.b and A.A.C. R18-2-331.A.3.e]
[Material Permit Conditions are defined by underline and italics]

c. Except as required during correlation testing under 40 CFR Part 60, Appendix B, PS-11, and Quality Assurance Requirements under Appendix F, Procedure 2, the Permittee shall at a minimum perform the following on the HS-ESP to the extent reasonably practicable:

(1) Fully energize each section of the HS-ESP for each unit and repair any failed HS-ESP section at the next planned or unplanned unit outage of sufficient length;

(2) Operate automatic control systems on each HS-ESP to maximize particulate matter collection efficiency;

(3) Maintain power levels delivered to the HS-ESPs, consistent with manufacturer's specifications, the operational design of the unit, and good engineering practices;

(4) Inspect for and repair during the next planned or unplanned unit outage of sufficient length any openings in HS-ESP casings, ductwork, and expansion joints to minimize air leakage; and

(5) Optimize the plate-cleaning and discharge-electrode-cleaning systems for the HS-ESPs at each unit by varying the cycle time, cycle frequency, rapper-vibrator intensity, and number of strikes per cleaning event.

[Significant Revision #46236 Condition II.C.2.c]

3. Monitoring & Recordkeeping Requirements

a. *The Permittee shall* maintain, correlate, and *operate a continuous emission monitoring systems for measuring PM emissions on the unit being controlled by the FGD system.*

[Significant Revision #46236, Condition II.B.3.b and A.A.C. R18-2-331 .A.3.c]
[Material Permit Conditions are defined by underline and italics]

b. *In developing the plan for correlation of the PM CEMS and QA/QC protocol, the Permittee shall use the criteria set forth in 40 CFR Part 60, Appendix B, PS-11, and Appendix F, Procedure 2.*

[Significant Revision #46236, Condition II.C.3.g.(1)(c) and A.A.C. R18-2-331.A.3.c]
[Material Permit Conditions are defined by underline and italics]

c. *The Permittee shall operate the PM CEMS in accordance with the QA/QC protocol approved by ADEQ and EPA.*

[Significant Revision #46236, Condition II.C.3.g.(1)(d) and A.A.C. R18-2-331.A.3.c]
[Material Permit Conditions are defined by underline and italics]

d. The PM CEMS shall comprise a continuous particle mass monitor measuring particulate matter concentration, directly or indirectly, on an hourly average basis and a diluents monitor used to convert the concentration to units expressed in pounds per MMBtu (lb/ MMBtu). The PM CEMS installed at Unit 1 and Unit 2 must be appropriate for the anticipated stack conditions and capable of measuring PM concentrations

on an hourly average basis.

[Significant Revision #46236, Condition II.C.3.g.(1)(f)]

e. Except for periods of monitor malfunction, maintenance, or repair, the Permittee shall continuously operate the PM CEMS at all times when the Unit it serves is operating.

[Significant Revision #46236, Condition II.C.3.g.(1)(g)]

f. The Permittee shall maintain, in an electronic database, the hourly average emission values from all PM CEMS data in lb/MMBtu.

[Significant Revision #46236, Condition II.C.3.g.(3)]

g. *The Permittee shall calibrate,* maintain, and operate *continuous opacity monitoring system (COMS) for measuring the opacity of emissions.*

[40 CFR 60.45(a) and A.A.C. R18-2-33l.A.3.c]
[*Material Permit Conditions are defined by underline and italics*]

h. COMS Requirements

(1) The COMS shall meet the following requirements:

40 CFR 60, Appendix B, Performance Specification 1, "Specification and Test Procedures for Opacity Continuous Emission Monitoring Systems in Stationary Sources"

(a) Apparatus

(b) Installation Specifications

(c) Design and Performance Procedure

(d) Design Specification Verification Procedure

(e) Performance Specification Verification Procedure

(f) Equations

[40 CFR 60.13(a)]

(2) The following are the quality assurance requirements to be met:

(a) Calibration Checks

The Permittee shall check the zero and span calibration drifts at least once daily in accordance with a written procedure.

[40 CFR 60.13(d)( 1) and Appendix B, PSI, 5.2]

(b) Zero and Span Drift Adjustments

[40 CFR 60.13(d)(1)]

(i) The zero and span shall, at a minimum, be adjusted whenever the 24-hr zero drift or 24-hr

span drift exceeds 4% opacity.

(ii) The system shall allow for the amount of excess zero and span drift measured at the 24-hour interval checks to be recorded and quantified.

(iii) The optical surfaces exposed to the effluent gases shall be cleaned prior to performing the zero and span drift adjustments, except for systems using automatic zero adjustments.

(iv) For systems using automatic zero adjustments, the optical surfaces shall be cleaned when the cumulative automatic zero compensation exceeds 4% opacity.

(3) System Check

[40 CFR 60.13(d)(2)]

A method for producing a simulated zero opacity condition and an upscale (span) opacity condition using a certified neutral density filter or other related technique to produce a known obscuration of the light beam to provide a system check of the analyzer internal optical surfaces and all electronic circuitry including the lamp and photodetector assembly shall be used by the Permittee.

(4) Minimum frequency of Operation

[40 CFR 60.13(e)(1)]

Except during periods of system breakdowns, repairs, calibration checks, and zero and span adjustments, the Continuous Opacity Monitoring System (COMS) shall be in continuous operation and shall complete a minimum of one cycle of sampling and analyzing for each successive I0-second period and one cycle of data recording for each successive 6-minute period.

(5) Data Reduction and Missing Data

(a) The Permittee shall reduce all data from the COMS to 6-minute averages. Six-minute opacity averages shall be calculated from 36 or more data points equally spaced over each 6-minute period.

[40 CFR 60.13(h)(1)]

(b) Data recorded during periods of system breakdowns, repairs, calibration checks, and zero and span adjustments shall not be included in the data averages computed under the previous paragraph. An arithmetic or integrated average of all data may be used.

[40 CFR 60.13(h)(2)(vi and ix)]

i. Compliance Assurance Monitoring (CAM) & Periodic Monitoring for

Particulate Matter

(1) The Permittee shall comply with the following indicators:
[40 CFR 64.6(c)(1)(i)]

(a) Emission measurements from the PM CEMS shall be the sole indicator of PM emissions.

(b) If PM CEMS emission measurements are greater than 0.028 lb/MMBtu on a 24-hour rolling average, excluding periods of startup, shutdown, and malfunction, this shall be considered an excursion and trigger an inspection, corrective action, and recordkeeping requirement in accordance with Conditions II.D.3.i.(4) & (6) of this Attachment.

(2) The Permittee shall maintain the monitoring equipment, including but not limited to maintaining necessary parts for routine repair of the monitoring equipment.
[40 CFR 64.6(c)(3) and 64.7(b)]

(3) Except for, as applicable, monitoring equipment malfunctions, associated repairs, and required quality assurance or control activities (including, as applicable, calibration checks and required zero and span adjustments), the Permittee shall conduct all monitoring in continuous operation (or shall collect data at all required .intervals) at all times that the boilers are operating. Data recorded during monitoring equipment malfunctions, associated repairs, and required quality assurance or control activities shall not be used for purposes of this part, including data averages and calculations, or fulfilling a minimum data availability requirement, if applicable. The Permittee shall use all the data collected during all other periods in assessing the operation of the control device and associated control system. A monitoring equipment malfunction is any sudden, infrequent, not reasonably preventable failure of the monitoring equipment to provide valid data. Monitoring failures that are caused in part by poor maintenance or careless operation are not malfunctions.
[40 CFR 64.6(c)(3) and 64.7(c)]

(4) Response to Excursions or Exceedances

(a) Upon detecting an excursion or exceedance, the Permittee shall restore operation of the boiler (including the control device and associated capture system) to their normal or usual manner of operation as expeditiously as practicable in accordance with good air pollution control practices for minimizing emissions. The response shall include minimizing the period of any startup, shutdown, or malfunction, and taking any necessary corrective actions to restore normal operation and prevent the likely recurrence of the cause of an excursion or exceedance

(other than those caused by excused startup or shutdown conditions). Such actions may include initial inspection and evaluation, recording that operations returned to normal without operator action (such as through response by a computerized distribution control system), or any necessary follow-up actions to return operations to within the indicator range, designated condition, or below applicable emission limitation or standard, as applicable.

[40 CFR 64.6(c)(3) and 64.7(d)(1)]

(b) Determination of whether the Permittee has used acceptable procedures in response to an excursion or exceedance will be based on information available, which may include but is not limited to, monitoring results, review of operation, and maintenance procedures and records, and inspection of the control device, associated capture system, and process.

[40 CFR 64.6(c)(3) and 64.7(d)(2)]

(5) After approval of the monitoring under this section, if the Permittee identifies a failure to achieve compliance with an emission limitation or standard for which the approved monitoring did not provide an indication of an excursion or exceedance while providing valid data, or the results of compliance or performance testing document a need to modify the existing indicator ranges or designated conditions, Permittee shall promptly notify the Department, and if necessary, submit a proposed modification to this permit to address the necessary monitoring changes. Such a modification may include, but is not limited to, re-establishing indicator ranges or designated conditions, modifying the frequency of conducting monitoring and collecting data, or the monitoring of additional parameters.

[40 CFR 64.6(c)(3) and 64.7(e)]

(6) Excursions shall be reported as required by Condition VII.A.4 of Attachment "A" of this permit. The report shall include, at a minimum, the following:

[A.A.C. R18-2-309(2)(c)(iii), 40 CFR 64.9(a)(2)(i), and (ii)]

(a) Summary information on the number, duration and cause (including unknown cause, if applicable) of excursion or exceedances, as applicable, and the corrective actions taken; and

(b) Summary information on the number, duration and cause (including unknown cause, if applicable) for monitoring downtime incidents (other than downtime associated with zero and span or other daily calibration checks, if applicable).

j. The Permittee shall maintain a record of the applicable monitoring parameters defined in Condition II.D.3. Records of all excursions and

corrective actions taken including the date and time of the event shall be maintained.

[A.A.C. R18-2-306.A.3.b]

4. Reporting Requirements

a. The Permittee shall report the data recorded by the PM CEMS, expressed in lb/MMBtu on a rolling average 3-hour, 6-hour, 24-hour, 30-day, and 365-day basis in electronic format to the ADEQ and EPA in accordance with Condition VII of Attachment "A".

[Significant Revision #46236, Condition II.C.3.g.(4)(a)]

b. The Permittee shall identify in the report any PM concentrations measured by the PM CEMS that are greater than 125% of the highest PM concentration level used in the most recent correlation testing performed pursuant to PS-11.

[Significant Revision #46236, Condition II.C.3.g.(4)(b)]

5. Performance Testing

a. The Permittee shall perform annual performance tests on each boiler Unit to determine compliance with the particulate matter concentration in II.D.1.a using EPA Reference Method 5, 5B, or 17.

[40 CFR 60.46(b)(2)]

b. The Permittee may use Method 17 if the stack gas temperature at the sampling location does not exceed an average temperature of 160°C (320 °F). The procedures of sections 8.1 and 11.1 of Method 5B may be used with Method 17 when used after wet FGD systems and the effluent gas is not saturated or laden with water droplets.

[40 CFR 60.46(d)(2)]

c. The Permittee shall conduct annual performance tests to determine compliance with the PM emissions rate established in Conditions II.D.l.b and c using the following reference methods and procedures (filterable portion only).

(1) 40 CFR Part .60, Appendix A-3, Method 5, Method 5B, or Method 5I.

(2) 40 CFR Part 60, Appendix A-6, Method 17; or

(3) Alternative stack tests or methods requested by the Permittee and approved by ADEQ and EPA.

[Significant Revision #46236, Condition II.C.4.c]

d. Test Procedures

(1) The Permittee shall conduct each test consisting of three separate runs performed under representative operating conditions not including periods of startup, shutdown, or malfunction.

(2) The sampling time for each run shall be at least 120 minutes and

the volume of each run shall be 1.70 dry standard cubic meters (60 standard dry cubic feet).

(3) The Permittee shall calculate the. PM emission rate from the stack test results in accordance with 40 CFR 60.8(f).

e. The Permittee shall submit the results of each PM stack test to EPA and ADEQ within forty-five (45) days of completion of each test.

[Significant Revision #46236, Condition II.C.4.d]

6. Permit Shield

[A.A.C. R18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with 40 CFR 60.42(a)(1), (a)(2), 60.45(a), (g)(1), 60.46(b)(2), (d)(2), 64.6, 64.7, and 64.9, and EPA Consent Decree Item #s 63, 64, 65, 67, 70, 71, and 74.

**E.** Nitrogen Oxides ($NO_x$)

1. Emission Limitations/Standards

a. Coal

(1) The Permittee shall not cause to be discharged into the atmosphere from the stack of each boiler any gases which contain nitrogen oxides, expressed as $NO_2$ in excess of 300 nanograms per joule heat input (0.70 lb per million Btu) derived from coal.

[40 CFR 60.44(a)(3)]

(2) The Permittee shall not allow the 30-day rolling average $NO_x$ emission rate from Unit 1 to exceed 0.320 lb/MMBtu.

[Consent Decree (Civil Action No. 2:08-cv-1479-JAT) IV.A.1]

(3) The Permittee shall not allow the 30-day rolling average $NO_X$ emission rate from Unit 2 to exceed 0.080 lb/MMBtu.

[Consent Decree (Civil Action No. 2:08-cv-1479-JAT) IV.A.2]

(4) The Permittee shall not allow the 365-day plant-wide rolling total $NO_X$ emissions of Unit 1 and Unit 2 to exceed 7,300 tons.

[Consent Decree (Civil Action No. 2:08-cv-1479-JAT) IV.A.4]

b. Fuel Oil

The Permittee shall not cause to be discharged into the atmosphere from the stack of each unit any gases which contain nitrogen oxides, expressed as $NO_2$ in excess of 129 nanograms per joule heat input (0.30 lb per million Btu) derived from used oil fuel.

[40 CFR 60.44(a)(2)]

c. Combination Fuels

(1) When different fossil fuels are burned simultaneously in any combination, the applicable standard (in ng/J) is determined by proration using the following formula:

$$PS_{NOX} = \frac{w(260) + x(86) + y(130) + z(300)}{w + x + y + z}$$

Where::

$PS_{NOX}$ = is the prorated standard for $NO_x$ when burning different fuels simultaneously, in nanograms per joule heat input derived from all fossil fuels fired or from all fossil fuels and wood residue fired;

w = is the percentage of total heat input derived from lignite;

x = is the percentage of total heat input derived from gaseous fossil fuel;

y = is the percentage of total heat input derived from liquid fossil fuel; and

z = is the percentage of total heat input derived from solid fossil fuel (except lignite)

[40 CFR 60.44(b)]

(2) Compliance shall be based on the total heat input from all fossil fuels burned, including gaseous fuels.

[40 CFR 60.43(c)]

d. Excess Emissions

[40 CFR 60.45(g)(3)]

(1) Excess emissions for Unit 1 and Unit 2 are defined as any three-hour period during which the average emissions (arithmetic average of three contiguous one-hour periods) exceed the applicable standards in Condition II.E.1.a.(1).

(2) Excess emissions for Unit 1 and Unit 2 are defined as any 30-day rolling average that exceeds the applicable standards in Conditions II.E.1.a.(2) and (3).

(3) Excess emissions for Units 1 and 2 are defined as any 365-rolling total that exceeds the applicable limit specified in Condition II.E.1.a.(4).

2. Air Pollution Control Requirements

a. *The Permittee shall operate the low-$NO_x$ burners (LNB) in accordance with manufacturer's specifications and good engineering practices to minimize emissions.*

[Significant Revision #46236, Condition II.D.2.c; A.A.C. R18-2-331.A.3.d & e]
[Material Permit Conditions are defined by underline and italics]

b. *At all times during the operation of Unit 2, the Permittee shall operate the SCR in accordance with manufacturer's specifications and good engineering practices to minimize emissions.*

[Significant Revision #46236, Condition II.D.2.d; A.A.C. R18-2-331.A.3.d & e]

[Material Permit Conditions are defined by underline and italics]

c. *The Permittee shall continuously operate each $NO_x$ control at all times the unit it serves is in operation consistent with technological imitations, manufacturer's specifications, and good engineering and maintenance practices for minimizing emissions to the extent practicable.*

[Significant Revision #46236, Condition II.D.2.e; A.A.C. R18-2-331.A.3.e]

[Material Permit Conditions are defined by underline and italics]

3. Monitoring & Recordkeeping Requirements

a. Continuous Emissions Monitoring System (CEMS)

*The Permittee shall calibrate,* maintain, and operate a *continuous emissions monitoring system for measuring nitrogen oxides emissions.*

[40 CFR 60.45(a) and A.A.C. R18-2-331.A.3.c]

[Material Permit Conditions are defined by underline and italics]

b. The CEMS for $NO_X$, shall meet the following requirements:

(1) 40 CFR Part 75, Appendix A, Specification and Test Procedures

(a) Installation and measurement location

(b) Equipment specifications

(c) Performance specifications

(d) Data acquisition and handling systems

(e) Calibration gas

(f) Certifications tests and procedures

(g) Calculations

(2) 40 CFR Part 75, Appendix B, Quality Assurance and Quality Control Procedure

(a) Quality control program

(b) Frequency of testing

(3) Data Reduction

The Permittee shall comply with the data reduction requirements of 40 CFR Part 75.10(d)(1).

c. Monitoring of $NO_x$ Emission Rate

The Permittee shall determine the 30-day rolling average $NO_x$ emission rate for Unit 1 and Unit 2 using CEMS in accordance with the procedures of 40 CFR Part 75, with the following exceptions:

(1) $NO_X$ emissions data need not be bias adjusted

(2) For CEMS with a span less than 100 parts per million (ppm), the calibration drift and out-of-control criteria in Procedure 1, Section 4.3 of 40 CFR Part 60 Appendix F shall apply in lieu of the low emitter specifications in 40 CFR Part 75, Appendix B, Section 2.1.

(3) For CEMS with a span less than or equal to 30 ppm, the exemption from the 40 CFR Part 75 linearity check will not apply and either the 40 CFR Part 75 linearity check or the cylinder gas audit described in Procedure 1, Section 5.1.2 of 40 CFR Part 60, Appendix F must be performed on a quarterly basis.

(4) With SCR system for Unit 2, an annual relative accuracy test (RATA) audit shall meet, at a minimum, a relative accuracy of less than 20 percent or an accuracy of less than 0.016 lb/MMBtu (expressed as the difference between the monitor mean and the reference value mean).

[Significant Revision #46236, Condition II.D.3.c]

d. Determining the 30-Day Rolling Average $NO_x$ Emission Rate

(1) The Permittee shall calculate the 30-day rolling average $NO_x$ emission rate in accordance with the following procedure:

(a) Sum the total pounds of $NO_x$ emitted from each Unit during the current Unit Operating Day and the previous 29 Unit Operating Days.

(b) Sum the total heat input to the unit in million British thermal units (MMBtu) during the current Unit Operating Day and the previous 29 Unit Operating Days.

(c) Divide the total number of pounds of $NO_x$ emitted during the 30 Unit Operating Days by the total heat input during the 30 Unit Operating Days.

[Significant Revision #46236, Condition II.D.3.d]

(2) A new 30-day rolling average $NO_x$ emission rate shall be calculated for each new Unit Operating Day. Each 30-day rolling average $NO_x$ emission rate will include all emissions that occur during all periods within any Unit Operating Day, including emissions from startup, shutdown, and malfunction.

[Significant Revision #46236, Condition II.D.3.e (2)]

e. Determining the 365-Day Plant-Wide Rolling $NO_x$ Emission Rate

(1) The 365-day plant-wide rolling $NO_x$ emission rate shall be determined using CEMS, in accordance with the procedures specified in 40 CFR Part 75.

[Significant Revision #46236, Condition II.D.3.e(1)]

(2) The 365-day plant-wide rolling $NO_x$ emission rate means the total number of tons of $NO_x$ emitted from Units 1 and 2 during a 365-day period, and shall include all emissions during startup, shutdown, and malfunction, unless the malfunction is determined to be a Force Majeure event as defined in Section XIV of the EPA Consent Decree (Civil Action No. 2:08-cv-1479-JAT).

[Significant Revision #46236, Condition II.D.3.e(2)]

4. Reporting Requirements

[A.A.C. R18-2-306.A.5.a]

The Permittee shall maintain records of the 30-day rolling average $NO_x$ emission rate and the 365-day plant-wide rolling total. Summary records of these shall be submitted along with the Compliance certifications required in Condition VII of the Attachment "A". Detailed reports shall be made available, upon request, to Department inspectors in a reasonable time.

5. Permit Shield

[A.A.C. R18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with 40 CFR 60.43(c), 60.44(a)(2), (a)(3), (b), 60.45(a), (g)(3), 40 CFR 75 Appendix "A" and "B", 40 CFR 75.10(d)(1), and EPA Consent Decree Item #s 41, 42, 43, 44, 45, and 46.

**F.** Carbon Dioxide ($CO_2$)

1. Monitoring, Recordkeeping & Reporting Requirements

a. Continuous Emissions Monitoring System (CEMS)

*The Permittee shall calibrate,* maintain, and operate a *continuous emissions monitoring system for measuring carbon dioxide ($CO_2$.) gas.*

[40 CFR 60.45(a) and A.A.C. R18-2-331.A.3.c]
[Material Permit Conditions are defined by underline and italics]

b. The continuous emission monitoring systems for $CO_2$ shall meet the following requirements:

(1) 40 CFR Part 75, Appendix A, Specification and Test Procedures

(a) Installation and measurement location

(b) Equipment specifications

(c) Performance specifications

(d) Data acquisition and handling systems

(e) Calibration gas

(f) Certifications tests and procedures

(g) Calculations

(2) 40 CFR Part 75, Appendix B, Quality Assurance and Quality Control Procedure

(a) Quality control program

(b) Frequency of testing

(3) Data Reduction

The Permittee shall comply with the data reduction requirements of 40 CFR Part 75.10(d)(1).

2. Permit Shield

[A.A.C. R18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with 40 CFR 60.45(a), 40 CFR 75 Appendix "A" and "B", and 40 CFR 75.10(d)(1).

**G.** Sulfur Dioxide ($SO_2$)

1. Emission Limitations/Standards

a. Coal

(1) The Permittee shall not cause to be discharged into the atmosphere from the stack of each unit any gases which contain sulfur dioxide in excess of 340 nanograms per joule heat input (0.8 pounds per million Btu) derived from coal.

[A.A.C. R18-2-903.1]

(2) For Unit 1, the Permittee shall maintain a 30-day rolling average $SO_2$ removal efficiency of at least 95.0 percent or a 30-day rolling average $SO_2$ emission rate no greater than 0.080 lb/MMBtu.

[Significant Revision #46236, Condition II.F.1.e]

(3) For Unit 2, the Permittee shall maintain a 30-day rolling average $SO_2$ removal efficiency of at least 95.0 percent or a 30-day rolling average $SO_2$ emission rate no greater than 0.080 lb/MMBtu.

[Significant Revision #46236, Condition II.F.1.d]

b. Fuel Oil

(1) The Permittee shall not cause to be discharged into the atmosphere from the stack of each unit any gases which contain sulfur dioxide in excess of 340 nanograms per joule heat input (0.8 pounds per million Btu) derived from used oil fuel.

[40 CFR 60.43(a)(1)]

(2) Compliance shall be based on the total heat input from all fossil fuels burned, including gaseous fuels.

[40 CFR 60.43(c)]

c. Excess Emissions

(1) Excess emissions for Unit 1 and Unit 2 are defined as any three-hour period during which the average emissions (arithmetic average of three contiguous one-hour periods) of sulfur dioxide as measured by a continuous monitoring system exceeds the applicable standard in Conditions II.G.1.

[40 CFR 60.45(g)](2)(i)]

(2) Excess emissions for Unit 1 and Unit 2 are defined as any 30-day rolling average emissions of sulfur dioxide as measured by a continuous monitoring system exceeds the applicable standard in Condition II.G.1.a.(2) and (3).

[40 CFR 60.45(g)](2)(ii)]

2. Air Pollution Control Requirement

*The Permittee shall* maintain, and *continuously operate the FGD system on each unit at all times that the unit it serves is in operation, consistent with the technological limitations, manufacturer's specifications, and good engineering and maintenance practices for the FGDs for minimizing emissions to the extent practicable.*

[Significant Revision #46236, Condition II.F.2.b; A.A.C. R18-2-306.A.2, and 331.A.3.e]
[Material Permit Conditions are defined by underline and italics]

3. Monitoring, Recordkeeping, & Reporting Requirements

a. *The Permittee shall calibrate,* maintain, and operate *continuous emissions monitoring system (CEMS) for measuring sulfur dioxide emissions.*

[40 CFR 60.45(a) and A.A.C. R18-2-331.A.3.c]
[Material Permit Conditions are defined by underline and italics]

b. The CEMS for $SO_2$ shall meet the following requirements:

(1) 40 CFR Part 75, Appendix A, Specification and Test Procedures

(a) Installation and measurement location

(b) Equipment specifications

(c) Performance specifications

(d) Data acquisition and handling systems

(e) Calibration gas

(f) Certifications tests and procedures

(g) Calculations

(2) 40 CFR Part 75, Appendix B, Quality Assurance and Quality Control Procedure

(a) Quality control program

(b) Frequency of testing

(3) The Permittee shall comply with the data reduction requirements of 40 CFR Part 75.10(d)(1).

(4) The Permittee shall comply with all applicable recordkeeping and reporting requirements of 40 CFR Part 75 Subparts F and G respectively.

c. Monitoring of $SO_2$ Emission Rate

[Significant Revision #46236, Condition II.F.3.b]

The Permittee shall determine the 30-day rolling average $SO_2$ emission rate and the 30-day rolling average $SO_2$ removal efficiency for Unit 1 and Unit 2 using CEMS in accordance with the procedures of 40 CFR Part 75, with the following exceptions:

(1) $SO_2$ emissions data need not be bias adjusted.

(2) For any CEMS with a span less than 100 ppm, the calibration drift and out-of-control criteria in Procedure 1, Section 4.3 of 40 CFR Part 60 Appendix F shall apply in lieu of the low emitter specifications in 40 CFR Part 75, Appendix B, Section 2.1.

(3) For any CEMS with a span less than or equal to 30 ppm, the exemption from the 40 CFR Part 75 linearity check will not apply and either the 40 CFR Part 75 linearity check or the cylinder gas audit described in Procedure 1, Section 5.1.2 of 40 CFR Part 60, Appendix F shall be performed on a quarterly basis.

(4) An annual relative accuracy test audit shall meet, at a minimum, a relative accuracy of less than 20 percent or an accuracy of less than 0.016 lb/MMBtu (expressed as the difference between the monitor mean and the reference value mean).

(5) In lieu of installing an inlet flow monitor, the inlet pounds of $SO_2$ will be calculated as described in Condition II.G.3.d.(1)(b).

[Significant Revision #46236, Condition II.F.3.b]

d. Determining the 30-Day Rolling Average $SO_2$ Removal Efficiency
[Significant Revision #46236, Condition II.F.3.c]

(1) If necessary, the Permittee shall calculate the 30-day rolling average $SO_2$ removal efficiency in accordance with the following procedure:

(a) Sum the total pounds of $SO_2$ emitted as measured at the outlet of the FGD system for the unit during the current Unit Operating Day and the previous 29 Unit Operating Days as measured at the outlet of the FGD system for that unit.

(b) Sum the total pounds of $SO_2$ delivered to the inlet of the FGD system for the unit during the current Unit Operating Day and the previous 29 Unit Operating Days as measured at the inlet to the FGD system for that unit (this shall be calculated by measuring the ratio of the lb/MMBtu $SO_2$ inlet to the lb/MMBtu $SO_2$ outlet and multiplying the outlet pounds of $SO_2$ by that ratio).

(c) Subtract the outlet $SO_2$ emissions calculated in Condition II.G.3.d.(1)(a) from the inlet $SO_2$ emissions calculated in Condition II.G.3.d.(1)(b).

(d) Divide the remainder calculated in Condition II.G.3.d.(1)(c) by the inlet $SO_2$ emissions calculated in Condition II.G.3.d.(1)(b).

(e) Multiply the quotient calculated in Condition II.G.3.d.(1)(d) by 100 to express as a percentage of removal efficiency.

(2) A new 30-day rolling average $SO_2$ removal efficiency shall be calculated for each new Unit Operating Day and shall include all emissions that occur during all periods within each Unit Operating Day, including emissions from startup, shutdown, and malfunction.

e. Determining the 30-Day Rolling Average $SO_2$ Emission Rate
[Significant Revision #46236, Condition II.F.3.d]

(1) The Permittee shall calculate the 30-day rolling average $SO_2$ emission rate in accordance with the following procedure:

(a) Sum the total pounds of $SO_2$ emitted from each Unit during the current Unit Operating Day and the previous 29 Unit Operating Days.

(b) Sum the total heat input to each Unit in MMBtu during the current Unit Operating Day and the previous 29 Unit

Operating Days.

(c) Divide the total number of pounds $SO_2$ emitted during the 30 Unit Operating Days by the total heat input during the 30 Unit Operating Days.

(2) A new 30-day rolling average $SO_2$ emission rate shall be calculated for each Unit Operating Day. Each 30-day rolling average $SO_2$ emission rate shall include all emissions that occur during all periods within any Unit Operating Day, including emissions from startup, shutdown, and malfunction.

f. Reporting Requirements

The Permittee shall maintain records of the $SO_2$ removal efficiency or $SO_2$ emission rate. These records shall be submitted along with the Compliance certifications required in Condition VII of the Attachment "A". These reports shall be made available, upon request, to Department.

4. Permit Shield

[A.A.C. R18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with 40 CFR 60.43(a)(1), (c), 60.45(a), 60.45(g)(2), 40 CFR 75 Subpart F and G, 40 CFR 75 Appendix "A" and "B", 40 CFR 75.10(d)(1), A.A.C. R18-2-903.1, and EPA Consent Decree Item #s 7, 47, 48, 49, 50, and 58.

**H.** Carbon Monoxide (CO)

1. Emission Limitations/Standards

a. The Permittee shall not cause to be discharged into the atmosphere from the stack of each unit any gases which contain CO in excess of 0.50 lb/MMBtu on a 30-day rolling average, excluding periods of start-up, shutdown, and malfunction.

[A.A.C. R18-2-406.A.4]

b. The Permittee shall not cause to be discharged into the atmosphere from the stack of each unit any gases which contains CO in excess of 3.6 lb/MMBtu on a 1-hour average.

[A.A.C. R18-2-406.A.5]

2. Monitoring, Recordkeeping & Reporting Requirements

a. *The Permittee shall calibrate*, maintain, *and operate continuous emission monitoring systems (CEMS) for measuring emissions of CO.*

[A.A.C. R18-2-331.A.3.c]
[Material Permit Conditions are defined by underline and italics]

b. *The Permittee shall calibrate*, maintain, *and operate continuous emissions monitoring system (CEMS) for measuring carbon monoxide emissions.*

[40 CFR 60.45(a) and A.A.C. R18-2-331.A.3.c]
[Material Permit Conditions are defined by underline and italics]

c. The CEMS for CO shall meet the following requirements:

(1) 40 CFR Part 60, Appendix B, Performance Specifications, Performance Specification 4, Specifications and Test Procedures for Carbon Monoxide Continuous Monitoring Systems in Stationary Sources.

(2) 40 CFR Part 60, Appendix F, Quality Assurance Procedures.

(3) The Permittee shall check the zero (or low-level value between 0 and 20 percent of span value) and span (50 to 100 percent of span value) calibration drifts at least once daily in accordance with a written procedure. The zero and span shall, at a minimum, be adjusted whenever the 24-hour zero drift or 24-hour span drift exceeds two times the limits of the applicable performance specifications in 40 CFR Part 60 Appendix B. The system must allow the amount of excess zero and span drift to be recorded and quantified, whenever specified.

[A.A.C. R18-2-306.A.3.c]

(4) Except for system breakdowns, repairs, calibration checks, and zero and span adjustments required under Condition II.H.2.c.(3), the Permittee shall operate the CO CEMS continuously and shall complete a minimum of one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute period.

[A.A.C. R18-2-306.A.3.c]

d. Carbon Monoxide Excess Emissions

(1) Excess emissions for Unit 1 and Unit 2 are defined as any 30 day period, excluding periods of start-up, shutdown and malfunction during which the average emissions of CO as measured by a continuous monitoring system exceeds the applicable standard in Conditions II.H.1 of this Attachment.

[A.A.C.R18-2-312.H.3]

(2) Excess emissions for Unit I and Unit 2 are defined as any one hour period during which the average emissions of CO as measured by a continuous monitoring system exceeds the applicable standard in Conditions II.H.1.

[A.A.C.R18-2-312.H.3]

(3) The Permittee shall submit excess emissions and monitoring systems performance reports to the Director semiannually. All reports shall be submitted along with the compliance certifications required by Condition VII of Attachment "A". Written reports of excess emissions shall include the following information:

(a) The magnitude of excess emissions computed in accordance with 40 CFR 60.13(h), any conversion factor(s) used, the date and time of commencement and completion of each time period of excess emissions, and

the process operating time during the reporting period.

(b) Specific identification of each period of excess emissions that occurs during startups, shutdowns, and malfunctions of Unit 1 and Unit 2, the nature and cause of any malfunction (if known), and the corrective action taken or preventive measures adopted.

(c) The date and time identifying each period during which the CO CEMS was inoperative, except for zero and span checks, and the nature of the system repairs or adjustments.

(d) When no excess emissions have occurred or the CO CEMS have not been inoperative, repaired, or adjusted, such information shall be stated in the report.

[A.A.C. R18-2-306.A.4]

(4) The summary report form shall contain the information and be in the format shown in Figure 1 of 40 CFR 60.7(d) unless otherwise specified by the Director. One summary report form shall be submitted for CO emissions monitored at Unit 1 and Unit 2.

[A.A.C. R18-2-306.A.4]

(a) If the total duration of excess emissions for the reporting period is less than 1 percent of the total operating time for the reporting period and CO CEMS downtime for the reporting period is less than 5 percent of the total operating time for the reporting period, only the summary report form shall be submitted and the excess emissions report described in 40 CFR 60.7(c) need not be submitted unless requested by the Department.

(b) If the total duration of excess emissions for the reporting period is 1 percent or greater of the total operating time for the reporting period or the total CO CEMS downtime for the reporting period is 5 percent or greater of the total operating time for the reporting period, the summary report form and the excess emission report described in 40 CFR 60.7 (c) shall both be submitted.

3. Permit Shield

[A.A.C. R18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with A.A.C. R18-2-406.A.4 & 5 and 40 CFR 60.45(a).

**I.** Sulfuric Acid ($H_2SO_4$) Mist

1. The Permittee shall not cause to be discharged into the atmosphere from Unit 2 any gases which contain $H_2SO_4$ in excess of 0.006 lb/MMBtu, excluding periods of start-up, shutdown, and malfunction.

2. The Permittee shall perform annual performance tests, using EPA Conditional Test Method 13 (CTM-13) or an alternate test method. If the Permittee requests an alternate test method, the Permittee must submit this request at least 60 days prior to commencing the test program. If the Permittee does not receive a response within 30 days of submitting such a request, the proposed alternative test method shall be considered to be approved by the Director and the Administrator. The Permittee must notify the Director and the Administrator at least 30 days prior to commencing the test program and shall submit the test report to the Director and the Administrator within 60 days of completing the test program.

3. Permit Shield

[A.A.C. R18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with Condition II.I.1.

**J.** Surrender of $SO_2$ Allowances

1. For the purposes of this section, "surrender" means, with regard to $SO_2$ Allowances, permanently surrendering so that such $SO_2$ Allowances can never be used to meet any compliance requirement under the Clean Air Act or the Arizona SIP.

[Significant Revision #46236, Condition II.I.1]

2. Except as provided in Condition II.J.9, the Permittee shall not sell, trade, or transfer any $SO_2$ allowances allocated to CGS that would otherwise be available for sale, trade, or transfer as a result of the actions taken by the Permittee to comply with the requirements of this Permit.

[Significant Revision #46236, Condition II.I.2]

3. The Permittee shall surrender to EPA, or transfer to a non-profit third party selected by the Permittee for purposes of surrender, all $SO_2$ Allowances that have been allocated to CGS in excess of the amount needed to meet its own federal and/or state Clean Air Act regulatory requirements at CGS and Springerville Unit 4, which is located at the Springerville Generating Station.

[Significant Revision #46236, Condition II.I.3]

4. If the Permittee commences operation of one or more new coal-fired units that it owns in whole or in part in the Western Electricity Coordinating Council Region no earlier than five years and no later than fourteen years from the date the Consent Decree (Civil Action No. 2:08-cv-1479-JAT) is entered by the Court, then the Permittee may also use $SO_2$ Allowances, as limited by this condition, allocated to CGS to meet the federal and/or state Clean Air Act regulatory requirements for certain $SO_2$ emissions from such new coal-fired unit(s).

   a. The Permittee may only use such $SO_2$ Allowances pursuant to this condition if such new coal-fired unit(s) is equipped with the Best Available Control Technology (if the new coal-fired unit(s) will be emitting any of the pollutants set forth at 40 CFR 52.21(b)(50) and the new coal-fired unit(s) will be located in an attainment area for those pollutants) and/or the Lowest Achievable Emission Rate (if the new coal- fired unit(s) will be

emitting any of the pollutants set forth at 40 CFR 51.165(a)(xxxvii) and the new coal-fired unit(s) will be located in a nonattainment area for those pollutants).

b. The Permittee may only use $SO_2$ Allowances for the $SO_2$ emissions associated with a total of 400 megawatts that it owns at such new coal-fired unit(s), whether at one new coal-fired unit (e.g., the Permittee owns a total of at least 400 MW at one new coal-fired unit) or in the aggregate at multiple new coal-fired units (e.g., the Permittee owns 100 MW at four new coal-fired units for an aggregate total of 400 MW).

c. To determine the number of $SO_2$ Allowances the Permittee may use pursuant to this condition, the Permittee may use no more than the number of $SO_2$ Allowances that cover the same percentage of total $SO_2$ emissions from such new coal-fired unit(s) as the percentage of the Permittee's ownership in such new coal-fired unit(s), on a MW basis. Thus, for example, if the Permittee owns 400 MW of a new 800 MW coal-fired unit that otherwise meets the requirements of this condition, the Permittee may use excess $SO_2$ Allowances allocated to CGS to cover no more than fifty percent of the total $SO_2$ emissions from such new coal-fired unit. This reduction in the amount of $SO_2$ Allowances surrendered by or on behalf of the Permittee would start with the year this new unit(s) commences operation.

[Significant Revision #46236, Condition II.I.4]

5. The Permittee shall make its surrender of $SO_2$ Allowances annually, within forty-five days of its receipt from EPA of the Annual Deduction Reports for $SO_2$. Any surrender need not include the specific $SO_2$ Allowances that were allocated to CGS, so long as the Permittee surrenders $SO_2$ Allowances that are from the same year and that are equal to the number required to be surrendered under Condition II.J.

[Significant Revision #46236, Condition II.I.5]

6. If any $SO_2$ Allowances are transferred directly to a non-profit third party for surrender to EPA, the Permittee shall include a description of such transfer in the next report submitted to EPA pursuant to Section XI (Periodic Reporting) of the Consent Decree (Civil Action No. 2:08-cv-1479-JAT). Such report shall:

a. Provide the identity of the non-profit third-party recipient(s) of the $SO_2$ Allowances and a listing of the serial numbers of the transferred $SO_2$ Allowances; and

b. Include a certification by the non-profit third-party recipient(s) stating that the recipient(s) will not sell, trade, or otherwise exchange any of the $SO_2$ Allowances and will not use any of the $SO_2$ Allowances to meet any obligation imposed by any environmental law.

[Significant Revision #46236, Condition II.I.6]

7. No later than the third periodic report due after the transfer of any $SO_2$ Allowances, the Permittee shall include a statement that the non-profit third-party recipient(s) surrendered the $SO_2$ Allowances for permanent surrender to EPA in accordance with the provisions of II.J.8 within 1 year after the Permittee transferred the $SO_2$

Allowances to them. The Permittee shall not have complied with the $SO_2$ Allowance surrender requirements of Condition II.J until all non- profit third-party recipient(s) shall have actually surrendered the transferred $SO_2$ Allowances to EPA.

[Significant Revision #46236, Condition II.I.7]

8. For all $SO_2$ Allowances surrendered to EPA, the Permittee or the non-profit third-party recipient(s) (as the case may be) shall first submit an $SO_2$ Allowance transfer request form to EPA's Office of Air and Radiation's Clean Air Markets Division directing the transfer of such $SO_2$ Allowances to the EPA Enforcement Surrender Account or to any other EPA account that EPA may direct in writing. As part of submitting these transfer requests, the Permittee or the non-profit third-party recipient(s) shall irrevocably authorize the transfer of these $SO_2$ Allowances and identify – by name of account and any applicable serial or other identification numbers or station names – the source and location of the $SO_2$ Allowances being surrendered.

[Significant Revision #46236, Condition II.I.8]

9. Provided that the Permittee is in compliance with the $SO_2$ emission limitations established in Conditions II.G.1.a.(2) and (3), nothing shall preclude the Permittee from using, selling, or transferring Super-Compliance $SO_2$ Allowances that may arise as a result of achieving and maintaining $SO_2$ emission rates or removal efficiencies at Unit 1 and Unit 2 below the emission limits required in Conditions II.G.1.a.(2) and (3), so long as the Permittee timely reports the generation of such Super-Compliant $SO_2$ Allowances in accordance with Section XI (Periodic Reporting) of the Consent Decree (Civil Action No. 2:08-cv-I479- JAT).

[Significant Revision #46236, Condition II.I.9]

10. The Permittee shall not use $SO_2$ Allowances to comply with any requirement of the Permit, including by claiming compliance with any emission limitation required by the Permit by using, tendering, or otherwise applying $SO_2$ allowances to offset any excess emissions (i.e., emissions above the limits specified in Conditions II.G.1.a.(2) and (3)).

[Significant Revision #46236, Condition II.I.10]

11. Nothing in this Section shall prevent the Permittee from purchasing or otherwise obtaining $SO_2$ Allowances from another source for purposes of complying with state or federal Clean Air Act requirements to the extent otherwise allowed by law.

[Significant Revision #46236, Condition II.I.11]

12. The requirements stated in Conditions II.J.2 to 10 pertaining to surrender of $SO_2$ allowances shall be permanent injunctions not subject to any termination provisions of the Consent Decree.

[Consent Decree (Civil Action No. 2:08-cv-1479-JAT) V.E.62]

13. Permit Shield

[A.A.C. R18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with Section II.J.

**K.** Mercury and Air Toxics Standards (MATS) - 40 CFR Part 63 Subpart UUUUU

1. Applicability

The requirements of 40 CFR Part 63, Subpart UUUUU are applicable to generating Units 1 and Unit 2.

2. Definitions

For purposes of the MATS Rule,

a. *Startup means* - The first-ever firing of fuel in a boiler for the purpose of producing electricity, or the firing of fuel in a boiler after a shutdown event for any purpose. Startup ends when any of the steam from the boiler is used to generate electricity for sale over the grid or for any other purpose (including on-site use). Any fraction of an hour in which startup occurs constitutes a full hour of startup

b. *Shutdown means* - The period in which cessation of operation of an EGU is initiated for any purpose. Shutdown begins when the EGU no longer generates electricity or makes useful thermal energy (such as heat or steam) for industrial, commercial, heating, or cooling purposes or when no coal, liquid oil, syngas, or solid oil-derived fuel is being fired in the EGU, whichever is earlier. Shutdown ends when the EGU no longer generates electricity or makes useful thermal energy (such as steam or heat) for industrial, commercial, heating, or cooling purposes, and no fuel is being fired in the EGU. Any fraction of an hour in which shutdown occurs constitutes a full hour of shutdown.

[40 CFR 63.10042]

3. General Requirements

a. The Permittee shall operate and maintain Units 1 and 2, including associated air pollution control and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions.

[40 CFR 63.10000(b)]

b. Startup and Shutdown Requirements

(1) During startup and shutdown, the Permittee shall follow the requirements of Table 3 to 40 CFR 63 Subpart UUUUU.

[40 CFR 63.10005(j), 63.10011(g), Table 3 of 40 CFR 63 Subpart UUUUU]

(2) During startup of Unit 1 and Unit 2, the Permittee shall use distillate oil (clean fuel).

[40 CFR 63.10011(f)]

(3) During startup and shutdown, the Permittee shall operate all continuous monitoring systems (CMS).

[Table 3 of 40 CFR 63 Subpart UUUUU]

(4) Once a unit is converted to firing coal, the Permittee shall engage all of the applicable control technologies except SCR.
[Table 3 of 40 CFR 63 Subpart UUUUU]

(5) The Permittee shall start the SCR systems, if present, appropriately to comply with relevant standards applicable during normal operation.
[Table 3 of 40 CFR 63 Subpart UUUUU]

(6) During shutdown, the Permittee shall operate all applicable control technologies while firing coal.
[Table 3 of 40 CFR 63 Subpart UUUUU]

(7) The Permittee shall comply with all applicable emissions limits established by Subpart UUUUU at all times except for periods of startup and shutdown.
[Table 3 of 40 CFR 63 Subpart UUUUU]

4. Boiler Tune-ups

a. Periodic Tune-up
[40 CFR 63.10021(e)]

The Permittee shall perform periodic tune-ups for Unit 1 and Unit 2 which include inspection of burners and combustion controls at least once every 48 calendar months after the previous performance tune-up. If an Electric Generating Unit (EGU) is offline when a deadline to perform the tune-up passes, the Permittee shall perform the tune-up work practice requirements within 30 days after the re-start of the unit. Tune-ups shall be performed as specified in Condition II.K.4.b.

b. Tune-up Procedures

In order to complete a tune-up the Permittee shall:

(1) As applicable, inspect the burner and combustion controls of Unit 1 and Unit 2, and clean or replace any components of the burner or combustion controls as necessary upon initiation of the work practice program and at least once every required inspection period. Repair of a burner or combustion control component requiring special order parts may be scheduled as follows:
[40 CFR 63.10021(e)(1)]

(a) Burner or combustion control component parts needing replacement that affect the ability to optimize $NO_X$ and CO must be installed within 3 calendar months after the burner inspection.
[40 CFR 63.10021(e)(1)(i)]

(b) Burner or combustion control component parts that do not affect the ability to optimize $NO_X$ and CO may be installed on a schedule determined by the operator.
[40 CFR 63.10021(e)(1)(ii)]

(2) As applicable, inspect the flame pattern and make any adjustments to the burner or combustion controls necessary to optimize the flame pattern. The adjustment should be consistent with the manufacturer's specifications, if available, or in accordance with best combustion engineering practice for that burner type;

[40 CFR 63.10021(e)(2)]

(3) As applicable, observe the damper operations as a function of mill and/or cyclone loadings, cyclone and pulverizer coal feeder loadings, or other pulverizer and coal mill performance parameters, making adjustments and effecting repair to dampers, controls, mills, pulverizers, cyclones, and sensors;

[40 CFR 63.10021(e)(3)]

(4) As applicable, evaluate wind box pressures and air proportions, making adjustments and effecting repair to dampers, actuators, controls, and sensors;

[40 CFR 63.10021(e)(4)]

(5) Inspect the system controlling the air-to-fuel ratio and ensure that it is correctly calibrated and functioning properly. Such inspection may include calibrating excess $O_2$ probes and/or sensors, adjusting over-fire air systems, changing software parameters, and calibrating associated actuators and dampers to ensure that the systems are operated as designed. Any component out of calibration, in or near failure, or in a state that is likely to negate combustion optimization efforts prior to the next tune-up, should be corrected or repaired as necessary;

[40 CFR 63.10021(e)(5)]

(6) Optimize combustion to minimize generation of CO and $NO_X$. This optimization should be consistent with the manufacturer's specifications, if available, or best combustion engineering practice for the applicable burner type. $NO_X$ optimization includes burners, over-fire air controls, concentric firing system improvements, neural network or combustion efficiency software, control systems calibrations, adjusting combustion zone temperature profiles, and add-on controls such as SCR and SNCR; CO optimization includes burners, over-fire air controls, concentric firing system improvements, neural network or combustion efficiency software, control systems calibrations, and adjusting combustion zone temperature profiles;

[40 CFR 63.10021(e)(6)]

(7) While operating at full load or the predominantly operated load, measure the concentration in the effluent stream of CO and $NO_X$ in ppm, by volume, and oxygen in volume percent, before and after the tune-up adjustments are made (measurements may be either on a dry or wet basis, as long as it is the same basis before and after the adjustments are made). The Permittee may use portable CO, $NO_X$, and $O_2$ monitors for this measurement. EGU's employing neural network optimization systems need only

provide a single pre- and post-tune-up value rather than continual values before and after each optimization adjustment made by the system;

[40 CFR 63.10021(e)(7)]

c. Recordkeeping and Reporting Requirements

(1) The Permittee shall maintain on-site and submit, if requested by the Administrator, an annual report containing the information in Condition II.K.4.b including:

[40 CFR 63.10021(e)(8)]

(a) The concentrations of CO and $NO_X$ in the effluent stream in ppm by volume, and oxygen in volume percent, measured before and after an adjustment of combustion systems;

[40 CFR 63.10021(e)(8)(i)]

(b) A description of any corrective actions taken as a part of the combustion adjustment; and

[40 CFR 63.10021(e)(8)(ii)]

(c) The type(s) and amount(s) of fuel used over the 12 calendar months prior to an adjustment, but only if the unit was physically and legally capable of using more than one type of fuel during that period.

[40 CFR 63.10021(e)(8)(iii)]

(2) The Permittee shall report the dates of the initial and subsequent tune-ups in hard copy until April 16, 2017. After that date, report all subsequent tune- ups electronically, in accordance with 40 CFR 63.10031(f).

[40 CFR 63.10021(e)(9)]

5. Site Specific Monitoring Plan

a. For demonstrating compliance with any applicable emissions limit through use of a continuous monitoring system (CMS), where a CMS includes a continuous parameter monitoring system (CPMS) as well as a continuous emissions monitoring system (CEMS) or a sorbent trap monitoring system, the Permittee shall develop a site-specific monitoring plan. This requirement to develop and submit a site-specific monitoring plan does not apply to affected sources with existing monitoring plans that apply to CEMS prepared under Appendix B to 40 CFR Part 60 or Part 75, and that meet the requirements of 40 CFR 63.10010. Using the process described in 40 CFR 63.8(f)(4), the Permittee may request approval of monitoring system quality assurance and quality control procedures alternative to those specified in this paragraph of this Condition and, if approved, include those in you site-specific monitoring plan. The monitoring plan must address the provisions in Conditions II.K.5.a.(1) through (4) as follows:

[40 CFR 63.10000(d)(1)]

(1) The site-specific monitoring plan shall include the information specified in Conditions II.K.5.a.(4)(a) through (g). Alternatively, the requirements of Conditions II.K.5.a.(4)(a) through (g) are considered to be met for a particular CEMS or sorbent trap monitoring system if:

[40 CFR 63.10000(d)(2)]

(a) The CEMS or sorbent trap monitoring system is installed, certified, maintained, operated, and quality-assured either according to 40 CFR Part 75, or appendix A or B of 40 CFR Part 63, Subpart UUUUU; and

[40 CFR 63.10000(d)(2)(i)]

(b) The recordkeeping and reporting requirements of 40 CFR Part 75, or appendix A or B of 40 CFR Part 63, Subpart UUUUU that pertain to the CEMS are met.

[40 CFR 63.10000(d)(2)(ii)]

(2) If requested by the Director, the Permittee shall submit the monitoring plan (or relevant portion of the plan) at least 60 days before the initial performance evaluation of a particular CEMS or sorbent trap monitoring system, except where the CEMS or sorbent trap monitoring system has already undergone a performance evaluation that meets the requirements of 40 CFR 63.10010 (e.g., if the CEMS was previously certified under another program).

[40 CFR 63.10000(d)(3)]

(3) The Permittee shall operate and maintain the CEMS or sorbent trap monitoring system according to the site-specific monitoring plan.

[40 CFR 63.10000(d)(4)]

(4) The Permittee, for the provisions of the site-specific monitoring plan, shall address the following items:

[40 CFR 63.10000(d)(5)]

(a) Installation of the CEMS or sorbent trap monitoring system sampling probe or other interface at a measurement location relative to each affected process unit such that the measurement is representative of control of the exhaust emissions (e.g., on or downstream of the last control device). See 40 CFR 63.10010(a) for further details.

[40 CFR 63.10000(d)(5)(i)]

(b) Performance and equipment specifications for the pollutant concentration or parametric signal analyzer, and the data collection and reduction systems.

[40 CFR 63.10000(d)(5)(ii)]

(c) Schedule for conducting initial and periodic performance evaluations.

[40 CFR 63.10000(d)(5)(iii)]

(d) Performance evaluation procedures and acceptance criteria (e.g., calibrations), including the quality control program in accordance with the general requirements of 40 CFR 63.8(d).

[40 CFR 63.10000(d)(5)(iv)]

(e) On-going operation and maintenance procedures, in accordance with the general requirements of 40 CFR 63.8(c)(1)(ii), (c)(3), and (c)(4)(ii).

[40 CFR 63.10000(d)(5)(v)]

(f) Conditions that define a CEMS that is out of control consistent with 40 CFR 63.8(c)(7)(i) and for responding to out of control periods consistent with 40 CFR 63.8(c)(7)(ii) and (c)(8).

[40 CFR 63.10000(d)(5)(vi)]

(g) On-going recordkeeping and reporting procedures, in accordance with the general requirements of 40 CFR 63.10(c), (e)(1), and (e)(2)(i), or as specifically required under Subpart UUUUU.

[40 CFR 63.10000(d)(5)(vii)]

6. Emission Limits/ Standards

[Table 2, 40 CFR 63 Subpart UUUUU, 40 CFR 63.9991(a), 63.10000(a)]

The Permittee shall not cause to be discharged into the atmosphere, except for periods of startup and shutdown as defined in Condition II.K.2, from the Unit 1 or Unit 2 stack:

a. Total particulate matter (PM) in excess of 0.030 lb/MMBTU or 0.30 lb/MWh,

b. Sulfur Dioxide ($SO_2$) in excess of 0.20 lb/MMBTU or 1.50 lb/MWh.

c. Mercury in excess of 1.2 lb/Tbu or 0.013 lb/GWh

7. Compliance Demonstration

a. General Requirements

(1) The Permittee shall conduct all required performance tests according to 40 CFR 63.7(d), (e), (f) and (h). The Permittee shall also develop a site- specific plan according to the requirements in 40 CFR 63.7(c).

[40 CFR 63.10007(a)]

(2) The Permittee shall conduct each performance test (including traditional 3-run stack tests, 30-boiler operating day tests based on CEMS or sorbent trap monitoring system data) according to the requirements of Table 5 of 40 CFR 63 Subpart UUUUU.

[40 CFR 63.10007(b)]

(a) Install, certify, operate and maintain the PM CEMS using Performance Specification 11 at Appendix B to 40 CFR Part 60 and Procedure 2 at Appendix F to 40 CFR Part 60.

(b) Install, certify, operate and maintain $SO_2$, CEMS using 40 CFR Part 75 and 40 CFR 63.10010(a) and (f).

(c) Install, certify, operate and maintain Hg CEMS or sorbent trap monitoring systems using Appendix A of 40 CFR Part 63, Subpart UUUUU.

(d) Install, certify, operate and maintain the diluent gas, flow rate, and/or moisture monitoring systems using 40 CFR Part 75 and 40 CFR 63.10010(a), (b), (c) and (d).

(e) Convert hourly emissions concentrations to 30-boiler operating day rolling average lb/MMBtu or lb/MWh emissions rates using Method 19 F-factor methodology at Appendix A-7 to 40 CFR Part 60, or calculate using mass emissions rate and electrical output data.

[Table 5 of 40 CFR 63 Subpart UUUUU, 63.10007(e)(2)]

(3) If the Permittee uses an oxygen ($O_2$) or carbon dioxide ($CO_2$) CEMS to convert measured pollutant concentrations to the units of the applicable emissions limit, the $O_2$ or $CO_2$ concentrations shall be monitored at a location that represents emissions to the atmosphere, *i.e.*, at the outlet of the EGU, downstream of all emission control devices. The Permittee shall install, certify, maintain, and operate the CEMS according to part 75 of this chapter. The Permittee shall use only quality assured $O_2$ or $CO_2$ data in the emissions calculations and shall not use part 75 substitute data values.

[40 CFR 63.10010(b)]

(4) If the Permittee uses a stack gas flow rate monitor to convert pollutant concentrations to units of an electrical output-based emission, it shall be installed, certified, operated, maintained and quality-assured according to 40 CFR Part 75. The Permittee shall only use unadjusted, quality-assured flow rate data in the emissions calculations, and shall not apply bias adjustment factors or substitute flow rate data in calculations.

[40 CFR 63.10010(c)]

(5) For determining compliance with emissions limits expressed in lb/MWh or lb/GWh, the Permittee shall first calculate the pollutant mass emission rate during the performance test, in units of lb/h, in accordance with 40 CFR 63.10007(e)(3).

[40 CFR 63. 10007(e)(3)]

(6) If the Permittee elects to use CEMS to continuously monitor $SO_2$,

PM, or Hg emissions (or, if applicable, sorbent trap monitoring systems to continuously collect Hg emissions data), the following default values are available for use in the emission rate calculations during startup and shutdown periods. For the purposes of 40 CFR Part 63, Subpart UUUUU, these default values are not considered to be substitute data.

(a) Diluent cap values: If using CEMS (or if applicable, sorbent trap monitoring systems) to comply with a heat input-based emission rate limit, the Permittee may use a 5% diluent cap value for $CO_2$ and an 14% diluent cap for $O_2$ for a startup or shutdown hour in which the measured $CO_2$ concentration is below the cap value or the measured $O_2$ concentration is above the cap value.

(b) Default gross output: If using CEMS to continuously monitor PM, $SO_2$, or Hg emissions (or, if applicable, sorbent trap monitoring systems to continuously collect Hg emissions data), the following default value is available for use in the emission rate calculations during startup and shutdown periods. For the purposes of 40 CFR Part 63, Subpart UUUUU, this default value is not considered to be substitute data. For a startup or shutdown hour in which there is heat input to an affected Unit but zero gross output, the Permittee shall calculate the pollutant emission rate using a value equivalent to 5% of the maximum sustainable gross output, expressed in MW. This default gross output is either the nameplate capacity of the Unit or the highest gross output observed in at least four representative quarters of the Unit's operation. [40 CFR 63.10007(f)]

(7) Emissions Averaging

(a) The Permittee may demonstrate compliance by emissions averaging among Units 1 and 2 if the averaged emissions (30 day rolling daily) of PM, $SO_2$, and Hg are equal to or less than the limits in Condition II.K.6.
[40 CFR 63.10009(a)(2) and (c)]

(b) 30-day group boiler operating days is defined as a period during which at least one unit in the emissions averaging group has operated 30 days.
[40 CFR 63.10009(a)(2)]

(c) The Permittee shall calculate the weighted average emissions rate for the group as follows, using the data from all units in the group, including any that operate fewer than 30 days during the preceding 30 group boiler days:
[40 CFR 63.10009(a)(2) and (g)(1)]

(i) The Permittee may choose to have the EGU emissions averaging group meet either the heat input basis (MMBtu or TBtu) or gross electrical output basis (MWh or GWh).

[40 CFR 63.10009(a)(2)(i)]

(ii) The Permittee may not mix bases within the EGU emission averaging group.

[40 CFR 63.10009(a)(2)(ii)]

(iii) The Permittee shall use the calculations in 40 CFR 63.10009(b)(l) and (2) for emissions averaging.

[40 CFR 63.10009(b)]

(d) The weighted-average emissions rate shall be in compliance with the limits in Condition II.K.6 at all times following the date that the Permittee begins emissions averaging.

[40 CFR 63.10009(e)]

(8) Emissions averaging group eligibility demonstration.

(a) The Permittee shall demonstrate the ability for the EGUs included in the emissions averaging group to demonstrate initial compliance using maximum rated heat input or gross output over a 30-boiler operating day period of each EGU and the results of the initial performance tests. For this demonstration and prior to preparing the emissions averaging plan, the Permittee shall conduct emissions monitoring for 30 days of boiler operation and any required manual performance testing to calculate an initial weighted average emissions rate in accordance with the following:

[40 CFR 63.10009(f)]

(i) The Permittee shall use Equation 1.a of 40 CFR 63.10009(b) to demonstrate that the maximum weighted average emissions rates of PM, $SO_2$, and Hg from the units participating in the emissions averaging option do not exceed the limit in Condition II.K.6.

[40 CFR 63.10009(f)(1)]

(ii) If the permittee is not capable of monitoring heat input or gross electrical output, and the EGU generates steam for purposes other than generating electricity, the Permittee may use Equation 1b of this section as an alternative to using Equation 1a of this section to demonstrate that the maximum weighted average emissions rates of filterable PM, $SO_2$, non-Hg HAP metals, or Hg emissions from the existing units

participating in the emissions averaging group do not exceed the emission limits in Table 2 to this subpart.

[40 CFR 63.10009(f)(2)]

(b) The Permittee shall determine the weighted average emissions rate in units of the applicable emission limit on a 30 day rolling average basis. The first averaging period begins on 30 days after the date that the Permittee begins averaging. The Permittee shall use the equations 2a or 3a in 40 CFR 63.10009(b) to calculate the weighted average emission rate using the actual heat input or gross output for each existing unit participating in the emissions averaging option.

[40 CFR 63.10009(g) and (g)(1)]

(c) The Permittee shall use the data from the CEMS (or sorbent trap monitoring for Hg emissions) to determine the 30 group boiler operating day rolling average emissions rate.

[40 CFR 63.10009(h)]

(9) Emissions Averaging Plan

If electing to average emissions, the Permittee shall develop an implementation plan for emissions averaging. The Permittee shall include the following information in the implementation plan for all emissions units included in the averaging:

[40 CFR 63.10009(j)]

(a) The identification of all units in the emissions averaging group, including for each the control technology installed, or the date for which emissions measurements used to support emissions averaging plan is completed, or the date that emissions averaging began, whichever is earlier; and the date on which the Permittee is requesting emissions averaging to commence;

[40 CFR 63.10009(j)(1)(i)]

(b) The process weighting parameter (heat input, gross output, or steam generated) that will be monitored for each averaging group;

[40 CFR 63.10009(j)(1)(ii)]

(c) The specific control technology or pollution prevention measure to be used for each emission EGU in the averaging group and the date of its installation or application. If the pollution prevention measure reduces or eliminates emissions from multiple EGUs, the Permittee shall identify each EGU;

[40 CFR 63.10009(j)(1)(iii)]

(d) The means of measurement of filterable PM, Hg, and $SO_2$

in accordance with 40 CFR 63.10007 and to be used in the emissions averaging calculations; and

[40 CFR 63.10009(j)(1)(iv)]

(e) A demonstration that emissions averaging can produce compliance with each of the applicable limits in Condition II.K.6.

[40 CFR 63.10009(j)(1)(v)]

b. Continuous Compliance

(1) The Permittee shall demonstrate continuous compliance with each applicable work practice, monitoring plan, and emission limit standard established in Conditions II.K.4, II.K.5, and II.K.6 according to the monitoring specified in this subsection.

[40 CFR 63.10021(a)]

(2) The Permittee shall demonstrate continuous compliance by using all quality-assured hourly data recorded by the CEMS or sorbent trap monitoring systems and the other required monitoring systems (e.g., flow rate, $CO_2$, $O_2$ or moisture systems) to calculate the arithmetic average emissions rate in units of the standard on a continuous 30- boiler operating day rolling average basis, updated at the end of each new boiler operating day. The 30-boiler operating day rolling average shall be calculated using the following equation:

[40 CFR 63.10021(b)]

$$30\ Boiler\ Operation\ Day\ Average = \frac{\sum_{i=1}^{n} Her_i}{n}$$

Where:

$Her_i$ = The hourly emissions rate for hour i

n = The number of hourly emissions rate values collected over 30-boiler operating days

(3) $SO_2$

(a) For demonstrating continuous compliance with the $SO_2$ emissions limits of Condition II.K.6.b, the Permittee shall certify, operate, and maintain the $SO_2$ CEMS according to 40 CFR Part 75.

[40 CFR 63.10010(f)(1)]

(b) For on-going QA, the $SO_2$ CEMS shall meet the applicable daily, quarterly, and semiannual or annual requirements in sections 2.1 through 2.3 of appendix B to 40 CFR Part 75, with the following addition: the Permittee shall perform the linearity checks required in section 2.2 of Appendix B to 40 CFR Part 75 if the $SO_2$ CEMS has a span value of 30 ppm or less.

[40 CFR 63.10010(f)(2)]

(c) The Permittee shall calculate and record a 30-boiler operating day rolling average $SO_2$ emission rate in the units of the standard, updated after each new boiler operating day. Each 30-boiler operating day rolling average emission rate is the average of all of the valid $SO_2$ emission rates in the preceding 30-boiler operating day period.

[40 CFR 63.10010(f)(3)]

(d) The Permittee shall use only unadjusted, quality-assured $SO_2$ concentration values in the emissions calculations, shall not apply bias adjustment factors to the 40 CFR Part 75 $SO_2$ data and shall not use 40 CFR Part 75 substitute data values. For startup or shutdown hours the default gross output and the diluent cap are available for use in the hourly $SO_2$ emission rate calculations, as described in §63.10007(f). The Permittee shall use a flag to identify each startup or shutdown hour and report a special code of the diluent cap or default gross output is used to calculate the $SO_2$ emission rate for any of these hours.

[40 CFR 63.10010(f)(4)]

(4) PM

(a) The Permittee shall operate and maintain the PM CEMS in accordance to the procedures and requirements in Procedure 2- Quality Assurance Requirements for Particulate Matter Continuous Emission Monitoring Systems at Stationary Sources in Appendix F to part 60 of this chapter.

[40 CFR 63.10010(i)(2)]

(i) The Permittee shall conduct the Relative Response Audit (RRA) at least once annually.

[40 CFR 63.10010(i)(2)(i)]

(ii) The Permittee shall conduct the Relative Correlation Audit (RCA) at least once every 3 years.

[40 CFR 63.10010(i)(2)(ii)]

(b) The Permittee shall calculate the arithmetic 30-boiler operating day rolling average of all the hourly average PM CEMS output data collected during all nonexempt boiler operating hours.

[40 CFR 63.10010(i)(4)]

(c) The Permittee shall collect data using the PM CEMS at all times Units 1 and 2 are operating, except for periods of monitoring system malfunctions, repairs associated with monitoring system malfunctions, and required monitoring system quality assurance or quality control

activities.

[40 CFR 63.10010(i)(5)]

(d) The Permittee shall use all the data collected during all boiler operating hours in assessing compliance with the operating limit except:

[40 CFR 63.10010(i)(5)(i)]

(i) Any data collected during monitoring system malfunctions, repairs associated with monitoring system malfunctions, and required monitoring system quality assurance or quality control activities; Any monitoring system quality assurance or out of control periods shall be reported in an annual deviation report;

[40 CFR 63.10010(i)(5)(i)(A)]

(ii) Any data collected during periods when the monitoring system is out of control as specified in the site-specific monitoring plan, repairs associated with periods when the monitoring system is out of control, or required monitoring system quality assurance or control activities conducted during out of control periods in calculations used to report emissions or operating levels and report any such periods in an annual deviation report;

[40 CFR 63.10010(i)(5)(i)(B)]

(iii) Any data recorded during periods of startup and shutdown.

[40 CFR 63.10010(i)(5)(i)(C)]

(5) Hg

(a) The Permittee shall operate, maintain, and quality assure the data from the CEMS or sorbent trap monitoring systems in accordance with Appendix A of 40 CFR Part 63, Subpart UUUUU.

[40 CFR 63.10010(g)]

(i) If using sorbent trap monitoring, the Permittee may choose to use separate sorbent trap monitoring systems. One sorbent trap monitoring system to demonstrate compliance with the numeric mercury emissions limit during periods other than startup or shutdown and the other sorbent trap monitoring system to report average mercury concentration during startup periods or shutdown periods.

[40 CFR 63.10000(c)(1)(vi)(A)]

(ii) The Permittee may choose to use one sorbent trap monitoring system to demonstrate compliance with the mercury emissions limit at all times (including startup periods and shutdown periods) and to report average mercury concentration. The Permittee must follow the startup and shutdown requirements that follow and as given in Table 3 to this subpart for each coal-fired, liquid oil-fired, or solid oil-derived fuel-fired EGU.

[40 CFR 63.10000(c)(1)(vi)(B)]

(b) The Permittee shall calculate and record a 30-boiler operating day rolling average Hg emission rate, in units of the standard, update after each new boiler operating day. Each 30- boiler operating day rolling average emission rate, calculated according to Section 6.2 of Appendix A to the subpart, is the average of all of the valid hourly Hg emission rates in the preceding 30- boiler operating days. Section 7.1.4.3 of Appendix A to this subpart explains how to reduce sorbent trap monitoring system data to an hourly basis.

[40 CFR 63.10010(g)]

(6) The Permittee shall, as part of demonstration of continuous compliance, perform periodic tune-ups of EGU(s), according to Condition II.K.4.c.

[40 CFR 63.10006(i)]

8. Notifications

a. The Permittee shall submit all of the applicable notifications in 40 CFR 63.7(b) and (c), 40 CFR 63.8 (e), (f)(4) and (6), and 40 CFR 63.9 (b) through (h) by the dates specified.

[40 CFR 63.10030(a)]

b. The Permittee shall submit a Notification of Compliance Status according to 40 CFR 63.9(h)(2)(ii) to demonstrate initial compliance as specified in 40 CFR 63.10011(a). The Notification of Compliance Status report must contain all the information specified in Conditions II.K.8.b.(1) through (7), as applicable:

[40 CFR 63.10030(e)]

(1) A description of the affected source(s) including identification of which subcategory the source is in, the design capacity of the source, a description of the add-on controls used on the source, description of the fuel(s) burned, including whether the fuel(s) were determined by the Permittee or EPA through a petition process to be a non-waste under 40 CFR 241.3, whether the fuel(s) were processed from discarded non-hazardous secondary materials within the meaning of 40 CFR 241.3, and justification for the selection of fuel(s) burned during the performance test.

[40 CFR 63.10030(e)(1)]

(2) Summary of the results of all performance tests and fuel analyses and calculations conducted to demonstrate initial compliance including all established operating limits.

[40 CFR 63.10030(e)(2)]

(3) Identification of whether the Permittee plans to demonstrate compliance with each applicable emission limit through performance testing; fuel moisture analyses; performance testing with operating limits; CEMS; or a sorbent trap monitoring system.

[40 CFR 63.10030(e)(3)]

(4) Identification of whether the Permittee plan to demonstrate compliance by emissions averaging.

[40 CFR 63.10030(e)(4)]

(5) A signed certification that the Permittee has met all applicable emission limits and work practice standards.

[40 CFR 63.10030(e)(5)]

(6) If the Permittee had a deviation from any emission limit, work practice standard, or operating limit, the Permittee shall also submit a brief description of the deviation, the duration of the deviation, emissions point identification and the cause of the deviation in the Notification of Compliance Status report.

[40 CFR 63.10030(e)(6). 63.10021(g)]

(7) In addition to the information required in 40 CFR 63.9(h)(2), the Permittee's notification of compliance status must include the certifications of compliance, as applicable, and must be signed by a responsible official stating:

[40 CFR 63.10030(e)(7) and (7)(ii)]

(a) "This EGU complies with the requirements in 40 CFR 63.10021(a) to demonstrate continuous compliance," and

[40 CFR 63.10030(e)(7)(ii)(A)]

(b) "No secondary materials that are solid waste were combusted in any affected unit."

[40 CFR 63.10030(e)(7)(ii)(B)]

(8) Identification of the emissions limits with which the Permittee plans to comply for each EGU.

[40 CFR 63.10030(e)(7)(iii)]

(a) The Permittee may switch from a mass per heat input to a mass per gross output limit (or vice-versa), provided that:

(i) The Permittee submit a request that identifies for each EGU or EGU emissions averaging group involved in the proposed switch both the current and proposed emission limit;

(ii) The request arrives to the Director at least 30 calendar days prior to the date that the switch is proposed to occur;

(iii) The request demonstrates through performance stack test results completed within 30 days prior to the submission, compliance for each EGU or EGU emissions averaging group with both the mass per heat input and mass per gross output limits;

(iv) All other applicable plans (monitoring, emissions averaging) are revised and submitted with the request;

(v) Records of all information regarding the choice of emissions limits are kept.

(b) The Permittee shall begin using the revised emission limits starting in the next reporting period, after receipt of written acknowledgement from the Director of the switch.

(c) From submission of the request until the start of the next reporting period after receipt of written acknowledgement from the Director of the switch, the Permittee shall demonstrate compliance with both the mass per heat input and mass per gross output emission limit for each pollutant for each EGU or EGU emissions averaging group.

c. The Permittee shall submit a Notification of Intent to conduct a performance test at least 30 days before a test is initially scheduled to begin.

[40 CFR 63.10030(d)]

9. Reports

a. The Permittee shall submit to the Director all reports required by Table 8 of 40 CFR 63, Subpart UUUUU and shall meet the reporting requirements as specified by 40 CFR 63.10031.

b. The Permittee shall submit each report, by the date identified in Table 8, 40 CFR 63.10031, Subpart UUUUU, according to the following requirements:

[40 CFR 63.10031(b)]

(1) Each compliance report must cover the semiannual reporting period from January 1st through June 30th or the semiannual reporting period from July 1st through December 31st.

[40 CFR 63.10031(b)(3)]

(2) Each compliance report must be postmarked or submitted

electronically no later than July 31st or January 31st, whichever date is the first date following the end of the semiannual reporting period.

[40 CFR 63.10031(b)(4)]

(3) The Permittee may submit the semiannual compliance reports according to the dates the Director has established instead of according to the dates in Conditions II.K.9.b.(1) and (2).

[40 CFR 63.10031(b)(5)]

c. The Permittee shall submit the compliance report containing the following:

[40 CFR 63.10031(c)]

(1) The information required by the summary report located in 40 CFR 63.10(e)(3)(vi).

[40 CFR 63.10031(c)(1)]

(2) The total fuel use by each affected source subject to an emission limit, for each calendar month within the semiannual reporting period, including, but not limited to, a description of the fuel, whether the fuel has received a non-waste determination by EPA or the Permittee's basis for concluding that the fuel is not a waste, and the total fuel usage amount with units of measure.

[40 CFR 63.10031(c)(2)]

(3) Indicate whether the Permittee burned new types of fuel during the reporting period. If the Permittee did burn new types of fuel the Permittee shall include the date of the performance test where that fuel was in use.

[40 CFR 63.10031(c)(3)]

(4) Include the date of the most recent tune-up for each unit subject to the requirement.

[40 CFR 63.10031(c)( 4)]

(5) A certification.

[40 CFR 63.10031(c)(8)]

(6) If there are any deviations from any emission limits, work practice standard, or operating limit, the Permittee shall also submit a brief description of the deviation, the duration, emissions point identification and the cause of the deviation.

[40 CFR 63.10031(c)(9)]

d. For each excess emissions occurring at the facility where the Permittee is using a CEMS or a sorbent trap monitoring system to comply with that emission limit or operating limit, the Permittee shall include the following information in the compliance report. [40 CFR 63.10031(d)]

(1) The date and time identifying each period during which the CEMS or sorbent trap measurement system was inoperative except for zero (low-level) and high-level checks;

[40 CFR 63.10(c)(5)]

(2) The date and time identifying each period during which the CEMS or separate sorbent trap measurement system was out of control, as defined in 40 CFR 63.8(c)(7);
[40 CFR 63.10(c)(6)]

(3) The specific identification (i.e., the date and time of commencement and completion) of each period of excess emissions and parameter monitoring exceedances, as defined in the relevant standard(s), that occurs during startups, shutdowns, and malfunctions of the affected source;
[40 CFR 63.10(c)(7)]

(4) The specific identification (i.e., the date and time of commencement and completion) of each time period of excess emissions and parameter monitoring exceedances, as defined in the relevant standard(s), that occurs during periods other than startups, shutdowns, and malfunctions of the affected source;
[40 CFR 63.10(c)(8)]

(5) The nature and cause of any malfunction (if known);
[40 CFR 63.10(c)(10)]

(6) The corrective action taken or preventative measures adopted;
[40 CFR 63.10(c)(11)]

(7) The nature of the repairs or adjustments to the CEMS or sorbent trap measurement system that was inoperative or out of control;
[40 CFR 63.10(c)(12)]

(8) The total process operating time during the reporting period; and
[40 CFR 63.10(c)(13)]

(9) All procedures that are part of a quality control program developed and implemented for CEMS under 40 CFR 63.8(d).
[40 CFR 63.10(c)(14)]

(10) When no excess emissions or exceedances of a parameter have occurred, or a CEMS or separate sorbent trap measurement system has not been inoperative, out of control, repaired, or adjusted, such information shall be stated in the report.
[40 CFR 63.10(e)(3)(v)]

e. The Permittee shall report all deviations as defined in this subpart in the semiannual monitoring report required by 40 CFR 70.6(a)(3)(iii)(A) or 40 CFR 71.6(a)(3)(iii)(A). If the Permittee submits a compliance report pursuant to Table 8 of 40 CFR Part 63, Subpart UUUUU along with, or as part of, the semiannual monitoring report required by 40 CFR 70.6(a)(3)(iii)(A) or 40 CFR 71.6(a)(3)(iii)(A), and the compliance report includes all required information concerning deviations from any emission limit, operating limit, or work practice requirement in this subpart, submission of the compliance report satisfies any obligation to report the

same deviations in the semiannual monitoring report. Submission of a compliance report does not otherwise affect any obligation the Permittee may have to report deviations from permit requirements to the permit authority.

[40 CFR 63.10031(e)]

f. On or after April 17, 2017, within 60 days after the date of completing each CEMS performance evaluation test, as defined in 40 CFR 63.2 and required by 40 CFR 63, Subpart UUUUU, the Permittee shall submit the relative accuracy test audit (RATA) data (or, for PM CEMS, RCA and RRA data) required by 40 CFR 63, Subpart UUUUU to EPA's WebFIRE database by using the Compliance and Emissions Data Reporting Interface (CEDRI) that is accessed through EPA's Central Data Exchange (CDX) *(www.epa.gov/cdx).* The RATA data shall be submitted in the file format generated through use of EPA's Electronic Reporting Tool (ERT) *(http://www.epa.gov/ttn/chiej/ertlindex.htmf).* Only RATA data compounds listed on the ERT Web site are subject to this requirement. Permittees who claim that some of the information being submitted for RATAs is confidential business information (CBI) shall submit a complete ERT file including information claimed to be CBI on a compact disk or other commonly used electronic storage media (including, but not limited to, flash drives) by registered letter to EPA and the same ERT file with the CBI omitted to EPA via CDX as described earlier in this paragraph. The compact disk or other commonly used electronic storage media shall be clearly marked as CBI and mailed to U.S. EPA/OAPQS/CORE CBI Office, Attention: WebFIRE Administrator, MD C404-02, 4930 Old Page Rd., Durham, NC 27703. The Permittee shall also submit these RATAs to the Director in the format specified in this condition. The Permittee shall submit calibration error testing, drift checks, and other information required in the performance evaluation as described in 40 CFR 63.2 and as required in 40 CFR63.10031(f)(1).

[40 CFR 63.10031(f)(1)]

g. On or after April 17, 2017, for PM CEMS, within 60 days after the reporting periods ending on March 31st, June 30th, September 30th, and December 31st the Permittee shall submit quarterly reports to EPAs WebFIRE database by using the Compliance and Emissions Data Repotting Interface (CEDRI) that is accessed through EPA's Central Data Exchange (CDX) *(www.epa.gov/cdx).* The Permittee shall use the appropriate electronic reporting form in CEDRI or provide an alternate electronic file consistent with EPA's reporting form output format. For each repotting period, the quarterly reports shall include all of the calculated 30-boiler operating day rolling average values derived from the CEMS.

[40 CFR 63.10031(f)(2)]

h. Reports for an $SO_2$ CEMS, and Hg CEMS or sorbent trap, and any supporting monitors for such system (such as a diluent or moisture monitor) shall be submitted by the Permittee using the ECMPS Client Tool, as provided for in 40 CFR 63, Subpart UUUUU, Appendices A and 40 CFR 63.10021(f). [40 CFR 63.10031(f)(3)]

i. On or after April 17, 2017, the Permittee shall submit the compliance reports required under Condition II.K.8.b and the notification of compliance status required of Condition II.K.8.b. to EPA's WebFIRE database by using the Compliance and Emissions Data Reporting Interface (CEDRI) that is accessed through EPA's Central Data Exchange (CDX) *(www.epa.gov/cdx)*. The Permittee shall use the appropriate electronic reporting form in CEDRI or provide an alternate electronic file consistent with EPA's reporting form output format.

[40 CFR 63.10031(f)(4)]

j. All reports required by this subpart not subject to the requirements in Condition II.K.9.f through i shall be sent to the Director at 1110 West Washington Street, Phoenix, Arizona 85007. These reports may be submitted on electronic media. The Director retains the right to require submittal of reports subject to Condition II.K.9.f through i in paper format.

[40 CFR 63.10031(f)(5)]

k. Prior to April 16, 2017, all reports subject to electronic submittal in Conditions II.K.9.f through i shall be submitted to the EPA at the frequency specified in those paragraphs in electronic portable document format (PDF) using the ECMPS Client Tool. Each PDF version of a submitted report must include sufficient information to assess compliance and to demonstrate that the testing was done properly. The following data elements must be entered into the ECMPS Client Tool at the time of submission of each PDF file.

[40 CFR 63.10031(f)(6)]

l. If a malfunction occurs during the reporting period, the compliance report shall include the number, duration, and a brief description for each type of malfunction which occurred during the reporting period and which caused or may have caused any applicable emission limitation to be exceeded.

[40 CFR 63.10031(g)]

10. Recordkeeping Requirements

a. The Permittee shall keep the following records:

(1) A copy of each notification and report submitted by the Permittee to comply with section, including all documentation supporting any Initial Notification or Notification of Compliance Status or semiannual compliance report that you submitted, according to the requirements in 40 CFR 63.10(b)(2)(xiv).

[40 CFR 63.10032(a)(1)]

(2) Records of performance stack tests, fuel analyses, or other compliance demonstrations and performance evaluations, as required in 40 CFR 63.10(b)(2)(viii).

[40 CFR 63.10032(a)(2)]

(3) For each CEMS and sorbent trap monitoring system, the Permittee shall keep the following records. [40 CFR 63.10032(b)]

(4) Records described in 40 CFR 63.10(b)(2)(vi) through (xi).
[40 CFR 63.10032(b)(1)]

(5) Previous *(i.e.*, superseded) versions of the performance evaluation plan as required in 40 CFR 63.8(d)(3).
[40 CFR 63.10032(b)(2)]

(6) Request for alternatives to relative accuracy test for CEMS as required in 40 CFR 63.8(f)(6)(i).
[40 CFR 63.10032(b)(3)]

(7) Records of the date and time that each deviation started and stopped and whether the deviation occurred during a period of startup, shutdown, or malfunction or during another period.
[40 CFR 63.10032(b)(4)]

b. The Permittee shall keep the following records required in Table 7, 40 CFR 63, Subpart UUUUU to show continuous compliance with each applicable emission limit in Condition II.K.6:
[40 CFR 63.10032(c), Table 7 of 40 CFR Part 63, Subpart UUUUU]

(1) All monitoring data and calculated averages for applicable limits;

(2) Periodic performance tune-ups of EGUs required under II.K.4.a; and

(3) Work practice standards required to be implemented under Conditions II.K.3.b and 4.

c. For each EGU subject to an emission limit, the Permittee shall keep the following records:

(1) The Permittee shall keep records of monthly fuel use by each EGU, including the type(s) of fuel and amount(s) used.
[40 CFR 63.10032(d)(1)]

(2) If the Permittee combusts non-hazardous secondary materials that have been determined not to be solid waste pursuant to 40 CFR 241.3(b)(1), the Permittee must keep a record which documents how the secondary material meets each of the legitimacy criteria. If the Permittee combusts a fuel that has been processed from a discarded non-hazardous secondary material pursuant to 40 CFR 241.3(b)(2), the Permittee shall keep records as to how the operations that produced the fuel satisfies the definition of processing in 40 CFR 241.2. If the fuel received a non-waste determination pursuant to the petition process submitted under 40 CFR 241.3(c), the Permittee shall keep a record which documents how the fuel satisfies the requirements of the petition process.
[40 CFR 63.10032(d)(2)]

d. If the Permittee elects to average emissions consistent with Condition

II.K.7.a.(7), the Permittee shall additionally keep a copy of the emissions averaging implementation plan required in Condition II.K.7.a.(7), including daily records of heat input or steam generation, as applicable, and monitoring records consistent with 40 CFR 63.10022.

[40 CFR 63.10032(e)]

e. The Permittee shall keep records of the occurrence and duration of each startup and/or shutdown.

[40 CFR 63.10032(f)]

f. The Permittee shall keep records of the occurrence and duration of each malfunction of an operation (i.e., process equipment) or the air pollution control and monitoring equipment.

[40 CFR 63.10032(g)]

g. The Permittee shall keep records of actions taken during periods of malfunction to minimize emissions in accordance with 40 CFR 63.10000(b), including corrective actions to restore malfunctioning process and air pollution control and monitoring equipment to its normal or usual manner of operation.

[40 CFR 63. 10032(h)]

h. The Permittee shall keep records of the type(s) and amount(s) of fuel used during each startup or shutdown.

[40 CFR 63.10032(i)]

i. All records shall be in a form suitable and readily available for expeditious review, according to 40 CFR 63.10(b)(1).

[40 CFR 63.10033(a)]

j. The Permittee shall keep each record for 5 years following the date of each occurrence, measurement, maintenance, corrective action, report, or record.

[40 CFR 63.10033(b)]

k. The Permittee shall keep each record on site for at least 2 years after the date of each occurrence, measurement, maintenance, corrective action, report or record; thereafter these records shall be kept off site for the remaining 3 years.

[40 CFR 63.10033(c)]

**L.** Regional Haze State Implementation Plan

1. Emission Limitations

a. $PM_{10}$

[40 CFR 52.145(e)(1)]

The Permittee shall not emit particulate matter below 10 micron size ($PM_{10}$) from Unit 1 and Unit 2 in excess of 0.030 lb/ MMBtu.

b. $SO_2$

[40 CFR 52.145(e)(1)]

The Permittee shall not allow the 30-day rolling average $SO_2$ emission rate from Unit 1 and Unit 2 to exceed 0.080 lb/MMBtu.

c. $NO_x$

[40 CFR 52.145(f)(3)(i)]

(1) The Permittee shall not allow the 30-day rolling average $NO_x$ emission rate from Unit 1 to exceed 0.065 lb/MMBtu.

(2) The Permittee shall not allow the 30-day rolling average $NO_x$ emission rate from Unit 2 to exceed 0.080 lb/MMBtu.

2. Compliance Dates

[40 CFR 52.145(f)(4)]

a. The Permittee shall show compliance with the applicable $PM_{10}$ and $SO_2$ emission limits in Conditions II.L.1.a and b and the related compliance recordkeeping and reporting on issuance of this permit.

b. The Permittee shall show compliance with the applicable $NO_x$ emission limits in Condition II.L.1.c and the related requirements by December 5, 2017.

3. Compliance Determinations for $PM_{10}$

Compliance with the particulate matter emission limitation for each coal-fired unit shall be determined from annual performance stack tests.

[40 CFR 52.145(f)(6)]

a. The Permittee shall conduct a annual stack test on each unit to measure $PM_{10}$ using EPA Method 5, in 40 CFR part 60, Appendix A, or Method 201A/202 in 40 CFR Part 51, Appendix M.

b. The Permittee shall submit a test protocol to EPA and ADEQ a minimum of 30 days prior to the scheduled testing. The protocol shall identify which method(s) will be used to demonstrate compliance.

c. Each test shall consist of three runs, with each run at least 120 minutes in duration and each run collecting a minimum sample of 60 dry standard cubic feet.

d. Results shall be reported in lb/MMBtu using the calculation in 40 CFR Part 60 Appendix A Method 19.

e. In addition to annual stack tests, the Permittee shall monitor particulate emissions for compliance with the emission limitations in accordance with the applicable Compliance Assurance Monitoring (CAM) plan developed and approved in accordance with 40 CFR Part 64.

f. The averaging time for any other demonstration of the $PM_{10}$ compliance or exceedance shall be based on a 6-hour average.

4. Compliance Determination for $SO_2$

a. The Permittee shall maintain, calibrate and operate a CEMS, in full compliance with the requirements found at 40 CFR Part 75, to accurately measure $SO_2$, diluent, and stack gas volumetric flow rate from each unit.
[40 CFR 52.145(f)(5)(i)(A)]

(1) All valid CEMS hourly data shall be used to determine compliance with the $SO_2$ emissions limit.

(2) When the CEMS is out of control as defined in Part 75, that CEMS data shall be treated as missing data and not used to calculate the emission average.

(3) Each required CEMS shall obtain valid data for at least 90 percent of the unit operating hours, on an annual basis.

b. The Permittee shall comply with the quality assurance procedures for CEMS found in 40 CFR Part 75.
[40 CFR 52.145(f)(5)(i)(B)]

(1) In addition to these Part 75 requirements, relative accuracy test audits shall be calculated for the $SO_2$ pounds per hour measurement and the heat input measurement.

(2) The CEMs monitoring data shall not be bias adjusted.

c. The Permittee shall calculate the 30-day rolling average $SO_2$ emission rate for each coal-fired unit in accordance with the following procedure:
[40 CFR 52.145(f)(5)(iii)]

(1) Sum the total pounds of $SO_2$ emitted from the unit during the current boiler-operating day and the previous twenty-nine (29) boiler-operating days;
[40 CFR 52.145(f)(5)(iii)(A)]

(2) Sum the total heat input to the unit in MMBtu during the current boiler-operating day and the previous twenty-nine (29) boiler-operating day; and
[40 CFR 52.145(f)(5)(iii)(A)]

(3) Divide the total number of pounds of $SO_2$ emitted during the thirty (30) boiler-operating days by the total heat input during the thirty (30) boiler-operating days.
[40 CFR 52.145(f)(5)(iii)(A)]

(4) A new 30-day rolling average $SO_2$ emission rate shall be calculated for each new boiler-operating day. Each 30-day rolling average $SO_2$ emission rate shall include all emissions and all heat input that occur during all periods within any boiler-operating day, including emissions from startup, shutdown, and malfunction.
[40 CFR 52.145(f)(5)(iii)(A)]

(5) If a valid $SO_2$ pounds per hour at the outlet of the FGD system or heat input is not available for any hour for a unit, that heat input and $SO_2$ pounds per hour shall not be used in the calculation of the 30-day rolling average.

[40 CFR 52.145(f)(5)(iii)(C)]

5. Compliance Determinations for $NO_x$

a. At all times after the compliance date, the Permittee shall maintain, calibrate and operate a CEMS, in full compliance with the requirements found at 40 CFR Part 75, to accurately measure $NO_x$, diluent, and stack gas volumetric flow rate from each unit.

[40 CFR 52.145(f)(5)(i)(A)]

(1) All valid CEMS hourly data shall be used to determine compliance with the $NO_x$ emissions limit.

(2) When the CEMS is out of control as defined in Part 75, that CEMS data shall be treated as missing data and not used to calculate the emission average.

(3) Each required CEMS shall obtain valid data for at least 90 percent of the unit operating hours, on an annual basis.

b. The Permittee shall comply with the quality assurance procedures for CEMS found in 40 CFR Part 75.

[40 CFR 52.145(f)(5)(i)(B)]

(1) In addition to these Part 75 requirements, relative accuracy test audits shall be calculated for the $NO_x$ pounds per hour measurement and the heat input measurement.

(2) The CEMs monitoring data shall not be bias adjusted.

(3) The testing and evaluation of the inlet monitors and the calculations of relative accuracy for lb/hr of $NO_x$ and heat input shall be performed each time the Part 75 CEMS undergo relative accuracy testing.

c. The Permittee shall calculate the 30-day rolling average $NO_x$ emission rate for each coal-fired unit in accordance with the following procedure:

[40 CFR 52.145(f)(5)(ii)]

(1) Sum the total pounds of $NO_x$ emitted from the unit during the current boiler-operating day and the previous twenty-nine (29) boiler operating days; [40 CFR 52.145(f)(5)(ii)(B)]

(2) Sum the total heat input to the unit in MMBtu during the current boiler-operating day and the previous twenty-nine (29) boiler operating day; and

[40 CFR 52.145(f)(5)(ii)(B)]

(3) Divide the total number of pounds of $NO_x$ emitted during the thirty

(30) boiler-operating days by the total heat input during the thirty (30) boiler-operating days.

[40 CFR 52.145(f)(5)(iii)(B)]

(4) A new 30-day rolling average $NO_x$ emission rate shall be calculated for each new boiler-operating day. Each 30-day rolling average $NO_x$ emission rate shall include all emissions and all emissions that occur during all periods within any boiler operating day, including emissions from startup, shutdown, and malfunction.

[40 CFR 52.145(f)(5)(iii)(B)]

6. Recordkeeping

The Permittee shall maintain the following records for at least five (5) years:

[40 CFR 52.145(f)(7)]

a. All CEMS data, including the date, place, and time of sampling or measurement; parameters sampled or measured; and results.

b. Daily 30-day rolling emission rates for $SO_2$ and $NO_x$ for each unit, calculated in accordance with Conditions II.L.4.c and 6.c.

c. Records of quality assurance and quality control activities for emissions measuring systems including, but not limited to, any records required by 40 CFR Part 75.

d. Records of the relative accuracy test for hourly $NO_x$ and $SO_2$ lb/hr measurement and hourly heat input measurement.

e. Records of all major maintenance activities conducted on emission units, air pollution control equipment, and CEMS.

f. Any other records required by 40 CFR Part 75.

7. Reporting

All reports and notifications listed below shall be submitted to the Director of Enforcement Division, U.S. EPA Region IX, at 75 Hawthorne Street, San Francisco, CA 94105.

[40 CFR 52.145(f)(8)]

a. The Permittee shall notify EPA within two weeks after completion of installation of combustion controls or Selective Catalytic Reactors on any of the units subject to this section.

[40 CFR 52.145(f)(8)](i)]

b. Within 30 days after the applicable compliance date(s) in Conditions II.L.2. a and b and within 30 days of every second calendar quarter thereafter (i.e., semi-annually), the Permittee shall submit a report that lists the daily 30-day rolling emission rates for $NO_x$ and $SO_2$ for each unit. Included in this report shall be the results of any relative accuracy test audit performed during the two preceding calendar quarters.

[40 CFR 52.145(f)(8)](ii)]

8. Equipment Operations

At all times, including periods of startup, shutdown, and malfunction, the Permittee shall, to the extent practicable, maintain and operate the unit including associated air pollution control equipment in a manner consistent with good air pollution control practices for minimizing emissions. Pollution control equipment shall be designed and capable of operating properly to minimize emissions during all expected operating conditions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Director, which may include, but is not limited to, monitoring results, review of operating and maintenance procedures, and inspection of the unit.

[40 CFR 52.145(f)(10)]

9. Permit Shield

[A.A.C. R18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with 40 CFR 52.145 (f).

**M.** Biomass Burning

The Permittee shall maintain monthly records of the amount of biomass burned, and the dates and times biomass is burned.

## III. AUXILIARY BOILER

**A.** Applicability

This section applies to the Auxiliary Boiler as described in Attachment "C" of this permit.

**B.** Fuel and Operational Requirements

1. The Permittee shall bum only Number 2 fuel oil and used oil in the auxiliary boiler.

[A.A.C. R18-2-306.A.2]

2. The Permittee shall not fire high sulfur oil (fuel sulfur content 0.9% by weight) as a fuel unless the Permittee demonstrates to the satisfaction of the Director that sufficient quantities of low sulfur oil are not available for use by the source and that it has adequate facilities and contingency plans to insure that the sulfur dioxide ambient air quality standards set forth in A.A.C. R18-2-202 will not be violated.

[A.A.C. R18-2-724.G]

3. *The Permittee shall not operate the auxiliary boiler at an annual average capacity factor greater than 10%.* The annual average capacity factor shall be defined as ratio between the actual heat input to the auxiliary boiler from the fuels burning during a calendar year, and the potential heat input to the auxiliary boiler had it been operating for 8,760 hours during a year at the maximum steady state design heat input capacity.

[A.A.C. R18-2-306.01.A and 331.A.3]

4. Monitoring, Reporting, and Recordkeeping

a. The Permittee shall maintain records of the daily fuel usage for the auxiliary boiler.

[A.A.C. R18-2-306.A.3.c]

b. At the end of each calendar year, the Permittee shall calculate and record the heat input in million Btu per year and the annual capacity factor.

[A.A.C. R18-2-306.A.3.c]

c. The Permittee shall keep on record the liquid fuel specifications containing the following information for each shipment of fuel oil. Alternatively, the Permittee may keep records of the on-site fuel oil sampling analysis:

(1) The name of the fuel oil supplier.

(2) The heating value of the fuel oil;

(3) The density of the fuel oil;

(4) The ash content of the fuel oil;

(5) The sulfur content of the fuel oil from which the shipment came;

(6) The method used to determine the ash content of the fuel oil; and

(7) The method used to determine the sulfur content of the fuel oil.

[A.A.C. R18-2-306.A.3.b]

5. Permit Shield

[A.A.C. R18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with A.A.C. R18-2-724.G.

**C.** Particulate Matter and Opacity

1. Emission Limitations/ Standards

a. Particulate Matter & Opacity

The Permittee shall not cause, allow or permit the emission of particulate matter, caused by combustion of fuel, from the auxiliary boiler in excess of the amount calculated by the following equation:

$E = 1.02\ Q^{0.769}$

Where:

E = the maximum allowable particulate emissions rate in pounds-mass per hour.

Q = the heat input in million Btu per hour.

[A.A.C. R18-2-724.C.1]

b. For the purposes of condition III.C.1.a of this Attachment, heat input is defined as the aggregate heat content of all fuels whose products of combustion pass through a stack or other outlet.

[A.A.C. R18-2-724.B]

c. The Permittee shall not cause, allow or permit to be emitted into the atmosphere from the auxiliary boiler, smoke which exceeds 15 percent opacity measured in accordance with EPA Reference Method 9.

[A.A.C. R18-2-724.J]

2. Monitoring, Recordkeeping & Reporting

a. The Permittee shall report all six-minute periods in which the opacity of any plume or effluent exceeds 15 percent from the auxiliary boiler.

[A.A.C. R18-2-724.J]

b. The Permittee shall conduct weekly opacity monitoring of visible emissions. If the opacity of the emissions observed appears to exceed the relevant opacity standard, the observer shall conduct a certified EPA Reference Method 9 observation. The Permittee shall keep records of the initial survey and any EPA Reference Method 9 observations performed. These records shall include the emission point observed, location of observer, name of observer, date and time of observation, and the results of the observation. If the observation shows a Method 9 opacity reading in excess of the relevant opacity standard, the Permittee shall initiate appropriate corrective action to reduce the opacity below the standard. The Permittee shall keep a record of the corrective action performed.

[A.A.C. R18-2-306.A.3.c]

3. Permit Shield

[A.A.C. R18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with A.A.C. R18-2-724.B, C.1 and J.

**D.** Sulfur Dioxide

1. Emission Limitations/Standards

a. The Permittee shall not cause, allow, or permit emission of more than 1.0 pounds of sulfur dioxide per million Btu heat input.

[A.A.C. R18-2-724.E]

b. For the purposes of Condition III.D.1.a, “heat input” is defined as the aggregate heat content of all fuels whose products of combustion pass through a stack or other outlet.

[A.A.C. R18-2-724.B]

2. Permit Shield

Compliance with the conditions of this Part shall be deemed compliance with A.A.C. R18-2-724.B and E.

[A.A.C. R18-2-325]

**E.** National Emissions Standards for Hazardous Air Pollutants (NESHAP) - Requirements for Boilers

1. Applicability

This section is applicable to the auxiliary boiler identified in Attachment "C".

[40 CFR 63.7499(t & u)]

2. Definition of Limited Use Boiler

[40 CFR 63.7575]

Limited use boiler means any boiler that burns any amount of solid, liquid, or gaseous fuels and has a federally enforceable average annual capacity factor of no more that 10 percent.

3. Work Practice Standards

a. The Permittee shall complete a tune-up once in five years on the auxiliary boiler in accordance with 40 CFR 63.7540(a)(10). Subsequent tune-ups shall commence no more than 61 months after the initial tune-up. The tune-up shall be conducted as follows: [40 CFR 63.7500(c)]

(1) Inspect the burner, and clean or replace components of the burner as necessary. The Permittee may delay the burner inspection until the next scheduled unit shutdown. [40 CFR 63.7540(a)(10)(i)]

(2) Inspect the flame pattern, as applicable, and adjust the burner as necessary to optimize the flame pattern. The adjustment shall be consistent with the manufacturer's specifications, if available.

[40 CFR 63.7540(a)(10)(ii)]

(3) Inspect the system controlling the air-to-fuel ratio, as applicable, and ensure that it is correctly calibrated and functioning properly (the Permittee may delay the inspection until the next scheduled unit shutdown). Units that produce electricity for sale may delay the inspection until the first outage, not to exceed 36 months from the previous inspection; [40 CFR 63.7540(a)(10)(iii)]

(4) Optimize total emissions of CO. This optimization should be consistent with the manufacturer's specifications, if available, and with any $NO_X$ requirement to which the unit is subject;

[40 CFR 63.7540(a)(10)(iv)]

(5) Measure the concentrations in the effluent stream of CO in parts

per million, by volume, and oxygen in volume percent, before and after the adjustments are made (measurements may be either on a dry or wet basis, as long as it is the same basis before and after the adjustments are made). Measurements may be taken using a portable CO analyzer; and

[40 CFR 63.7540(a)(10)(v)]

(6) Maintain on-site and submit, if requested by the Director, a tune-up report containing the information in paragraphs (6)(a) through (c) below,

[40 CFR 63.7540(a)(10)(vi)]

(a) The concentrations of CO in the effluent stream in parts per million by volume, and oxygen in volume percent, measured at high fire or typical operating load, before and after the tune-up of the boiler or process heater;

[40 CFR 63.7540(a)(10)(vi)(A)]

(b) A description of any corrective actions taken as a part of the tune-up; and

[40 CFR 63.7540(a)(10)(vi)(B)]

(c) Types and amount of fuel used over the 12 months prior to tune up, but only if the unit was physically and legally capable of using more than one type of fuel during that period.

[40 CFR 63.7540(a)(10)(vi)(C)]

b. Permit Shield

[A.A.C.R 18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with 40 CFR Part 63.7500(c) and 7540(a)(10).

4. Recordkeeping Requirements

a. The Permittee shall keep records of fuel use for the days the auxiliary boiler was operated.

[40 CFR 63.7525(k)]

b. Permit Shield

[A.A.C. R18-2-325]

Compliance with the conditions of this Section shall be deemed compliance with 40 CFR Part 63.7522(k).

5. Reporting Requirements

a. The first 5-year compliance report must cover the period beginning January 31, 2016 and ending on December 31, 2020. Subsequent 5-year compliance reports will cover the applicable 5-year period from January 1 to December 31. Compliance reports must be postmarked or submitted to

the Director no later than January 31. The report shall contain the following information:

[40 CFR 63.7550(b)]

(1) Company and Facility name and address;

[40 CFR 63.7550(c)(5)(i)]

(2) Process unit information;

[40 CFR 63.7550(c)(5)(ii)]

(3) Date of report and beginning and ending dates of the reporting period;

[40 CFR 63.7550(c)(5)(iii)]

(4) The total operating hours during the reporting period; and

[40 CFR 63.7550(c)(5)(iv)]

(5) Include the date of the most recent tune-up including the date of the most recent burner inspection if it was delayed until the next scheduled or unscheduled unit shutdown.

[40 CFR 63.7550(c)(5)(xiv)]

b. Permit Shield

[A.A.C. R18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with 40 CFR Part 63.7550(b) and (c).

## IV. INTERNAL COMBUSTION ENGINES (ICE)

**A.** Applicability

This section applies to the emergency ICEs identified in the Equipment List, Attachment "C" of this permit.

**B.** Operational Limitation

1. The Permittee shall only burn diesel fuel in the emergency ICEs located at the facility.

[A.A.C. R18-2-306.A.2]

2. The Permittee shall record the hours of operation of the emergency ICEs and at the end of each month calculate and record a 12 month rolling total.

[A.A.C. R18-2-306.A.3]

**C.** Existing Source Requirements

1. Applicability

This Subsection (C) is applicable to ICEs marked "No" under the NSPS Applicability Column in the Equipment List, Attachment "C".

2. Particulate Matter and Opacity

a. Emissions Limitations/Standards

(1) The Permittee shall not cause or allow to be discharged into the atmosphere from the internal combustion engines any gases in which exhibit greater than 40% opacity.

[A.A.C. R18-2-719.E]

(2) The Permittee shall not cause, allow or permit the emission of particulate matter, caused by combustion of fuel, from the internal combustion engines having a heat input rate of 4200 million Btu per hour or less, in excess of the amounts calculated by the following equation:

$E = 1.02*Q^{0.769}$

where:

E = the maximum allowable particulate emissions rate in pounds-mass per hour

Q = the heat input in million BTU per hour.

[A.A.C. R18-2-719.C.1]

(3) For the purposes of Condition IV.C.2.a.(2), the heat input shall be the aggregate heat content of all fuels whose products of combustion pass through a stack or other outlet. Compliance tests shall be conducted during operation at the normal rated capacity of each unit. The total heat input of all operation generators and internal combustion engines on a plant or premises shall be used for determining the maximum allowable amount of particulate matter which may be emitted.

[A.A.C. R18-2-719.B]

b. Monitoring, Recordkeeping and Reporting Requirements

(1) The Permittee shall monitor the lower heating value of the fuel being combusted in the internal combustion engines. The Permittee shall maintain records of the lower heating value of the fuel fired in the internal combustion engines. This may be accomplished by maintaining on record a copy of fuel supplier certifications that specify the lower heating value of the fuel.

[A.A.C. R18-2-306.A.3.c and A.A.C. R18-2-719.I]

(2) The Permittee shall conduct opacity monitoring in accordance with Condition I.B of this Attachment while the engine is in operation.

[A.A.C. R18-2-306.A.3.c]

c. Permit Shield

[A.A.C. R18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with A.A.C. R18-2-719.B, C.1, E, and I.

3. Sulfur Dioxide

a. Emissions Limitations/Standards

The Permittee shall not burn high sulfur fuel and shall limit the emission of sulfur dioxide to 1.0 pound per million Btu heat input.

[A.A.C. R18-2-719.F and H]

b. Monitoring, Recordkeeping and Reporting Requirements

(1) The Permittee shall monitor the sulfur content of the fuel being combusted in the internal combustion engines. The Permittee shall maintain records of the daily sulfur content and lower heating value of the fuel fired in the internal combustion engines. This may be accomplished by maintaining on record a copy of fuel supplier certifications that specify the sulfur content and lower heating value of the fuel.

[A.A.C. R18-2-306.A.3.c and A.A.C. R18-2-719.I]

(2) The Permittee shall report to the Director any daily period during which the sulfur content of the fuel being fired in the machine exceeds 0.8%.

[A.A.C. R18-2-719.J and 306.A.3]

c. Permit Shield

[A.A.C. R18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with A.A.C. R18-2-719.F, I, J, and H.

**D.** National Emissions Standards for Hazardous Air Pollutants (NESHAP) Requirements for Engines Less than 500 Horsepower

1. Applicability

This Subsection D is applicable to ICEs marked "No" under the NSPS Applicability Column in the Equipment List, Attachment "C".

2. Operating Requirements

[40 CFR 63.6605]

a. The Permittee shall operate and maintain the emergency ICE engine and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions. The general duty to minimize emissions does not require the Permittee to make any further efforts to reduce emissions if levels required by this standard have been achieved. Determination of whether such operation and maintenance procedures are being used will be based on information available to the Administrator and the Director which may include, but is not limited to, monitoring results, review of operation and maintenance procedures, review of operation and maintenance records, and inspection of the source.

[40 CFR 63.6605(b)]

b. The Permittee shall minimize the engine's time spent at idle during startup and minimize the engine's startup time to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the emission standards applicable to all times other than startup in Table 2c to 40 CFR Part 63 subpart ZZZZ apply.

c. The Permittee shall operate each ICE according to the requirements in Conditions IV.D.2.c.(1) and (2). If the engine is not operated according to Conditions IV.D.2.c.(1) and (2), the engine will not be considered an emergency engine and shall meet all requirements for non-emergency engines.

[40 CFR 63.6640 (f)]

(1) The Permittee may operate the emergency engine for the purpose of maintenance checks and readiness testing, provided that the tests are recommended by Federal, State, or local government, the manufacturer, the vendor, or the insurance company associated with the engine. Maintenance checks and readiness testing of the engine is limited to no more than 100 hours per year. The Permittee may petition the Administrator and the Director for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if the Permittee maintains records indicating that the Federal, State, or local standards require maintenance and testing beyond 100 hours per year. Copies of records shall be made available to ADEQ upon request.

(2) The Permittee may operate the emergency engine for up to 50 hours per year in non-emergency situations, but those 50 hours are counted towards the 100 hours per year provided for maintenance and testing. The 50 hours per year for non-emergency situations cannot be used for peak shaving or to generate income for a facility to supply power to an electric grid or otherwise supply power as part of a financial arrangement with another entity; except that the Permittee may operate the emergency engine for a maximum of 15 hours per year as part of a demand response program if the regional transmission organization or equivalent balancing authority and transmission operator has determined there are emergency conditions that could lead to a potential electrical blackout, such as unusually low frequency, equipment overload, capacity or energy deficiency, or unacceptable voltage level. The engine may not be operated for more than 30 minutes prior to the time when the emergency condition is expected to occur, and the engine operation must be terminated immediately after the facility is notified that the emergency condition is no longer imminent. The 15 hours per year of demand response operation are counted as part of the 50 hours of operation per year provided for non-emergency situations. The supply of emergency power to another entity or entities pursuant to financial arrangement is not limited by this paragraph, as long as the power provided by the financial arrangement is limited to emergency

power.

d. *The Permittee shall install a non-resettable hour meter on the emergency engine.*

[40 CFR 63.6625(f), R18-2-331.A.3.a]
[Material Permit Conditions are indicated by underline and italics]

e. The Permittee shall change oil and filter every 500 hours of operation or annually, whichever comes first. If the Permittee prefers to extend the oil change requirement, an oil analysis program as described in 40 CFR 63.6625(i) shall be completed.

[40 CFR 63.6603(a); Table 2d of Subpart ZZZZ; 63.6625(i)]

f. The Permittee shall inspect air cleaner every 1,000 hours of operation or annually, whichever comes first, and replace as necessary.

[40 CFR 63.6603(a); Table 2d of Subpart ZZZZ]

g. The Permittee shall inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary.

[40 CFR 63.6603(a); Table 2d of Subpart ZZZZ]

h. The Permittee shall operate and maintain the emergency fire pump engine according to the manufacturer's emission-related written instructions or develop a maintenance plan which must provide to the extent practicable for the maintenance and operation of the engine in a manner consistent with good air pollution control practice for minimizing emissions.

[40 CFR 63.6625(e)].

3. Recordkeeping Requirements

a. The Permittee shall keep records of the hours of operation of each emergency engine that is recorded through the non-resettable hour meter. Records shall include the date, start and stop times, hours spent for emergency operation, including what classified the operation as emergency and how many hours are spent for non-emergency operation.

[40 CFR 63.6655(f)]

b. If the Permittee elects to implement the oil analysis program described in 40 CFR 63.6625(i), the Permittee shall keep records of the parameters that are analyzed and the results of the oil analysis and the oil changes for the engine.

[40 CFR 63.6625(i)]

c. The Permittee shall keep records of the maintenance conducted on the emergency engine that demonstrates operation and maintenance in accordance with the maintenance plan.

[40 CFR 63.6655(e)]

d. The Permittee shall document the hours spent for emergency operation, including what classified the operation as emergency and how many hours are spent for non-emergency operation. If the engine is used for demand response operation, the Permittee shall keep records of the notification of the emergency situation, and the time the engine was operated as part of

demand response.

[40 CFR 63.6655(f)]

e. The Permittee, for the emergency ICE subject to NSPS Subpart IIII in Condition IV.E below shall comply with the requirements of NESHAP ZZZZ by meeting requirements of NSPS Subpart IIII.

4. Permit Shield

[A.A.C. R18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with 40 CFR Part 63.6605(b); 63.6640(f); 63.6625(i) & (f); 63.6603(a), 63.6655(e) & (f), Table 2d of 40 CFR subpart ZZZZ, 63.6655.

**E.** New Source Performance Standards (NSPS) Requirements

1. Applicability

This Subsection E is applicable to the ICEs marked "Yes" under the NSPS Applicability Column in the Equipment List, Attachment "C".

2. Voluntarily Accepted Limitations

a. Type of Fuel

[A.A.C. R18-2-306.01.A, -306.A.2, & -331.A.3.a]
[Material permit conditions are indicated by underline and italics]

*The Permittee shall burn only diesel fuel in the emergency engine.*

b. Operating Hours

[A.A.C. R18-2-306.01.A and -331.A.3.a]
[Material permit conditions are indicated by underline and italics]

*The Permittee shall not operate the engine for more than 500 hours in a rolling twelve-month period.*

c. Monitoring, Reporting and Recordkeeping requirements

[A.A.C. R18-2-306.A.3.c]

The Permittee shall keep a monthly record of the hours of operation of the engine. At the end of each month, a 12-month rolling total of hours of operation of the engine shall be computed.

3. General Requirements

a. Operating Requirements

(1) The Permittee shall operate and maintain the engine over its entire life according to the manufacturer's written instructions or procedures developed by the Permittee that are approved by the engine manufacturer. A copy of the instructions or procedures shall be kept onsite and made available to ADEQ upon request.

[40 CFR 60.4206, 4211(a), and A.A.C. R18-2-306.A.3]

(2) The Permittee shall only change those emission related settings that are permitted by the manufacturer. [40 CFR 60.4211(a)]

(3) The Permittee shall meet the requirements of 40 CFR parts 89, 94, or 1068, as they apply.

[40 CFR 60.4211(a)]

(4) The engine must be installed and configured according to the manufacturer's emission-related specifications.

[40 CFR 60.4211(c)]

(5) If the Permittee does not install, configure, operate, and maintain the engine according to the manufacturer's emission-related written instructions, or changes emission-related settings in a way that is not permitted by the manufacturer, the Permittee must demonstrate compliance as follows:

[40 CFR 60.4211(g)]

(a) Keep a maintenance plan and records of conducted maintenance;

(b) To the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions; and

(c) Conduct an initial performance test to demonstrate compliance with the applicable emission standards within 1 year of startup, or within 1 year after an engine is installed, configured, operated, and maintained in accordance with the manufacturer's emission related written instructions, or within 1 year after the Permittee changes emission-related settings in a way that is not permitted by the manufacturer.

(6) Fuel Requirements

The engine shall use diesel fuel that meets the following requirements of 40 CFR 80.510(b):

[40 CFR 60.4207(b)]

(a) Sulfur content: 15 ppm maximum; and

(b) A minimum cetane index of 40 or a maximum aromatic content of 35 volume percent.

(7) Additional Emergency Engine Requirements

[40 CFR 60.4211(f), 60.4209(a), A.A.C. R18-2-306.A.3.c, -306.A.4, and -331.A.3.c]
[Material permit conditions are indicated by underline and italics]

(a) *The Permittee shall install a non-resettable hour meter prior to startup of the engine.*

(b) Emergency engines may be operated for the purpose of maintenance checks and readiness testing, provided that the tests are recommended by Federal, State, or local government, the manufacturer, the vendor, or the insurance company associated with the engine.

(c) The Permittee shall not operate the emergency engine for the purposes of maintenance checks and readiness testing for more than 100 hours per year unless the Permittee maintains records identifying the Federal, State, or local standards that require maintenance and testing of the engine beyond 100 hours per year. Copies of such records shall be provided to ADEQ upon request. The Permittee may operate the engine for up to 50 hours per year in non-emergency situations, but those 50 hours are counted towards the 100 hours per year provided for maintenance and testing.

(d) The Permittee may petition the Administrator for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if the Permittee maintains records indicating that Federal, State, or local standards require maintenance and testing of the engine beyond 100 hours per year.

(e) The Permittee shall only operate the emergency engine for emergency purposes, maintenance, and testing, and operation in non-emergency situations for 50 hours per year.

b. Emission Limitation and Standards

[40 CFR 60.4205(c)]

(1) NMHC + Nitrogen Oxides (NMHC + $NO_x$)

The Permittee shall limit the emissions of NMHC + $NO_x$ to below 3.0 g/ hp-hr from the emergency engine.

(2) Particulate Matter (PM)

The Permittee shall limit the emission of PM to below 0.15 g/ hp-hr from the emergency engine.

c. Monitoring and Record Keeping Requirements

(1) The Permittee shall comply by purchasing an engine certified to the emission standards in Condition IV.E.3.b. The engine shall be installed and configured according to the manufacturer's specifications.

[40 CFR 60.4211(c)]

(2) The Permittee shall maintain a copy of engine certifications or

other documentation demonstrating that the engine complies with the applicable standards in this Permit, and shall make the documentation available to ADEQ upon request.

[A.A.C. R18-2-306.A.4]

(3) The Permittee shall keep records of fuel supplier specifications. The specifications shall contain information regarding the name of fuel supplier, sulfur content, and cetane index or aromatic content in the fuel. These records shall be made available to ADEQ upon request.

(4) The Permittee shall maintain monthly records of engine operation. The records shall include the purpose of operation and the duration of time the engine was operated. The record shall identify whenever the operation of the engine was for emergency purposes.

[40 CFR 60.4214(b)]

4. Permit Shield

[A.A.C. R18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with 40 CFR Part 63.6605(b); 63.6640(f); 63.6625(i) & (f); 63.6603(a), 63.6655(e) & (f), Table 2d of 40 CFR subpart ZZZZ, 63.6655.

## V. COAL HANDLING

**A.** Applicability

This section applies to the Coal Handling and the Coal Mixing systems as listed in Equipment List, Attachment "C".

**B.** Opacity

1. Emission Limitations/Standards

The Permittee shall not cause to be discharged into the atmosphere from any coal processing and conveying equipment including breakers and crushers, coal storage systems, and coal transfer and loading systems, any emissions greater than 20 percent opacity.

[A.A.C. R18-2-702.B.3]

2. Monitoring, Recordkeeping & Reporting

[A.A.C. R18-2-306.A.3.c]

The Permittee shall conduct opacity monitoring in accordance with Condition I.E of this Attachment. This weekly survey shall include observation of all exposed transfer points, enclosed transfer points, the coal storage pile, and baghouses.

3. Permit Shield

[A.A.C. R18-2-325]

Compliance with the condition of this Part shall be deemed compliance with A.A.C. R18-2-702.B.3.

**C.** Particulate Matter

1. Emission Limitations/Standards

a. The Permittee shall not cause, allow or permit the discharge of particulate matter into the atmosphere in any one hour from any coal handling operation in total quantities in excess of the amounts calculated by the following equation:

$E = 55.0 \cdot P^{0.11} - 40$

Where:

E = the maximum allowable particulate emissions rate in pounds- mass per hour.

P = the process weight rate in tons-mass per hour. The total process weight from all similar units employing a similar type process shall be used in determining the maximum allowable emission of particulate matter.

[A.A.C. R18-2-716.B.2]

b. The total process weight rate from all similar units employing a similar type process shall be used in determining the maximum allowable emission of particulate matter.

[A.A.C. R18-2-716.B.2]

2. Air Pollution Controls

*When the coal handling and mixing system is operational, the Permittee shall* maintain and *operate the appropriate baghouses used to capture particulate matter emissions associated with coal handling in accordance with manufacturer's specification and in a manner consistent with good air pollution control practices. Wet dust suppression shall be maintained and operated at the rotary car dumper during train unloading at conveyor transfer points in the yard area and at the stacking-reclaiming area.*

[A.A.C. R18-2-306.A.2 and 331.A.3.e]
[Material Permit Conditions are defined by underline and italics]

3. Monitoring, Recordkeeping & Reporting

a. The manufacturer's specifications shall be on file and shall be readily available for inspection by the Department.

[A.A.C. R18-2-306.A.2]

b. The Permittee shall maintain records of emissions related maintenance performed on the baghouses. [A.A.C. R18-2-306.A.3.c]

4. Permit Shield

[A.A.C. R18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with A.A.C R18-2-716.B, D, and E.

## VI. LIMESTONE HANDLING

**A.** Applicability

This Section applies to the Upgraded Belt Conveyors (BC-101, BC-101A), New Belt Conveyors (BC-101B and B), Upgraded Transfer Tower (TT-1), New Transfer Tower (TT-2), Dry Dust Collectors (DC-12 and DC-13), New Limestone Storage Bins A, B, & C, and Bin Vent Dust Collectors (DC-14, DC-15, and DC-16) in the Limestone Handling Plant.

**B.** Particulate Matter and Opacity

1. Emission Limitations/Standards

a. Particulate Matter

(1) The Permittee shall not cause to be discharged into the atmosphere from any transfer point on belt conveyors or from any other affected facility any stack emissions (DC-12 and DC-13) that contain PM in excess of 0.032 grams per dry standard cubic meter (0.014 gr/dscf). Bin vent filters (DC-14, DC-15, and DC-16) are exempt from this PM stack limit since these individually control emissions from the associated storage bin.

[40 CFR 60.672(a) & 60.672(f)]

(2) The Permittee shall not cause to be discharged into the atmosphere from DC-12, DC-13, DC-14, DC-15, and DC-16 any stack emissions that contain filterable $PM/PM_{10}$ in excess of 0.005 grains per actual cubic feet.

[A.A.C. R18-2-406.A.4]

b. Opacity

(1) *The Permittee shall not cause to be discharged into the atmosphere from any storage bin any stack emissions that exhibit opacity greater than 7 percent opacity.*

[40 CFR 60.672(a) and A.A.C. R18-2-331.A.3.f]
[Material Permit Conditions is defined by underline and italics]

(2) *The Permittee shall not cause to be discharged into the atmosphere from any transfer point on belt conveyors or from any other affected facility any fugitive emissions which exhibit opacity greater than 7 percent.*

[40 CFR 60.672(b) and A.A.C. R18-2-331.A.3.f]
[Material Permit Conditions is defined by underline and italics]

2. Air Pollution Control Equipment

*At all times, including periods of startup. shutdown, and malfunction, the Permittee shall, to the extent practicable, install*, maintain, and *operate Drv Dust Collectors*

*{DC-12 on Transfer Tower (TT-l) and DC-13 on Transfer Tower (TT-2)} and Bin Vent Filters (DC-14, DC-15, and DC-16) on Limestone Storage Bins (A, B, & C) in a manner consistent with good air pollution control practice for minimizing PM emissions.*

[40 CFR 60.11(d), A.A.C. R18-2-306.01.A and -331.A.3.d & e]
[Material Permit Conditions are defined by underline and italics]

3. Monitoring Requirements

The Permittee shall conduct quarterly 30-minute visible emissions inspections using EPA Method 22 (40 CFR part 60, Appendix A-7) on the Transfer Tower Dust Collectors (DC-12 and DC-13) and Bin Vent Dust Collectors (DC-14, DC-15, and DC-16). The Method 22 (40 CFR part 60, Appendix A-7) test shall be conducted while the dust collectors are operating. The test is successful if no visible emissions are observed. If any visible emissions are observed, the owner or operator of the affected facility must initiate corrective action within 24 hours to return the dust collector to normal operation. The owner or operator must record each Method 22 (40 CFR part 60, Appendix A-7) test, including the date and any corrective actions taken, in the logbook required under Condition VI.B.4.a.

4. Recordkeeping and Reporting Requirements

a. The Permittee shall record each periodic inspection required under Condition VI.B.3, including dates and any corrective actions taken, in a logbook (in written or electronic format). The Permittee shall keep the logbook onsite and make hard or electronic copies available to the Administrator upon request

[40 CFR 60.676(b)]

b. The Permittee shall submit written reports of the results of all performance tests conducted to demonstrate compliance with the emission limit in Condition VI.B.1.a.(1), including reports of opacity observations made using Method 9 to demonstrate compliance with Condition VI.B.1.b.(1).

[40 CFR 60.676(f)]

5. Permit Shield

[A.A.C. R18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with 40 CFR 60.672(a), (b), (f), 675(c)(2), 676(b), (f), and A.A.C R18-2-406.A.4.

## VII. FLY ASH HANDLING, COAL ADDITIVE SODA ASH, AND CEMENT KILN DUST HANDLING

**A.** Applicability

This section applies to the Fly Ash Handling, Coal Additive Soda Ash, and Cement Kiln Dust Handling (Systems) listed in Equipment List, Attachment "C".

**B.** Opacity

1. Emission Limitations/ Standards

The Permittee shall not cause to be discharged into the atmosphere from the systems any emissions greater than 20 percent opacity.

[A.A.C. R18-2-702.B.3]

2. Monitoring, Recordkeeping & Reporting

The Permittee shall conduct opacity monitoring in accordance with Condition I.E of this Attachment. This weekly observation shall include observation of all exposed transfer points, enclosed transfer points, the baghouses, and the mixer unloader. [A.A.C. R18-2-306.A.3.b]

3. Permit Shield

[A.A.C. R18-2-325]

Compliance with the condition of this Part shall be deemed compliance with A.A.C. R18-2-702.B.3.

**C.** Particulate Matter

1. Emission Limitation/Standards

a. The Permittee shall not cause, allow or permit the discharge of particulate matter into the atmosphere in any one hour from any systems (with process rate of 60,000 lbs/hr or less) operation in total quantities in excess of the amounts calculated by the following equation:

$E = 4.1*P^{0.67}$

Where:

E = the maximum allowable particulate emissions rate in pounds-mass per hour.

P = the process weight rate in tons-mass per hour.

[A.A.C. R18-2-730.A.l.a]

b. The Permittee shall not cause, allow or permit the discharge of particulate matter into the atmosphere in any one hour from any systems (with process rate greater than 60,000 lbs/hr) operation in total quantities in excess of the amounts calculated by the following equation:

$E = 55.0*P^{0.11} - 40$

Where:

E = the maximum allowable particulate emissions rate in pounds-mass per hour.

P = the process weight rate in tons-mass per hour.

[A.A.C. R18-2-730.A.l.b]

c. The total process weight from all similar units employing a similar type process shall be used in determining the maximum allowable emission of particulate matter.

[A.A.C. R18-2-730.B]

2. Air Pollution Controls

*At all times when these systems are operational, the Permittee shall maintain and operate the associated baghouses, water spray header, pugmill, and the mixer unloader used to minimize particulate matter emissions in accordance with manufacturer's specification and in a manner consistent with good air pollution control practices.*

[A.A.C. R18-2-306.A.2 and 331]
[Material Permit Conditions are defined by underline and italics]

3. Monitoring, Recordkeeping & Reporting

a. The manufacturer's specifications shall be on file and shall be readily available for inspection by the Department.

[A.A.C. R18-2-306.A.2]

b. The Permittee shall maintain records of emissions related maintenance performed on the baghouses and mixer unloader.

[A.A.C. R18-2-306.A.3.c]

4. Permit Shield

[A.A.C. R18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with A.A.C. R18-2-730.A.1 and B.

**D.** Odorous Materials

1. The Permittee shall not emit gaseous or odorous materials from equipment, operations or premises in such quantities or concentrations as to cause air pollution.

[A.A.C. R18-2-730.0]

2. Where a stack, vent or other outlet is at such a level that fumes, gas mist, odor, smoke, vapor or any combination thereof constituting air pollution is discharged to adjoining property, the Director may require the installation of abatement equipment or the alteration of such stack, vent, or other outlet by the Permittee thereof to a degree that will adequately dilute, reduce or eliminate the discharge of air pollution to adjoining property.

[A.A.C. R18-2-730.G]

3. Permit Shield

[A.A.C. R18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with A.A.C. R18- 730.D and G.

## VIII. COOLING TOWERS 1 AND 2

**A.** Applicability

This Section applies to Cooling Towers 1 and 2 listed in Equipment List, Attachment "C".

**B.** Opacity

1. Emissions Standards/Limitations

The Permittee shall not cause to be discharged into the atmosphere from the cooling towers any emissions greater than 20 percent opacity.

[A.A.C. R18-2-702.B.3]

2. Monitoring, Recordkeeping & Reporting

The Permittee shall conduct opacity monitoring for the cooling towers in accordance with Condition I.A of this Attachment. [A.A.C. R18-2-306.A.3.b]

3. Permit Shield

[A.A.C. R18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with A.A.C. R18-2-702.B.3.

**C.** Particulate Matter

1. Emission Limitation/Standards

a. The Permittee shall not cause, allow or permit the discharge of particulate matter into the atmosphere in any one hour from any systems operation in total quantities in excess of the amounts calculated by the following equation:

$E = 55.0*P^{0.11} - 40$

Where:

E = the maximum allowable particulate emissions rate in pounds-mass per hour.

P = the process weight rate in tons-mass per hour.

[A.A.C. R18-2-730.A.l.b]

b. The total process weight from all similar units employing a similar type process shall be used in determining the maximum allowable emission of particulate matter.

[A.A.C. R18-2-730.B]

2. Permit Shield

[A.A.C. R18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with

A.A.C. R18-2-730.A.1.b and B.

**D.** Odorous Materials

1. The Permittee shall not emit gaseous or odorous materials from equipment, operations or premises in such quantities or concentrations as to cause air pollution. [A.A.C. R18-2-730.D]

2. Where a stack, vent or other outlet is at such a level that fumes, gas mist, odor, smoke, vapor or any combination thereof constituting air pollution is discharged to adjoining property, the Director may require the installation of abatement equipment or the alteration of such stack, vent, or other outlet by the Permittee thereof to a degree that will adequately dilute, reduce or eliminate the discharge of air pollution to adjoining property. [A.A.C. R18-2-730.G]

3. Permit Shield [A.A.C. R18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with A.A.C. R18-2-730.D and G.

## IX. FUGITIVE DUST REQUIREMENTS

**A.** Applicability

This Section applies to any source of fugitive dust in the facility.

**B.** Particulate Matter and Opacity

Open Areas, Roadways & Streets, Storage Piles, and Material Handling

1. Emission Limitations/Standards

a. Opacity of emissions from any fugitive dust non-point source shall not be greater than 40% measured in accordance with the Arizona Testing Manual, Reference Method 9. [A.A.C. R18-2-614]

b. The Permittee shall employ the following reasonable precautions to prevent excessive amounts of particulate matter from becoming airborne:

(1) Keep dust and other types of air contaminants to a minimum in an open area where construction operations, repair operations, demolition activities, clearing operations, leveling operations, or any earth moving or excavating activities are taking place, by good modern practices such as using an approved dust suppressant or adhesive soil stabilizer, paving, covering, landscaping, continuous wetting, detouring, barring access, or other acceptable means; [A.A.C. R18-2-604.A]

(2) Keep dust to a minimum from driveways, parking areas, and

vacant lots where motor vehicular activity occurs by using an approved dust suppressant, or adhesive soil stabilizer, or by paving, or by barring access to the property, or by other acceptable means;

[A.A.C. R18-2-604.B]

(3) Keep dust and other particulates to a minimum by employing dust suppressants, temporary paving, detouring, wetting down or by other reasonable means when a roadway is repaired, constructed, or reconstructed;

[A.A.C. R18-2-605.A]

(4) Take reasonable precautions, such as wetting, applying dust suppressants, or covering the load when transporting material likely to give rise to airborne dust;

[A.A.C. R18-2-605.B]

(5) Take reasonable precautions, such as the use of spray bars, wetting agents, dust suppressants, covering the load, and hoods when crushing, handling, or conveying material likely to give rise to airborne dust;

[A.A.C. R18-2-606]

(6) Take reasonable precautions such as chemical stabilization, wetting, or covering when organic or inorganic dust producing material is being stacked, piled, or otherwise stored;

[A.A.C. R18-2-607.A]

(7) Operate stacking and reclaiming machinery utilized at storage piles at all times with a minimum fall of material, or with the use of spray bars and wetting agents;

[A.A.C. R18-2-607.B]

(8) Any other method as proposed by the Permittee and approved by the Director.

[A.A.C. R18-2-306.A.3.c]

2. Air Pollution Control Requirements

Haul Roads and Storage Piles

*Water, or an equivalent control, shall be used to control visible emissions from haul roads and storage piles.*

[A.A.C. R18-2-306.A.2 and -331.A.3.d]
[Material Permit Condition is indicated by underline and italics]

3. Monitoring and Recordkeeping Requirements

a. The Permittee shall maintain records of the dates on which any of the activities listed in Conditions IX.B.1.b.(1) through (8) were performed and the control measures that were adopted.

[A.A.C. R18-2-306.A.3.c]

b. Opacity Monitoring Requirements

(1) A certified Method 9 observer shall conduct a monthly visual survey of visible emissions from the fugitive dust sources. The Permittee shall keep a record of the name of the observer, the date and location on which the observation was made, and the results of the observation.

(2) If the observer sees a visible emission from a fugitive dust source that on an instantaneous basis appears to exceed applicable opacity standard, then the observer shall, if practicable, take a six-minute Method 9 observation of the visible emission.

(a) If the six-minute opacity of the visible emission is less than or equal to applicable opacity standard, the observer shall make a record of the following:

(i) Location, date, and time of the observation; and

(ii) The results of the Method 9 observation.

(b) If the six-minute opacity of the visible emission exceeds applicable opacity standard, then the Permittee shall do the following:

(i) Adjust or repair the controls or equipment to reduce opacity to below the applicable standard; and

(ii) Report it as an excess emission under Section XII.A of Attachment "A".

[A.A.C. R18-2-306.A.3.c]

4. Permit Shield

[A.A.C. R18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with A.A.C. R18-2-604, -605,-606, -607, -608,- 612, -614, and -702.B.3.

## X. MOBILE SOURCE REQUIREMENTS

**A.** Applicability

The requirements of this Section are applicable to mobile sources which either move while emitting air contaminants or are frequently moved during the course of their utilization but are not classified as motor vehicles, agricultural vehicles, or agricultural equipment used in normal farm operations. Mobile sources shall not include portable sources as defined in A.A.C. R18-2-101.90.

[A.A.C. R18-2-801.A]

**B.** Particulate Matter and Opacity

1. Emission Limitations/Standards

a. Off-Road Machinery

The Permittee shall not cause, allow, or permit to be emitted into the atmosphere from any off-road machinery, smoke for any period greater than ten consecutive seconds, the opacity of which exceeds 40%. Visible emissions when starting cold equipment shall be exempt from this requirement for the first ten minutes. Off-road machinery shall include trucks, graders, scrapers, rollers, and other construction and mining machinery not normally driven on a completed public roadway.

[A.A.C. R18-2-802.A and -802.B]

b. Roadway and Site Cleaning Machinery

(1) The Permittee shall not cause, allow or permit to be emitted into the atmosphere from any roadway and site cleaning machinery smoke or dust for any period greater than ten consecutive seconds, the opacity of which exceeds 40%. Visible emissions when starting cold equipment shall be exempt from this requirement for the first ten minutes.

[A.A.C. R18-2-804.A]

(2) The Permittee shall take reasonable precautions, such as the use of dust suppressants, before the cleaning of a site, roadway, or alley. Earth or other material shall be removed from paved streets onto which earth or other material has been transported by trucking or earth moving equipment, erosion by water or by other means.

[A.A.C. R18-2-804.B]

c. Unless otherwise specified, no mobile source shall emit smoke or dust the opacity of which exceeds 40%.

[A.A.C. R18-2-801.B]

2. Recordkeeping Requirement

The Permittee shall keep a record of all emissions related maintenance activities performed on the Permittee's mobile sources stationed at the facility as per manufacturer's specifications.

[A.A.C. R18-2-306.A.5.a]

3. Permit Shield

[A.A.C. R18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with A.A.C. R18-2-801, -802, and -804.

## XI. OTHER PERIODIC ACTIVITIES

**A.** Abrasive Blasting

1. Particulate Matter and Opacity

a. Emission Limitations/Standards

The Permittee shall not cause or allow sandblasting or other abrasive blasting without minimizing dust emissions to the atmosphere through the use of good modern practices. Good modern practices include:

(1) wet blasting;

(2) effective enclosures with necessary dust collecting equipment; or

(3) any other method approved by the Director.

[A.A.C. R18-2-726]

b. Opacity

The Permittee shall not cause, allow or permit visible emissions from sandblasting or other abrasive blasting operations in excess of 20% opacity, as measured by EPA Reference Method 9.

[A.A.C. R18-2-702.B.3]

2. Monitoring and Recordkeeping Requirement

Each time an abrasive blasting project is conducted, the Permittee shall make a record of the following:

a. The date the project was conducted;

b. The duration of the project; and

c. Type of control measures employed.

[A.A.C. R18-2-306.A.3.c]

3. Permit Shield

[A.A.C. R18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with A.A.C. R18-2-702.B.3 and -726.

**B.** Use of Paints

1. Volatile Organic Compounds

a. Emission Limitations/Standards

While performing spray painting operations, the Permittee shall comply with the following requirements:

(1) The Permittee shall not conduct or cause to be conducted any spray painting operation without minimizing organic solvent emissions. Such operations, other than architectural coating and spot painting, shall be conducted in an enclosed area equipped with controls containing no less than 96 percent of the overspray.

[A.A.C.R18-2-727.A]

(2) The Permittee or their designated contractor shall not either:

(a) Employ, apply, evaporate, or dry any architectural coating containing photochemically reactive solvents for industrial or commercial purposes; or

(b) Thin or dilute any architectural coating with a photochemically reactive solvent.

[A.A.C.R18-2-727.B]

(3) For the purposes of Condition XI.B.1.a.(2), a photochemically reactive solvent shall be any solvent with an aggregate of more than 20 percent of its total volume composed of the chemical compounds classified in Conditions XI.B.1.a.(3)(a) through (c), or which exceeds any of the following percentage composition limitations, referred to the total volume of solvent:

(a) A combination of the following types of compounds having an olefinic or cyclo-olefinic type of unsaturation-hydrocarbons, alcohols, aldehydes, esters, ethers, or ketones: 5 percent.

(b) A combination of aromatic compounds with eight or more carbon atoms to the molecule except ethylbenzene: 8 percent.

(c) A combination of ethylbenzene, ketones having branched hydrocarbon structures, trichloroethylene or toluene: 20 percent.

[A.A.C.R18-2-727.C]

(4) Whenever any organic solvent or any constituent of an organic solvent may be classified from its chemical structure into more than one of the groups of organic compounds described in Conditions XI.B.1.a.(3)(a) through (c), it shall be considered to be a member of the group having the least allowable percent of the total volume of solvents.

[A.A.C.R18-2-727.D]

b. Monitoring and Recordkeeping Requirements

(1) Each time a spray painting project is conducted, the Permittee shall make a record of the following:

(a) The date the project was conducted;

(b) The duration of the project;

(c) Type of control measures employed;

(d) Material Safety Data Sheets for all paints and solvents used in the project; and

(e) The amount of paint consumed during the project.

(2) Architectural coating and spot painting projects shall be exempt from the recordkeeping requirements of Condition XI.B.1.b(1) .

[A.A.C. R18-2-306.A.3.c]

c. Permit Shield

[A.A.C. R18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with A.A.C.R18-2-727.

2. Opacity

a. Emission Limitation/Standard

The Permittee shall not cause, allow or permit visible emissions from painting operations in excess of 20% opacity, as measured by EPA Reference Method 9.

[A.A.C. R18-2-702.B.3]

b. Permit Shield

[A.A.C. R18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with A.A.C.R18-2-702.B.3.

**C.** Demolition/Renovation - Hazardous Air Pollutants

1. Emission Limitation/Standard

The Permittee shall comply with all of the requirements of 40 CFR 61 Subpart M (National Emissions Standards for Hazardous Air Pollutants - Asbestos).

[A.A.C. R18-2-1101.A.8]

2. Monitoring and Recordkeeping Requirement

The Permittee shall keep all required records in a file. The required records shall include the "NESHAP Notification for Renovation and Demolition Activities" form and all supporting documents.

[A.A.C. R18-2-306.A.3.c]

3. Permit Shield

[A.A.C. R18-2-325]

Compliance with the conditions of this Part shall be deemed compliance with A.A.C. R18-2-1101.A.8.

## ATTACHMENT "C": EQUIPMENT LIST

| Type | Maximum Capacity | Number of Equipment | Model | Serial #/ Equipment # | Installation/ Manufacturing Date | Subject to | |
|---|---|---|---|---|---|---|---|
| | | | | | | NSPS | NESHAP |
| **Steam Generation** | | | | | | | |
| Unit 1 Boiler | 4,719 MMBtu/ hr | 1 | Riley Stoker Corporation | 3901 | 7/25/1974 | Yes | Yes |
| Unit 2 Boiler | 4,719 MMBtu/ hr | 1 | Riley Stoker Corporation | 3902 | 7/25/1974 | Yes | Yes |
| Auxiliary Boiler | 157 MMBtu/ hr | 1 | Combustion Engineering | CFAABOIL | 7/25/1974 | No | Yes |
| Coal Pulverizer U1 | 145,000 lbs/hr ea | 3 | Riley Stoker Corporation | 1BAFMILL A, B, C | 7/25/1974 | No | No |
| Coal Pulverizer U2 | 145,000 lbs/hr ea | 3 | Riley Stoker Corporation | 2BAFMILL A, B, C | 7/25/1974 | No | No |
| Pulverizer Feeder Unit 1 | 72,500 lbs/hr ea | 3 | Riley Stoker Corporation | 1BAFFDR 1A1, 1A2, 1B1 | 7/25/1974 | No | No |
| Pulverizer Feeder Unit 1 | 72,500 lbs/hr ea | 3 | Riley Stoker Corporation | 1BAFFDR 1B2, 1C1, 1C2 | 7/25/1974 | No | No |
| Pulverizer Feeder Unit 2 | 72,500 lbs/hr ea | 3 | Riley Stoker Corporation | 2BAFFDR 2A1, 2A2, 2B1 | 7/25/1974 | No | No |
| Pulverizer Feeder Unit 2 | 72,500 lbs/hr ea | 3 | Riley Stoker Corporation | 2BAFFDR 2B2, 2C1, 2C2 | 7/25/1974 | No | No |
| Cooling Tower 1 | 179,900 gallons/hr | 1 | Marley Company 664-4-14 | 1DABSTRU | 7/25/1974 | No | No |
| Cooling Tower 2 | 179,900 gallons/hr | 1 | Marley Company 664-4-14 | 2DABSTRU | 7/25/1974 | No | No |
| Hot Side Electrostatic Precipitator | 2,800,000 acfm (Design Flow/unit) | 2 | Joy-Western | 1JPAPREC0002 1JPAPREC0005 | 7/25/1974 | No | No |
| Hot Side Electrostatic Precipitator | 2,800,000 acfm (Design Flow/unit) | 2 | Joy-Western | 2JPAPREC0080 1JPAPREC0082 | 7/25/1974 | No | No |

| Type | Maximum Capacity | Number of Equipment | Model | Serial #/ Equipment # | Installation/ Manufacturing Date | Subject to | |
|---|---|---|---|---|---|---|---|
| | | | | | | NSPS | NESHAP |
| Sulfur Dioxide Absorbers | 2,028,184 acfm (Design Flow/unit) | 2 | Alstom | 1WRAABS 2WRAABS | 4/12/2012 5/22/2011 | No | No |
| Low NOx Burners | 4,719 MMBtu/ hr | 24 per boiler | Babcock Power | 1BAEBURNNEFR 2BAEBURNNEFR | 5/19/2009 5/20/2011 | No | No |
| Selective Catalyst Reduction System | 3,096,256 acfm Design | 1 | Riley Power | Contract # 10051 | May, 2014 | No | No |
| Oxidizer Application System | 56 gph | 2 | Alstom | TBD | Late 2011 | No | No |
| **Coal Handling System** | | | | | | | |
| Rotary Car Dumper | 100,00 lbs | 1 | Heyl & Patterson | CJKADUMPRCD | 7/24/1974 | No | No |
| Track Hopper | 500 tons | 1 | Heyl & Patterson | CJKAHOPP | 7/24/1974 | No | No |
| Coal Crusher | 1,200 tph | 2 | Pennsylvania Crusher | CJKARUSACL, CJKAROSBCL | 7/24/1974 | No | No |
| Track Hopper Feeder | 750 tph | 4 | FMC | CJKAFDRV1, 2, 3, 4 | 7/24/1974 | No | No |
| Belt Conveyor BC-2A | 3,000 tph | 1 | FMC | CJKCONVB2A | 7/24/1974 | No | No |
| Belt Conveyor BC-4 | 3,000 tph | 1 | FMC | CJKCONVBC4 | 7/24/1974 | No | No |
| Belt Conveyor BC-5 | 1.200 tph | 1 | FMC | CJKCONVBC5 | 7/24/1974 | No | No |
| Belt Conveyor BC-6 | 1.200 tph | 1 | FMC | CJKCONVBC6 | 7/24/1974 | No | No |
| Belt Conveyor BC-7A & 7B | 1.200 tph | 2 | FMC | CJKCONVB7A, 7B | 7/24/1974 | No | No |
| Belt Conveyor BC-8A & 8B | 1.200 tph | 2 | FMC | 2JKCONVB8A, 8B | 7/24/1974 | No | No |
| Belt Conveyor BC-9A & 9B | 1.200 tph | 2 | FMC | 1JKCONVB9A, 9B | 7/24/1974 | No | No |
| Belt Conveyor BC-10A & 10B | 1.200 tph | 2 | FMC | 2JKCONVB10A, 10B | 7/24/1974 | No | No |
| Belt Conveyor BC-11 | 1.200 tph | 1 | | | 8/1/2012 | No | No |
| Belt Conveyor BC-12 | 1.200 tph | 1 | | | 8/1/2012 | No | No |
| Emergency Hopper | 280 tons | 1 | FMC | CJKAHOPPRCL | 7/24/1974 | No | No |
| Emergency Hopper Feeder | 1,000 tons | 2 | FMC | CJKAFDRAER CJKAFDRBER | 7/24/1974 | No | No |
| Crusher Surge Bin | 345 tons | 1 | FMC | CJKABINBNC | 7/24/1974 | No | No |

| Type | Maximum Capacity | Number of Equipment | Model | Serial #/ Equipment # | Installation/ Manufacturing Date | Subject to | |
|---|---|---|---|---|---|---|---|
| | | | | | | NSPS | NESHAP |
| Surge Bin Feeder | 1,200 tons | 2 | FMC | CJKAFDRASB CJKAFDRBSB | 7/24/1974 | No | No |
| Coal Sampling System | | 1 | FMC | | | No | No |
| Coal Silos | 825 tons | 3 | FMC | 1JKASILO1A, 1B, 1C | 7/24/1974 | No | No |
| Coal Silos | 825 tons | 3 | FMC | 2JKASILO2A, 2B, 2C | 7/24/1974 | No | No |
| Sampling Building Dust collector, CM1 | 7,200 cfm | 1 | FMC | | | | |
| Dust Extractor 2, DC-2 | 17,000 cfm | 1 | Engart | CJKABACDDC2 | 7/24/1974 | No | No |
| Dust Extractor 3, DC-3 | 22,000 cfm | 1 | Engart | 1JKACOLLDC3 | 7/24/1974 | No | No |
| Dust Extractor 4, DC-4 | 22,000 cfm | 1 | Engart | 2JKACOLLDC4 | 7/24/1974 | No | No |
| Dust Extractor 5, DC-5 | 6,000 cfm | 1 | Engart | 1JKACOLLDC5 | 7/24/1974 | No | No |
| Dust Extractor 6, DC-17 | 5,250 cfm | 1 | Tri-Mer | 40859 | 12/1/2012 | No | No |
| Dust Extractor 7, DC-18 | 5,250 cfm | 1 | Tri-Mer | 40860 | 12/1/2012 | No | No |
| **Coal Mixing System** | | | | | | | |
| Belt Conveyor, BC-3A | 3,000 tph | 1 | Continental Conveyor and Equipment | CJKACONVB3A | 7/24/1974 | No | No |
| Belt Conveyor, BC-3B | 1,200 tph | 1 | Continental Conveyor and Equipment | CJKAFCONVB3B | 7/24/1974 | No | No |
| Belt Conveyor, BC-3C | 1,200 tph | 1 | Continental Conveyor and Equipment | CJKAFCONVB3C | 7/24/1974 | No | No |
| Belt Feeder CMI | 1,200 tph | 1 | | CJKACONVCMI | 7/24/1974 | No | No |
| Transfer Hopper CMI | 40 tons | 1 | | CJKAHOPPXFR | 7/24/1974 | No | No |
| Coal Storage Pile | 1,000,000 tons | 2 | | CJKAPILECL | | No | No |

| Type | Maximum Capacity | Number of Equipment | Model | Serial #/ Equipment # | Installation/ Manufacturing Date | Subject to | |
|---|---|---|---|---|---|---|---|
| | | | | | | NSPS | NESHAP |
| Rotary Plow Feeders | 600 tph | 3 | Continental Conveyor and Equipment | CJKAFDRCM 1, M2. M3, M4 | 7/24/1974 | No | No |
| Coal Crusher | 1,200 tph | 1 | | | | No | No |
| Traveling Boom Stacker | 3,000 tph | 1 | Stephens-Adamson | CJKASTACCL | 7/24/1974 | No | No |
| **Fly Ash Handling System** | | | | | | | |
| Fly Ash Storage Silos | 62,800 ft3 | 2 | Allen-Shermann-Hoff | 1JNASILOFAS 2JNASILOFAS | 7/24/1974 | No | No |
| Fly Ash Storage Silos Dust Collector, DC-7A | 2375 cfm | 5 | Flex-Kleen | IJNAFLTRAEB –A, B, C, D, E | 7/24/1974 | No | No |
| Fly Ash Storage Silos Dust Collector, DC-7B | 2375 cfm | 5 | Flex-Kleen | 2JNAFLTRAEB –A, B, C, D, E | 7/24/1974 | No | No |
| Fly Ash Receiving Silos Dust Collector, DC-8 | 15,000 cfm | 1 | Scientific | Cjnamrtdc1 | 01/01/2012 | No | No |
| **Limestone Handling System** | | | | | | | |
| Limestone Truck Unloading Hopper | 30 tons | 1 | McNally Pittsburg | CJSAHOPPTUL | 7/24/1974 | Yes | No |
| Limestone Truck Unloading Hopper Feeder | 200 tons | 1 | Marathon Electric Mfg. | C-M-JS-R-5910 | 6/23/2009 | Yes | No |
| Limestone Belt Conveyor, BC-101 | 200 tons | 1 | Varo | C-M-JS-R-5911 | 6/23/2009 | Yes | No |
| Limestone Belt Conveyor, BC-101 A | 200 tons | 1 | Varo | C-M-JS-R-5914 | 6/23/2009 | Yes | No |
| Limestone Belt Conveyor, BC-101 B | 200 tons | 1 | Varo | | | Yes | No |
| Limestone Belt Conveyor B | 200 tons | 1 | | | | Yes | No |
| Limestone Ball Mill | 18 tph | 1 | | | | Yes | No |
| Limestone Transfer Tower, TT-1 Dust Collector, DC-12 | 3,000 cfm | 1 | SDC | SL Series (SL2-8) | 2013 | Yes | No |

| Type | Maximum Capacity | Number of Equipment | Model | Serial #/ Equipment # | Installation/ Manufacturing Date | Subject to | |
|---|---|---|---|---|---|---|---|
| | | | | | | NSPS | NESHAP |
| Limestone Transfer Tower, TT-2 Dust Collector, DC-13 | 3,000 cfm | 1 | SDC | LP Series | 2013 | Yes | No |
| Limestone Storage Bin A | 73 tons | 1 | | C-M-JS-R-5917 | 6/23/2009 | Yes | No |
| Limestone Storage Bin B | 73 tons | 1 | | C-M-JS-R-5921 | 6/23/2009 | Yes | No |
| Limestone Storage Bin C | 250 tons | 1 | | | | Yes | No |
| Limestone Storage Bin Vent Filter, DC-14 | 600 SCFM | 1 | Met-Pro Flex Kleen Division | 11918 | 6/23/2009 | Yes | No |
| Limestone Storage Bin Vent Filter, DC-15 | 600 SCFM | 1 | Met-Pro Flex Kleen Division | 11918 | 6/23/2009 | Yes | No |
| Limestone Storage Bin Vent Filter, DC-16 | 1,000 SCFM | 1 | | | | Yes | No |
| **Soda Ash Handling System** | | | | | | | |
| Coal Additive Soda Ash Silo | 3,000 ft3 | 1 | CHEMCO Systems, L.P. | SILO-12 | 01/01/2003 | No | No |
| Coal Additive Soda Ash Silo Baghouse | 750 SCFM | 1 | CHEMCO Systems, L.P. | DC-9 | 01/01/2013 | No | No |
| **Cement Kiln Dust Handling System** | | | | | | | |
| CKD Storage Silos | 150 tons | 2 | | | 08/2012 | No | No |
| CKD Silo vents | 2,340 acfm | 2 | C&W Mfg &Sales Co | CP-LPR-8_S | 08/2012 | No | No |
| **Powdered Activated Carbon Handling System** | | | | | | | |
| PAC Silos Dust Collectors (existing) | 750 cfm | 2 | Merrick | | 04/2016 | No | No |
| PAC Silos (future) | 750 cfm | 2 | TBD | TBD | | No | No |
| **Other Control Equipment** | | | | | | | |
| Lime Silo Baghouse-Water Treatment | 300 SCFM | 1 | Peabody | CARACOOLL135 | 7/24/1974 | No | No |

| Type | Maximum Capacity | Number of Equipment | Model | Serial #/ Equipment # | Installation/ Manufacturing Date | Subject to | |
|---|---|---|---|---|---|---|---|
| | | | | | | NSPS | NESHAP |
| Soda Ash Silo Baghouse- Water Treatment | 300 SCFM | 1 | Peabody | CARACOOLL134 | 7/24/1974 | No | No |
| Weld Shop Baghouse | | 2 | Torit | UNIT1 1G569313<br>UNIT2 1G569313 | | No | No |
| Paint Booth Filter | | 1 | | CZAAFLTR0001 | | No | No |
| **Emergency Internal Combustion Engines** | | | | | | | |
| Fire Booster Pump | 800 hp | 1 | Cummins | 10644000 | 1977 | No | Yes |
| Emergency Generator | 1,177hp | 1 | Detroit Diesel | 501681 | 1978 | No | Yes |
| Emergency Fire Pump A | 266 hp | 1 | Caterpillar | 64Z09303 | 1977 | No | Yes |
| Emergency Fire Pump B | 305 hp | 1 | Cummins/ CFP9E-F30 | | 2013 | Yes | Yes |
| **Miscellaneous Equipment** | | | | | | | |
| Diesel Tank | 1,023,750 gallons | 1 | n/a | n/a | 1977 | No | No |

## CONTINUOUS MONITORING SYSTEM FOR UNIT 1 AND UNIT 2

| Steam Unit | Monitors | | | | |
|---|---|---|---|---|---|
| | NOx | SO2 | CO2 | Opacity | Flow |
| Unit 1 | TEI 42i | TEI 43i | TEI 410i | TML Lighthawk-560 | EMRC DP-75 |
| Unit 2 | TEI 42i | TEI 43i | TEI 410i | TML Lighthawk-560 | EMRC DP-75 |

| Steam Unit | CO Monitor | HG Sampler | PM Monitor | Inlet SO2 | Inlet CO2 |
|---|---|---|---|---|---|
| Unit 1 | TEI 48i | ESC Hg-324K Automated Mercury Sampler | Sick Maihak FWE 200 | TEI 43i | TEI 410i |
| Unit 1 | TEI 48i | ESC-324K Automated Mercury Sampler | Sick Maihak FWE 200 | TEI 43i | TEI410i |

## ATTACHMENT "D": PHASE II ACID RAIN PROVISIONS

### I. STATEMENT OF BASIS

Statutory and Regulatory Authorities: In accordance with Arizona Revised Statutes, Title 49, Chapter 3, Article 2, Section 426.N, and Titles IV & V of the Clean Air Act, the Arizona Department of Environmental Quality issues this Phase II Acid Rain Permit pursuant to Arizona Administrative Code, Title 18, Chapter 2, Article 3, Section 333 ( A.A.C. R18-2-333), "Acid Rain".

### II. $SO_2$ ALLOWANCES[!] ALLOCATIONS AND $NO_X$ REQUIREMENTS FOR EACH AFFECTED UNIT

| | | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|---|---|
| Unit 1 and Unit 2 | $SO_2$ allowances under Tables2, 3, or 4 of 40 CFR part 73 | 5,332* | 5,332* | 5,332* | 5,332* | 5,332* | 5,332* | 5,332* |
| | $NO_x$ limit | CGS is now subject to the applicable emission limitation, under 40 CFR 76.7(a)(2), of 0.46 lb/MMBtu.<br>In addition to the described $NO_X$ compliance plan, this unit shall comply with all other applicable requirements of 40 CFR Part 76, including the duty to reapply for $NO_X$ compliance plan and requirements covering excess emissions. | | | | | | |

! As defined under 40 CFR §72.2, "Allowance" means an authorization by the Administrator under the Acid Rain Program to emit up to one ton of sulfur dioxide during or after a specified calendar year.

* The number of allowances actually held by an affected source in a unit account may differ from the number allocated by U.S. EPA. Neither of the aforementioned conditions necessitate a revision to the unit $SO_2$ allowance allocations identified in this permit (See 40 CFR 72.84).

### III. COMMENTS, NOTES, AND JUSTIFICATIONS

SRP has early-elected for $NO_x$ requirements on Units 1 and 2.

### IV. PERMIT APPLICATION

The Permittee, and any other owners or operators of the units at this facility, shall comply with the requirements contained in the attached acid rain permit application (OMB No. 2060-0258) signed by the Alternate Designated Representative Dan Bevier on 06/02/2016.

# ATTACHMENT "E": BART ALTERNATIVES

## I. GENERAL

**A.** The requirements under this Attachment "E" shall become effective on the date of final action by the U.S. Environmental Protection Agency (EPA) approving Attachment "E" as part of the State Implementation Plan for Arizona, provided that such final EPA action also revokes or rescinds EPA's Federal Implementation Plan {published at 77 Federal Register 72511 (December 5, 2012), and 81 Federal Register 21735 (April 13, 2016)}, insofar as that Federal Implementation Plan establishes emission limits and other requirements for $NO_x$ and $SO_2$ emissions from Unit 1 and Unit 2 of the Coronado Generating Station.

**B.** Where multiple emission limits, standards, or requirements apply to a unit, compliance with the most stringent emission limit, standard, or requirement shall be deemed compliance with less stringent emission limits, standards, or requirements.

## II. COMPLIANCE OPTIONS– BART ALTERNATIVES

**A.** BART Alternative - Final Operating Strategies

[A.A.C R18-2-306.A.2]

The Permittee shall notify the Administrator and the Director of the selection of one of the following two BART Alternative operating strategies by December 31, 2022, and shall thereafter implement the selected operating strategy:

1. Operating Strategy-1 (OS-1): Installation and operation of SCR on Unit 1 no later than December 31, 2025.

2. Operating Strategy-2 (OS-2): Unit 1 shutdown no later than December 31, 2025.

**B.** BART Alternative- Interim Operating Strategies

The Permittee shall comply with one of the three Unit 1 curtailment options under the BART Alternative interim operating strategy requirements listed in Condition II.D beginning no later than December 5, 2017, and continuing until the Permittee either has permanently shut down Unit 1 in accordance with Condition II.A.2 or has installed and commenced operation of a SCR system on Unit 1 in accordance with Condition II.A.1.

[A.A.C R18-2-306.A.2]

**C.** Emissions and Operational Limitations for Particulate Matter and $H_2SO_4$

1. The Permittee shall not emit filterable particulate matter below 10 micron size ($PM_{10}$) in excess of 0.030 lb/MMBtu from Unit 1 and 0.030 lb/MMBtu from Unit 2, as determined by annual performance tests conducted in accordance with the particulate matter testing provisions of 40 CFR 60.46.

[40 CFR 52.145(e)(1) and A.A.C R18-2-306.A.2]
[Partial SIP Approval on December 5, 2012; 77 FR 72511]

2. If a SCR on Unit 1 begins operation as provided by Condition II.A.1, the Permittee shall not emit total filterable and condensable particulate matter (as a surrogate for $PM_{10}$ and $PM_{2.5}$) below 10 micron size in excess of 0.033 lb/MMBtu from Unit 1, as determined by annual performance tests in accordance with Condition II.F.3.

[A.A.C. R18-2-406.A.4]

3. If a SCR on Unit 1 begins operation as provided by Condition II.A.1, the Permittee shall not emit $H_2SO_4$ in excess of 0.0050 lb/MMBtu from Unit 1, as determined by annual performance tests in accordance with Condition II.F.4.

[A.A.C. R18-2-406.A.4]

4. Authority to construct the SCR system on Unit 1 shall terminate if the Permittee does not commence construction within 18 months after the date of issuance of this proposed final Class I Permit or if, during construction, the Permittee suspends work for more than 18 months.

[A.A.C. R18-2-402.I.4]

**D.** Emissions and Operational Limitations for Unit 1 and Unit 2 for $NO_x$ and $SO_2$

[A.A.C R18-2-306.A.2]

1. BART Alternative - Interim Operating Strategy Requirements

a. Until operating under a final BART Alternative operating strategy pursuant to Condition II.A.1 or II.A.2, the Permittee shall not exceed the following $NO_x$ emission rates on a 30-boiler-operating-day average

(1) 0.320 lb/MMBtu for Unit 1.

(2) 0.080 lb/MMBtu for Unit 2.

b. Until operating under a final BART Alternative operating strategy pursuant to Condition II.A.1 or II.A.2, the Permittee shall not exceed the following $SO_2$ emission rates on a 30-boiler-operating-day average

(1) 0.060 lb/MMBtu for Unit 1.

(2) 0.060 lb/MMBtu for Unit 2.

c. For the first compliance year (2017), the Permittee shall cause Unit 1 to be shut down on December 5, 2017, and shall not re-start the unit before January 20, 2018, or January 31, 2018, depending on the applicable Interim Operating Strategy option as listed in Table 1.

d. Beginning in calendar year 2018 and continuing each year thereafter until the Final BART Alternative Compliance Date pursuant to Condition II.D.2.b, the Permittee shall select, for each such year, an Interim Operating Strategy option as outlined in Table 1 and shall implement the selected interim operating strategy with respect to that year.

**Table 1: Seasonal Curtailment Options for Unit 1 Interim Operating Strategies (IS)**

| Strategies | Unit 1 (lb/MMBtu) (Highest 30-boiler-operating-day average) | | Unit 2 | Unit 1 Curtailment Period |
|---|---|---|---|---|
| | $NO_x$ | $SO_2$ | | |
| IS 2 | 0.320 | 0.060 | 0.060 | Oct. 21 to Jan. 31 |
| IS 3 | 0.320 | 0.050 | 0.050 | Nov. 21 to Jan. 20 |
| IS 4 | 0.310 | 0.060 | 0.060 | Nov. 21 to Jan. 20 |
| IS 2, IS 3, and IS 4 | | 1,970 tons of $SO_2$ per calendar year starting in 2018 (Unit 1 and Unit 2 combined) | | |

(1) To qualify for an Interim Operating Strategy option, the Permittee must demonstrate that $NO_x$ emissions from Unit 1, and $SO_2$ emissions from Unit 1 and Unit 2, did not exceed the emission limit specified for that IS option in Table 1 during the calendar year.

(2) By October 21 of each calendar year, the Permittee shall notify the Administrator and the Director of the applicable Interim Operating Strategy option for the calendar year in which the notification is given, except that for 2017, notification shall be given no later than December 5, 2017. This notification shall include the highest 30-boiler-operating-day average $NO_x$ emission rate for Unit 1, the highest 30-boiler-operating-day average $SO_2$ emission rate for Unit 1, and the highest 30-boiler-operating-day average $SO_2$ emissions for Unit 2 for each boiler-operating-day during the calendar year up to and not including the October 21 notification date.

(3) For each calendar year after selecting an Interim Operating Strategy option, the Permittee shall not allow $NO_x$ emissions from Unit 1 to exceed the emission rate associated with that option beginning on October 21 of the calendar year in which the strategy was selected through the end of the Unit 1 curtailment period. In the event the emissions limits are exceeded, the excess emissions provisions of Attachment A shall apply.

(4) For each calendar year after selecting an Interim Operating Strategy option, the Permittee shall not allow $SO_2$ emissions from Unit 1 or Unit 2 to exceed the emission rate associated with that option beginning on October 21 of the calendar year in which the strategy was selected through the end of the Unit 1 curtailment period. In the event the emissions limits are exceeded, the excess emissions provisions of Attachment A shall apply.

e. Beginning January 1, 2018, the Permittee shall not emit more than 1,970 combined tons of $SO_2$ from the stacks of Unit 1 and Unit 2 in any calendar year.

2. BART Alternative - Final Operating Strategy Requirements

a. Table 2 below lists the $NO_x$, $SO_2$, and $PM_{10}$ emission standards that Unit 1 and Unit 2 shall meet upon final implementation of a final BART Alternative Operating Strategy pursuant to Condition II.A.1 or II.A.2.

**Table 2: Final BART Alternative Operating Strategy**

| Final BART Alternative Operating Strategies | Unit 1 (lb/MMBtu) (30- boiler-operating-day average) | | | Unit 2 (lb/MMBtu) (30- boiler-operating-day average) | | | Annual Combined Unit 1 and Unit 2 $SO_2$ Cap (Tons/year) |
|---|---|---|---|---|---|---|---|
| | $NO_x$ | $SO_2$ | $PM_{10}$[1] | $NO_x$ | $SO_2$ | $PM_{10}$ | |
| OS-1 SCR Installation* | 0.065 | 0.060 | 0.033 | 0.080 | 0.060 | 0.030 | 1,970 |
| OS-2 Unit 1 Shutdown** | 0.00 | 0.00 | 0.00 | 0.080 | 0.060 | 0.030 | 1,080 (Unit 2 only) |

* SCR installation and operation no later than December 31, 2025. Unit 1 will be subject to a 0.033 total $PM_{10}/_{2.5}$ BACT limit in Condition II.C.2.
**Unit 1 shut down no later than December 31, 2025.
Notification of selection of the Final BART Alternative Operating Strategy shall be sent by SRP to EPA and ADEQ by December 31, 2022.
[1] $PM_{10}$ BART limits are based on filterable PM testing using method 5 as provided in Attachment B.

b. The date on which both Unit 1 and Unit 2 begin complying with the emission limits in Table 2, which shall be no later than December 31, 2025, shall be the "Final BART Alternative Compliance Date."

**E.** Air Pollution Control Requirements

1. *At all times during the operation of Unit 1 and until the SCR system is installed on Unit 1, the Permittee shall operate the low $NO_x$ burners and overfire air in a manner consistent with technological limitations, manufacturer's specifications, and good engineering and good air pollution control practices for minimizing emissions.*

[A.A.C. R18-2-306.A.2 and A.A.C. R-18-2-331.A.3.e]
[Material Permit Condition indicated by italics and underline]

2. *If OS-1 is selected, the Permittee shall install a SCR system on Unit 1 no later than December 31, 2025. At all times during the operation of Unit 1 after the SCR commences operation, the Permittee shall operate the SCR in a manner consistent with technological limitations, manufacturer's specifications, and good engineering and maintenance practices for minimizing emissions to the extent practicable.*

[A.A.C. R18-2-306.A.2 and A.A.C. R-18-2-331.A.3.c & e]
[Material Permit Condition indicated by italics and underline]

3. *At all times during the operation of Unit 2, the Permittee shall operate the low $NO_x$ burners, overfire air, and the SCR system in accordance with manufacturer's specifications and good engineering practices to minimize emissions to the extent practicable.*

[A.A.C. R18-2-306.A.2 and A.A.C. R-18-2-331.A.3.e]
[Material Permit Condition indicated by italics and underline]

4. *At all times, including during periods of startup, shutdown, and malfunction, the Permittee shall, to the extent practicable, maintain and operate each unit in a manner consistent with good air pollution control practices for minimizing emissions to the extent practicable.*

[A.A.C. R18-2-306.A.2 and A.A.C. R-18-2-331.A.3.e]
[Material Permit Condition indicated by italics and underline]

5. *The Permittee shall, at all times when Unit 1 and Unit 2 are operating, continuously operate the Wet Flue Gas Desulfurization systems and Hot Side Electrostatic Precipitators in accordance with manufacturer's specifications and good engineering practices to minimize emissions to the extent practicable.*

[A.A.C. R18-2-306.A.2 and A.A.C. R-18-2-331.A.3.e]
[Material Permit Condition indicated by italics and underline]

**F.** Compliance Determination Requirements

1. Oxides of Nitrogen ($NO_x$)

a. *At all times, the Permittee shall calibrate, maintain, and operate a continuous emissions monitoring system for monitoring $NO_x$ emissions in accordance with 40 CFR Part 75 requirements.*

[A.A.C. R18-2-306.A.3.c and A.A.C. R-18-2-331.A.3.c]
[Material Permit Condition indicated by italics and underline]

b. The Permittee shall demonstrate compliance with the $NO_x$ emission limitations specified in Condition II.D.1 or 2 (whichever is applicable) in accordance with the following procedure:

[A.A.C R18-2-306.A.3.c]

(1) Sum the total pounds of $NO_x$ emitted from each unit during the current boiler operating day and the immediately preceding twenty-nine (29) boiler operating days for that unit;

(2) Sum the total heat input to each unit, in MMBtu, during the current boiler operating day and the immediately preceding twenty-nine (29) boiler operating days for that unit; and

(3) Divide the total number of pounds of $NO_x$ emitted from each unit during the thirty (30) boiler operating days by the total heat input during the thirty (30) boiler operating days. A new 30-boiler-operating-day average $NO_x$ emission rate shall be calculated for each new boiler operating day. Each 30-boiler-operating-day average $NO_x$ emission rate shall include all emissions and all heat

input that occur during all periods within any boiler operating day, including emissions from startup, shutdown, and malfunction.

c. If a valid $NO_x$-pounds-per-hour value or a valid heat input value is not available for any hour for a unit in a given boiler operating day, the $NO_x$-pounds-per-hour value or the heat input value (as the case may be) for that hour shall not be used in the calculation of the 30-boiler-operating-day average.

[A.A.C R18-2-306.A.3.c]

d. The Permittee shall maintain records of the 30-boiler-operating-day average $NO_x$ emission rate for each unit for each boiler operating day.

[A.A.C R18-2-306.A.3.c]

2. Sulfur Dioxide ($SO_2$)

a. *At all times, the Permittee shall calibrate, maintain, and operate a continuous emissions monitoring system for monitoring $SO_2$ emissions in accordance with 40 CFR Part 75 requirements.*

[A.A.C. R18-2-306.A.3.c and A.A.C. R-18-2-331A.3.c]
[Material Permit Condition indicated by italics and underline]

b. The Permittee shall demonstrate compliance with the $SO_2$ emission limitations specified in Condition II.D.1.b or Condition II.D.2.a (whichever is applicable) in accordance with the following procedure:

[A.A.C R18-2-306.A.3.c]

(1) Sum the total pounds of $SO_2$ emitted from each unit during the current boiler operating day and the immediately preceding twenty-nine (29) boiler operating days for that unit.

(2) Sum the total heat input from each unit, in MMBtu, during the current boiler operating day and the immediately preceding twenty-nine (29) boiler-operating days for that unit.

(3) Divide the total number of pounds of $SO_2$ emitted from each unit during the thirty (30) boiler operating days by the total heat input during the thirty (30) boiler operating days. A new 30-boiler-operating-day average $SO_2$ emission rate shall be calculated for each new boiler operating day. Each 30-boiler-operating-day average $SO_2$ emission rate shall include all emissions and all heat input that occur during all periods within any boiler operating day, including emissions from startup, shutdown, and malfunction.

c. In determining the 30-boiler-operating-day average $SO_2$ emission rate, the Permittee shall use CEMS in accordance with the procedures of 40 CFR Part 75 except for the following, as to which the Permittee shall follow 40 CFR Part 63.10010(e)(4) and (f):

[A.A.C R18-2-306.A.3.c]

(1) $SO_2$ emissions data shall not be bias adjusted,

(2) The missing data substitution procedures from 40 CFR Part 75

shall not apply, and

(3) Diluent capping (i.e., 5% $CO_2$) will be applied to the $SO_2$ emission calculation for any hours where the measured $CO_2$ concentration is less than 5% following the procedures in 40 CFR Part 63.10007(f).

d. If a valid $SO_2$ pounds per hour value or a valid heat input value is not available for any hour for a unit in a given boiler operating day, the $SO_2$ pounds per hour value or the heat input value (as the case may be) for that hour shall not be used in the calculation of the 30-boiler-operating-day average.

[A.A.C R18-2-306.A.3.c]

e. The Permittee shall maintain records of the 30-boiler-operating-day average $SO_2$ emission rate for each unit for each boiler -operating day.

f. The Permittee shall demonstrate compliance with the $SO_2$ emission limitation specified in Condition II.D.1.e by daily summing the total tons of $SO_2$ emitted from each unit during the current calendar year.

3. Particulate Matter

a. If OS-1 is selected, within 180 days after installation and commencing commercial operation of a SCR system on Unit 1, the Permittee shall conduct a performance test to determine compliance with the total particulate matter emission limitation established in Condition II.C.2 using EPA Method 5, in 40 CFR part 60, Appendix A-3, and Method 202 in 40 CFR Part 51- Appendix M, and/or other approved alternative test methods. Thereafter, the tests shall be conducted annually.

[A.A.C R18-2-306.A.3.c and A.A.C. R18-2-312]

b. A test protocol shall be submitted to EPA and ADEQ a minimum of 30 days prior to the scheduled testing. The protocol shall identify which method(s) will be used to demonstrate compliance.

[A.A.C R18-2-306.A.3.c and A.A.C. R18-2-312]

c. Each test shall consist of three runs, with each run at least 120 minutes in duration and with each run collecting a minimum sample of 60 dry standard cubic feet. Results shall be reported in lb/MMBtu using the calculation in Method 19 in 40 CFR Part 60 Appendix A-7.

[A.A.C R18-2-306.A.3.c and A.A.C. R18-2-312]

4. Sulfuric Acid ($H_2SO_4$) Mist

[A.A.C. R18-2-312]

a. If OS-1 is selected, within 180 days after installation and commencing commercial operation of a SCR system on Unit 1, the Permittee shall conduct performance tests using EPA Conditional Test Method 13 (CTM-13) or an approved alternative test method, to show compliance with the emission limit in Condition II.C.3. Thereafter, the tests shall be conducted annually.

b. If the Permittee requests approval of an alternative test method, the Permittee must submit its request for approval to the Director at least 60 days prior to commencing the test program. The Permittee must notify the Director at least 30 days prior to commencing the test program and shall submit the test report to the Director within 60 days after completing the test program.

**G.** Monitoring Requirements

1. *At all times, the Permittee shall calibrate, maintain, and operate CEMS, in full compliance with the requirements of 40 CFR Part 75, to accurately measure $SO_2$, $NO_x$, diluent, and stack gas volumetric flow rate from each unit.*

[A.A.C R18-2-306.A.3.c and A.A.C R-18-2-331A.3.c]
[Material Permit Condition indicated by italics and underline]

2. All valid CEMS hourly data shall be used to determine compliance with the emission limitations for $NO_x$ and $SO_2$ in Condition II.D.

[A.A.C R18-2-306.A.3.c]

**H.** Recordkeeping Requirements

[A.A.C. R18-2-306.A.3.c]

The Permittee shall maintain the following records for five years:

1. All CEMS data including the date, place, and time of sampling or measurement; parameters sampled or measured; and results.

2. Daily 30-boiler-operating-day average emission rates for $NO_x$ and $SO_2$, when applicable, for each unit calculated in accordance with Conditions II.F.1 and 2.

3. Records of quality assurance and quality control activities for emissions measuring systems, including, but not limited to. Any records required by 40 CFR Part 75.

4. Records of the relative accuracy test for hourly $NO_x$ and $SO_2$ lb/hr measurement and hourly heat input measurement.

5. Records of all major maintenance activities conducted on emission units, air pollution control equipment, and CEMS.

6. Any other records required by 40 CFR Part 75.

7. Records of annual $SO_2$ emissions from Units 1 and 2.

**I.** Reporting Requirements

[A.A.C. R18-2-306.A.3.c]

All reports shall be submitted to ADEQ and the EPA.

1. The owner/operator shall notify the Administrator and the Director within ten (10) business days after completion of any installation of a Selective Catalytic Reduction system on Unit 1 subject to this section.

2. Within 30 days after the end of every calendar quarter, the Permittee shall submit

a report that lists the daily 30-boiler-operating-day average emission rates for $NO_x$ and $SO_2$ for each unit calculated in Conditions II.F.1.b and II.F.2.b, respectively, and $SO_2$ annual emissions calculated in Condition II.F.2.f.

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# APPENDIX C

# Technical Supporting Document for Permit Revision to the Salt River Project Coronado Generating Station

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ADEQ Arizona Department of Environmental Quality

# TECHNICAL SUPPORT DOCUMENT

**TECHNICAL REVIEW AND EVALUATION**
**OF APPLICATION FOR**
**AIR QUALITY SIGNIFICANT REVISION NO. 63088**
**TO OPERATING PERMIT NO. 64169**

**Salt River Project Agricultural Improvement and Power District – Coronado Generating Station**

## I. INTRODUCTION

This Significant Permit Revision No. 63088 to Operating Permit No. 64169 is issued to the Salt River Project (SRP) – Coronado Generating Station (CGS). CGS consists of two coal-fired electric generating units, Units 1 and 2, which are subject to the Best Available Retrofit Technology (BART) requirements of the Clean Air Act. The Arizona Department of Environmental Quality (ADEQ) is approving an alternative to $NO_x$ BART requirements ("BART Alternative") established by the Environmental Protection Agency (EPA) as a revision to the Regional Haze Program State Implementation Plan (SIP). This Significant Permit Revision incorporates two BART Alternative operating strategies (OS) into Operating Permit No. 52639.

- Operating Strategy 1 (OS-1): Install and commence operation of a Selective Catalytic Reduction (SCR) System on Unit 1 by December 31, 2025; or

- Operating Strategy 2 (OS-2): Shut down Unit 1 by December 31, 2025.

For the period starting December 5, 2017, and ending no later than December 31, 2025, both BART Alternative operating strategies will include a Unit 1 interim operating strategy (IS) that will involve three seasonal curtailment options for Unit 1. These options entail varying durations of curtailment of Unit 1 and are dependent on the demonstrated $NO_x$ emissions rate of Unit 1 and the demonstrated $SO_2$ emissions rates of Unit 1 and Unit 2. In connection with the SIP revision, SRP has conducted visibility modeling to demonstrate that the BART Alternative represents an improvement in visibility in Class I areas over the BART required by the current Regional Haze SIP and 2016 EPA BART Reconsideration.[1]

In addition, this Significant Permit Revision constitutes a Prevention of Significant Deterioration construction permit for the installation of a SCR on Unit 1, if BART Alternative OS-1 is selected.

### A. Company Information

| | |
|---|---|
| Facility Name: | SRP – Coronado Generating Station |
| Mailing Address: | PO Box 52025, PAB 352, Phoenix, AZ 85072-2025 |
| Facility Location: | Six miles northeast of St. Johns off U.S. Highway 191<br>St. Johns, AZ 85936 |

[1] 81 FR 21735, April 13, 2016.

**B.** Attainment Classification

SRP's Coronado Generating Station is located in an area that is designated unclassifiable or attainment for all National Ambient Air Quality Standards (NAAQS) for which final designations have been made.

## II. BACKGROUND

On February 28, 2011, the Arizona Department of Environmental Quality (ADEQ) submitted to the Environmental Protection Agency (EPA) the state's initial Regional Haze SIP for the first planning period of the regional haze program. This submission included BART determinations for CGS Unit 1 and Unit 2.

EPA published its notice of final rulemaking approving Arizona's $SO_2$ and $PM_{10}$ BART determinations, disapproving Arizona's $NO_x$ BART determinations, and establishing a $NO_x$ BART Federal Implementation Plan (FIP) for Units 1 and 2, the two BART-eligible electric generating units at CGS, on December 5, 2012. The FIP imposed a $NO_x$ emission limit of 0.065 pounds per million British thermal units applicable across both units on a 30-boiler-operating-day average basis, with a final compliance date of December 5, 2017. The rule also required SRP to install a SCR system on Unit 1 by the compliance date of December 5, 2017. Unit 2 is already equipped with SCR (commenced operation in 2014) through a consent decree (CD) between SRP and EPA.

In February 2013, SRP filed with EPA a petition for administrative reconsideration of the $NO_x$ BART determination in the FIP. EPA granted this petition in part and thereafter prepared and proposed a revised $NO_x$ BART FIP, which, after notice-and-comment rulemaking, was published as a final rule in the Federal Register on April 13, 2016. This EPA action revised the $NO_x$ limit for Unit 1 to 0.065 lb/MMBtu and for Unit 2 to 0.080 lb/MMBtu, with both limits to be met on a 30-boiler-operating-day average, and maintained the initial compliance date of December 5, 2017.

EPA released its proposed Carbon Pollution Emission Guidelines for Existing Electric Utility Generating Units, commonly referred to as the Clean Power Plan (CPP), in June 2014. EPA published this rule in final form in October 2015. The final rule gave states until September 2018 to submit final plans outlining how they will meet the requirements set forth by EPA in the final CPP. On February 9, 2016, the U.S. Supreme Court granted a stay of the CPP, halting implementation of the CPP pending the resolution of legal challenges to the program in court. This action has created uncertainty for SRP with respect to the nature and timing of its CPP compliance obligations for the CGS units.

## III. REVISION DESCRIPTION

Effectiveness of this permit revision is contingent on approval of ADEQ's SIP revision as part of the Regional Haze SIP for Arizona and will be effective on the date of final action by EPA, provided that such final EPA action also revokes or rescinds EPA's FIP (published at 77 FR 72511 on Dec. 5, 2012, and the reconsideration published in the Federal Register on April 13, 2016), insofar as that FIP establishes $NO_x$, $SO_2$, and $PM_{10}$ emission limits or other requirements for the CGS units.

**A.** Regional Haze Requirements (RHR):

The BART Alternative for CGS Unit 1 consists of two alternative operating strategies. These BART Alternative Operating Strategies comprise an interim operating strategy followed by either installation of SCR on Unit 1 or permanent cessation of operation of Unit 1 (either alternative to be implemented no later than December 31, 2025).

1. BART Alternative Operating Strategy-1 (OS-1): Seasonal Curtailments followed by SCR on Unit 1

   This operating strategy comprises of three interim operating strategies (IS) that employs seasonal curtailment periods of Unit 1 followed by installation of a SCR system on Unit 1 no later than December 31, 2025 to achieve a $NO_x$ limit of 0.065 lb/MMBtu on a 30-boiler-operating-day average. These three IS options (IS 2, IS 3, and IS 4) involve a reduction in the $SO_2$ emission rate at both Unit 1 and Unit 2. One of the interim operating strategies (IS4) also includes a $NO_x$ emission rate below the permit limit for Unit 1. In each option ~~year~~, the length of the required curtailment period for Unit 1 is dependent on the $NO_x$ emissions rate performance of Unit 1 and on the $SO_2$ emissions rate performance of both Unit 1 and Unit 2.

2. BART Alternative Operating Strategy-2 (OS-2): Seasonal Curtailments followed by Unit 1 Shutdown No Later than 2025

   Under this BART Alternative operating strategy, the IS's described above (IS2, IS3, and IS4) are followed until permanent cessation of operation of Unit 1, which must occur no later than December 31, 2025.

3. BART-Alternative Implementation Schedule

   The BART Alternative will take effect on the compliance date established by EPA's BART FIP, i.e., December 5, 2017. On this date, SRP will begin compliance with one of the three seasonal curtailment options under the IS based on CGS emissions performance between January 1, 2017 and October 20, 2017. The three curtailment options are listed in Table 1 below.

**Table 1: Seasonal Curtailment Options for Unit 1 Interim Operating Strategy**

| Strategies | Unit 1 | | Unit 2 | Unit 1 Curtailment Period |
|---|---|---|---|---|
| | (lb/MMBtu) (Highest 30-boiler-operating-day average) | | | |
| | $NO_x$ | $SO_2$ | | |
| IS 2 | 0.320 | 0.060 | 0.060 | Oct. 21 to Jan. 31 |
| IS 3 | 0.320 | 0.050 | 0.050 | Nov. 21 to Jan. 20 |
| IS 4 | 0.310 | 0.060 | 0.060 | Nov. 21 to Jan. 20 |
| IS 2, IS 3, and IS 4 | | 1,970 tons of $SO_2$ per year | | |

Once Arizona has in place a final approved CPP plan, (if CPP takes effect and is implemented), SRP will finalize its choice (no later than December 31, 2022 regardless of CPP status) of BART Alternative Operating Strategy and notify EPA and ADEQ.

a. OS-1 – Under the first BART Alternative Operating Strategy, SRP will install a SCR system on Unit 1 that achieves a $NO_x$ emission limit at that unit of 0.065 lb/MMBtu on a 30-boiler-operating-day average no later than December 31, 2025. Under this operating strategy, this commitment will provide visibility improvement compared to the BART control strategy,

followed by an indefinite number of years of operation with the same NOx emissions limitations for Unit 1 as the 2016 EPA BART Reconsideration and more stringent $SO_2$ emissions limitations for both units than those in the existing EPA-approved SIP.

Installation of the SCR system on Unit 1 ("SCR Project" or "Project") will result in significant increases in emissions of three regulated NSR pollutants: $PM_{10}$, $PM_{2.5}$, and sulfuric acid mist (abbreviated herein and in the permit revision as $H_2SO_4$). Therefore, the SCR Project at Unit 1 is a major modification under prevention of significant deterioration (PSD) and is subject to PSD review for $PM_{10}$, $PM_{2.5}$, and $H_2SO_4$ under A.A.C. R18-2-406. Table 2 below shows the projected increase in emissions from Unit 1.

**Table 2: Increase in Emissions Due to SCR System on Unit 1**

| Pollutant | Baseline Actual Emissions | Projected Actual Emissions | Excluded * Emissions | Project Emissions Increase | Significant Emission Rate |
|---|---|---|---|---|---|
| | Tons per year | | | | |
| $NO_x$ | 4,986.8 | 1,226.6 | NA | -3,760.2 | 40 |
| PM | 132.8 | 169.8 | 37.1 | 0.0 | 25 |
| $PM_{10}$ | 171.4 | 622.7 | 364.5 | 86.8 | 15 |
| $PM_{2.5}$ | 171.4 | 622.7 | 364.5 | 86.8 | 10 |
| $H_2SO_4$ | 6.7 | 94.4 | 0.8 | 86.8 | 7 |

* These excluded emissions are the emissions that could have been accommodated from Unit 1.

b. OS-2 – Under the second BART Alternative Operating Strategy, SRP will permanently shut down Unit 1 no later than December 31, 2025. The interim operating strategy will be required until the date Unit 1 shuts down.

**B.** Best Available Control Technology (BACT) Analysis for SCR Project under OS-1

This section presents a summary of the methodology used and the results obtained while determining BACT for $PM_{10}$, $PM_{2.5}$, and $H_2SO_4$ emissions resulting from the Unit 1 SCR Project. The BACT determinations are supported by a complete BACT analysis contained in Appendix "F" of the permit application. As summarized below, the Department agrees with the analysis performed and the conclusions reached by SRP.

As discussed in Section III.C herein, in the event that the construction of the SCR does not commence within 3 years of issuance of this permit revision, SRP shall submit a significant revision application containing an updated BACT analysis at least 18 months but no more than 24 months prior to the expected start of construction of the SCR system that demonstrates that the emission limits still represent BACT for $PM_{10}$, $PM_{2.5}$, and $H_2SO_4$.

**General**

"Best available control technology" (BACT) means an emission limitation, including a visible emissions standard, based on the maximum degree of reduction for each regulated New Source Review (NSR) air pollutant that would be emitted from any proposed major

source or major modification, taking into account energy, environmental, and economic impact and other costs, determined by the Director in accordance with R18-2-406(A)(4) to be achievable for such source or modification.

The Department generally uses a "top-down" procedure when making BACT determinations. This procedure is designed to ensure that each determination is made consistent with the two core criteria for BACT: consideration of the most stringent control technologies available, and a reasoned justification, considering energy, environmental and economic impacts and other costs, of any decision to require less than the maximum degree of reduction in emissions. The framework for the top-down BACT analysis procedure used by the Department comprises five key steps as follows:

- Identify all control options;
- Eliminate technically infeasible control options;
- Characterize control effectiveness of technically feasible control options;
- Evaluate more effective control options; and
- Select BACT.

1. $H_2SO_4$ BACT Analysis

The majority of the fuel sulfur combusted in a coal-fired boiler leaves the boiler as sulfur dioxide ($SO_2$). During combustion, a small percentage of the fuel sulfur is further oxidized to sulfur trioxide ($SO_3$). The oxidation of $SO_2$ to $SO_3$ will increase when the SCR catalyst is used for $NO_x$ control.

A fraction of the $SO_3$ in the flue gas stream reacts with water vapor to form sulfuric acid ($H_2SO_4$). The flue gas temperature decreases as it passes through the air heater and pollution control systems. When the flue gas temperature drops below the acid dew point, a fraction of the gaseous $H_2SO_4$ condenses into an aerosol. Thus, the resulting emissions include three related constituents: gaseous $SO_3$, gaseous $H_2SO_4$, and aerosol $H_2SO_4$. The total emissions rate for the regulated NSR pollutant named "sulfuric acid mist" is the sum of the emissions rates for these three constituents, reported as $H_2SO_4$.

Guidance documents and technical papers regarding $H_2SO_4$ emissions from coal-fired electric generating units have $H_2SO_4$ emission concentrations covering a wide range from 0.03 to 14 parts per million volume (ppmv) at 3% oxygen. For example, an EPA document recommends using a $H_2SO_4$ emission concentration of 3 to 7 ppmv for coal with a sulfur content of 0.5% or less, and a concentration of 14 ppmv for coal with a sulfur content of 1.0%. EPA's AP-42 document states that about 0.7% of fuel sulfur is emitted as $SO_3$. For CGS Unit 1, a coal sulfur content of 1.6 pounds of $SO_2$ per million Btu (lb $SO_2$/MMBtu) would result in an $H_2SO_4$ emission rate of 0.017 lb/MMBtu or 6 ppm.

There are other factors that affect the $H_2SO_4$ emission rate exiting the stack. Factors that can increase emissions of $H_2SO_4$ include SCR and flue gas conditioning using $SO_3$. Factors reducing emissions of $H_2SO_4$ include particulate matter removal devices, air heater deposition, reagent injection, flue gas conditioning using ammonia, ammonia slip from the SCR, coal ash alkalinity, and FGD systems. CGS Unit 1 currently burns approximately 60 to 100% Powder River Basin (PRB) coal with a highly alkaline fly ash and a hot-side electrostatic precipitator (ESP),

conventional air heater, and wet flue gas desulfurization (WFGD) system. The Project under consideration would add an SCR system to the unit which would increase $H_2SO_4$ emissions. With the addition of the SCR system, it is estimated that the post-SCR $H_2SO_4$ emission rates would range from 0.003 to 0.019 lb/MMBtu, depending on the formation of $SO_3$ by the boiler for various coals, an SCR $SO_2$-to-$SO_3$ conversion rate of 0.5%, and the reductions afforded by the hot-side ESP, air heater, and WFGD system.

a. Step 1: Identify all potential control technologies

Until about ten years ago, the only control options identified in the RACT/BACT/LAER Clearinghouse (RBLC) database for the control of $H_2SO_4$ from coal-fired boilers were the controls used for controlling particulate matter and $SO_2$. These included WFGD or dry flue gas desulfurization (DFGD) systems, and ESPs or fabric filters (FF) used for PM control. $H_2SO_4$ is controlled in both WFGD and DFGD systems through mechanisms similar to $SO_2$ control. $H_2SO_4$ also tends to adsorb onto fly ash particles as the flue gas cools and is collected by the PM controls.

In the last ten years, several new pulverized coal (PC) units burning moderate to high sulfur coals were permitted with the use of wet electrostatic precipitators (WESP) and reagent injection systems for $H_2SO_4$ control. Reagent injection systems for $H_2SO_4$ control identified in RBLC database include: sorbent injection (SI), spray dryer absorber (SDA), and hydrated lime injection (HLI). These systems use lime as the sorbent.

Another technology identified in RBLC database for the control of $H_2SO_4$ is the use of ultra-low activity (ULA) SCR. Catalysts used in SCR systems can be formulated in ways that reduce the oxidation of $SO_2$ to $SO_3$. Oxidation rates for SCR catalysts range from 0.3% to 3%. For example, the CGS Unit 2 SCR catalyst oxidation rate is guaranteed ≤ 0.5%. SRP intends to include ULA SCR catalyst as part of the SCR design for CGS Unit 1.

The amount of $H_2SO_4$ generated is a function of combustion gas $SO_2$ concentration. $H_2SO_4$ formation can be reduced by firing lower sulfur content coals. The following control options are potentially applicable for the control of $H_2SO_4$ emissions:

- Coal switching – burning 100% of very low sulfur coals (i.e., PRB coal);
- Coal washing – reducing coal ash and sulfur content; and
- Coal processing – mixing the coal with chemicals that break the sulfur away from the coal molecules.

The following control technologies can potentially be used to reduce $H_2SO_4$ emissions in addition to the existing CGS Unit 1 control systems (PRB coal, hot-side ESP, and WFGD):

- Coal Switching, Washing, and Processing

- Flue Gas Conditioning
- Reagent/Sorbent Injection Systems
  - Calcium-based reagent injection
  - Sodium-based reagent injection
  - Hydrated lime injection (HLI)
- Wet Electrostatic Precipitation

b. Step 2: Identify Technically Feasible Control Technologies

As discussed in Step 1, $H_2SO_4$ emissions can be controlled to varying degrees using PM and FGD control systems and low sulfur coals. CGS Unit 1 is already well controlled for PM, $SO_2$, and $H_2SO_4$ by the following systems in place: 60 to 100% PRB coal, hot-side ESP, and WFGD. The use of ultra-low activity SCR catalyst is an inherent part of the proposed Project. Additional $H_2SO_4$ controls that are potentially applicable include:

- Coal Switching, Washing, and Processing;
- Flue Gas Conditioning;
- Reagent/Sorbent Injection; and
- Wet Electrostatic Precipitation.

The following discussion identifies which of these control options are technically feasible and available.

(1) Coal Switching, Washing, and Processing

Fuel switching to a lower sulfur coal can be one option for reducing emissions of $H_2SO_4$. CGS Unit 1 currently fires sub-bituminous blends, but has historically used bituminous and sub-bituminous coals, and may continue to do so in the future. Western bituminous coal has sulfur concentrations ranging from 1.0% to 1.5% with a heating value range of 9,200 to 12,000 British thermal unit (Btu) per pound. Sub-bituminous/ PRB coal has sulfur concentrations below 0.5% with a heating value range of 8,000 to 8,600 Btu per pound. Switching to 100% PRB subbituminous coal could potentially reduce boiler $SO_3$ emissions. Currently, CGS Unit 1 burns 60% to 100% PRB coal. The decision of the type and amount of coal to burn is very complex. The reliability of PRB deliveries is a legitimate and significant concern. In order to minimize potential issues associated with dependable fuel delivery and to ensure economical long-term supply of fuel, CGS must keep the option to use western bituminous coals. Thus switching to 100% PRB subbituminous coal is not considered an available $H_2SO_4$ control option.

Coal washing, or beneficiation, is one pre-combustion method that has been used to reduce impurities in the coal (i.e., ash and sulfur). In general coal washing is accomplished by separating and removing inorganic impurities from organic coal particles. For economic reasons, coal washing occurs at the mine in order to reduce the cost of shipping the waste rock and to provide a disposal area for the waste rock. To date, no commercial coal

washing plants have been built to wash western coals. Therefore, washing coal as a strategy to reduce $H_2SO_4$ emissions is not considered an available control option.

(2) Flue Gas Conditioning

Flue gas conditioning refers to the addition of water or chemicals to the flue gas in order to modify properties of fly ash or other particulate matter that improves the collection efficiency of the ESP or WFGD. A conditioning agent may influence the ESP collection efficiency through one or more of the following mechanisms:

- adsorbing on the surface of fly ash to reduce surface resistivity;
- adsorbing on the fly ash to change the adhesion and cohesion properties of the ash;
- increasing ultrafine particle concentrations for space charge enhancement;
- increasing the electrical breakdown strength of the flue gas,
- increasing the mean particle size; and
- changing the acid dew point in the flue gas.

Many chemicals and water have been used as conditioning agents at power plants, most common being $SO_3$ and ammonia ($NH_3$). The injection of $SO_3$ increases the amount of $SO_3$ in the flue gas and as a result are not technically feasible controls for $SO_3$. Humidification adds water upstream of the WFGD to slowly cool the flue gas below its acid dew point and thereby condense large acid droplets. The WFGD more effectively captures larger acid droplets. However, humidification upstream of the WFGD may cause fly ash dropout in the ductwork resulting in corrosion or choking of equipment near the WFGD inlet. This process has not been demonstrated on coal- fired boilers equipped with WFGD. Therefore, humidification is not considered a technically feasible $H_2SO_4$ control option.

Ammonia and dry alkali injection are discussed in the following subsection.

(3) Reagent/ Sorbent Injection

Reagent/sorbent injection systems use chemicals such as ammonia, sodium bisulfite ($NaHSO_3$) or lime (CaO) to react with $SO_3$ to form sulfate byproducts. Most of the reagent injection technologies react with $SO_3$ or $H_2SO_4$ to form a solid particle which is then collected by downstream particulate control systems or WFGD systems.

One sorbent injection system injects a solution of sodium bisulfite upstream in the flue gas. This reagent reduces $SO_3$ to $SO_2$ so that the sulfur dioxide may be collected in the WFGD system. Sulfur

trioxide is removed according to the following general equation:

$SO_3 + NaHSO_3 \rightarrow NaHSO_4 + SO_2$

Reagent injection with $NH_3$ has achieved $SO_3$ reductions greater than 90%.

One major factor with the application of some reagent injection technologies is the injection must be before a PM control device. Most coal-fired utility boilers have cold side ESPs or fabric filters. As a result, the injection of reagent will be ahead of the PM control device. However, as is the case with CGS Unit 1, some boilers are equipped with hot-side ESPs. In order to control the $H_2SO_4$ generated by the installation of the SCR system, the reagent injection would have to be before the WFGD system. As a result, the solid byproducts of the reagent injection system would have to be captured by the CGS Unit 1 WFGD system.

All of the reagent injection technologies increase the amount of PM in the flue gas. Reagent injection technologies that inject a solid reactant (lime, sodium bicarbonate, etc.) increase the PM loading due to the solids injected. Reagent injection technologies that inject a gas or liquid reactant increase the PM loadings due to the reaction product (ammonium sulfates, $NaHSO_4$, etc.). These solids are fine particulates, less than 2.5 μm, and are not easily removed by WFGD systems. Typically, WFGD systems only remove 50% to 60% of $PM_{10}$.

(4) Wet Electrostatic Precipitators

The principle of operation of a WESP is similar to a dry ESP. Particulate matter in the flue gas is exposed to an electric field which induces a charge on the particle which is then drawn to an oppositely charged collection electrode. However, in a WESP, the flue gas is cooled near or below the dew point and consequently PM may be present as either solid or liquid particles. For large flue gas flow applications, plate type WESPs are most commonly used. Recently membrane-type WESPs have been commercially demonstrated at industrial scale and have been pilot tested on coal/coke-fired boiler flue gas. Each of these types is discussed below.

(a) Conventional WESP

Conventional WESPs have been reported to provide significant control of filterable (solid and liquid) PM. The EPA Air Pollution Control Technology Fact Sheet for conventional WESPs reports filterable $PM_{2.5}$ control efficiencies of 90.0 to 99.2% for various industrial applications.

(b) Membrane WESP

Membrane WESPs use the same electrostatic principles used in conventional WESPs, but they utilize polypropylene membranes rather than steel plates as collection surfaces. The membrane collectors are made of corrosion-resistant fibers. Capillary action between the fibers maintains an even distribution of water throughout the membrane. In addition to flushing collected particles, the water acts as the charge-carrying electrode. These attributes of membrane WESPs avoid issues with plate-type WESPs such as: field disruptions that occur due to spraying (misting) of water, and formation of dry spots (channeling) that causes collector surface corrosion and reduced collector efficiency.

(c) WESP Performance Summary

WESPs are expected to be effective in controlling $H_2SO_4$ emissions at saturated flue gas conditions. When used in conjunction with WFGD systems and high sulfur fuels, WESPs are very effective at reducing $H_2SO_4$ mist. However, WESP systems have only been required for PC fired boilers firing high percentages of medium to high sulfur bituminous coals or petroleum coke and equipped with WFGD systems for $SO_2$ control. In these medium to high sulfur fuel applications, $H_2SO_4$ concentrations leaving the WFGD system may be as high as 10 to 40 ppm, or 0.03 to 0.12 lb/MMBtu. WESP control efficiencies when applied to boiler flue gases with high concentrations of $H_2SO_4$ are on the order of 90%.

While the use of a WESP system is technically feasible for application at CGS Unit 1, there are no WESP demonstrations that indicate the use of WESP on units that fire a significant percentage of subbituminous coal would reduce emissions by a quantifiable amount below the levels which can be achieved without a WESP system. Recent stack testing at CGS Unit 2, which was retrofit with an SCR system in 2014, measured $H_2SO_4$ emissions as 0.002 lb/MMBtu without the application of any $H_2SO_4$ controls. This $H_2SO_4$ level is lower than most of the $H_2SO_4$ permit limits in the RBLC database.

c. STEP 3. Rank the Technically Feasible Control Technologies

Based on the Step 2 analysis, the following $H_2SO_4$ controls are considered technically feasible and available: reagent injection and WESP. Based on the RBLC database, permitted operational units with WESPs have a BACT range from 0.005 lb/MMBtu to 0.01 lb/MMBtu for $H_2SO_4$ emissions and those with reagent injection technologies range from 0.005 lb/MMBtu to 0.027 lb/MMBtu. Currently, CGS Unit 2 has a $H_2SO_4$ emissions limit of 0.006 lb/MMBtu without any specific $H_2SO_4$ emission controls. Recent stack testing at CGS Unit 2, which was retrofit with an

SCR system in 2014, measured $H_2SO_4$ emissions as 0.002 lb/MMBtu. Since CGS Units 1 and 2 are similar (except that Unit 2 is equipped with SCR), it is assumed for baseline purposes that the emissions from CGS Unit 1 will be similar to the CGS Unit 2 permit limit after the installation of SCR on CGS Unit 1. It is assumed that the application of WESP or reagent injection can lower $H_2SO_4$ emissions to 0.0005 lb/MMBtu (90% reduction).

d. STEP 4. Evaluate the Most Effective Controls

Based on the Step 3 discussion, the maximum achievable emission reduction is based on reducing $H_2SO_4$ emissions from 0.005 lb/MMBtu (1.7 ppm) down to 0.0005 lb/MMBtu (0.17 ppm) using either a WESP or reagent injection. The following identify the BACT impacts (environmental, economic and energy) of WESP and reagent injection technologies.

(1) Reagent Injection

Pilot scale and full-scale testing and commercial operation have confirmed that up to 90% or greater $SO_3$ control efficiency is possible with several different sorbents, including ammonia and SBS™. Control efficiency performance with other sorbents is somewhat lower at 70% to 90%. Table 3 provides the environmental, economic, and energy impacts for reducing $H_2SO_4$ emissions by 70% and 90% using reagent injection technologies. The environmental, economic, and energy impacts are discussed in the following subsections.

**Table 3: Summary of $H_2SO_4$ BACT Impacts for Reagent Injection**

| Parameter | WFGD Baseline | Reagent Injection at 90% Control | Reagent Injection at 70% Control |
|---|---|---|---|
| Boiler Heat Input, MMBtu/hour (HHV) | 4,719 | | |
| Flue Gas From FGD, scfm | 1,097,387 | | |
| Unit Gross Generation, kW | 456,000 | | |
| Controlled Emission Rate, lb/MMBtu | 0.005 | 0.0005 | 0.0015 |
| Potential $H_2SO_4$ Emissions, tons/year | 103 | 10 | 31 |
| Total Capital Requirement, $ | n/a | $6,840,000 | $6,840,000 |
| Capital Recovery Factor (CRF) | n/a | 0.0944 | 0.0944 |
| Annual Capital Cost, $/yr | n/a | $646,000 | $646,000 |
| Annual O&M Cost, $/yr | n/a | $46,000 | $35,000 |
| Total Annual Cost, $/yr | n/a | $692,000 | $681,000 |
| Emission Reductions relative to Baseline, tons/year | 0 | 93 | 72 |
| Average Cost Effectiveness, $/ton | n/a | $7,440 | $9,414 |

(a) Environmental Impacts

The primary environmental impact of reagent injection is the reduction in $H_2SO_4$ emissions from 0.005 lb/MMBtu to 0.0015 lb/MMBtu for 70% control, and to 0.0005 lb/MMBtu for 90% control. Reagent injection would reduce $H_2SO_4$ emissions by 72 tons for 70% control and 93 tons for 90% control. On the negative side, with reagent injection systems there will be a small increase in plant solid waste and a potential increase in PM emissions from the WFGD stack.

Additionally, as discussed above, the use of reagent injection systems to control $H_2SO_4$ emissions will result in an increase in $PM_{2.5}$. The CGS Unit 1 WFGD may capture 50 to 60% of the $PM_{2.5}$, with the remainder being emitted from the WFGD stack. This collateral increase in $PM_{2.5}$ along with the undemonstrated status of reagent injection on boilers firing low-sulfur, alkaline ash coals makes the use of reagent injection systems infeasible as BACT for technical and environmental impact reasons for CGS Unit 1.

(b) Economic Impacts

The addition of a reagent injection system before the WFGD system would have a negative economic impact (Unit is equipped with ESP and WFGD that are considered the baseline for the analysis). The capital costs of retrofitting a reagent injection system before the WFGD system is estimated at $6.8 million based on an average cost of $15 per kilowatt. The total annual cost of approximately $0.68 million per year is based on:

- A capital recovery factor of 0.0944 (20-year life and 7% societal cost of money per U.S. EPA guidance); and
- Annual operating and maintenance cost of $600 per ton of SO3 removed.

Table 3 above shows that the incremental cost effectiveness of adding a reagent injection system before the existing WFGD is greater than $7,400 per ton of $H_2SO_4$ reduced. This is a high cost of control and is not economically feasible as BACT.

(c) Energy Impacts

The application of a retrofit reagent injection would result in a small increase in power requirements for the injection

system pumps (for liquids injection) or air compressors (for solids injection).

(2) Wet Electrostatic Precipitators

Table 4 below presents the environmental, economic, and energy impacts for reducing $H_2SO_4$ emissions by 90% using a WESP, and the results are discussed in the following subsections.

**Table 4: Summary of $H_2SO_4$ BACT Impacts for Wet ESP Addition after WFGD System**

| Parameter | WFGD-Baseline | WFGD Plus WESP |
|---|---|---|
| Boiler Heat Input, MMBtu/hour (HHV) | 4,719 | |
| Flue Gas From FGD, scfm | 939,868 | |
| Unit Gross Generation, kW | 456,000 | |
| Controlled Emission Rate, lb/MMBtu | 0.005 | 0.0005 |
| Potential H2SO4 Emissions, tons/year | 103 | 10 |
| WESP Total Capital Requirement, $ | n/a | $29,112,000 |
| Capital Recovery Factor (CRF) | n/a | 0.0944 |
| Annual Capital Cost, $/yr | n/a | $2,748,000 |
| Annual O&M Cost, $/yr | n/a | $5,487,000 |
| Total Annual Cost, $/yr | n/a | $8,235,000 |
| Ton Reduced, tons per year | n/a | 93 |
| Cost per Incremental Ton Reduced, $/ton | | $88,500 |

(a) Environmental Impacts

The primary environmental impact of adding the WESPs after the WFGD is the reduction in total $H_2SO_4$ emissions from 0.005 to 0.0005 lb/MMBtu assuming a 90% control efficiency. The addition of a WESP would reduce potential $H_2SO_4$ emissions from 103 tons per year to 10 tons per year, resulting in a reduction in total $H_2SO_4$ emissions of 93 tons per year. In addition, emissions of $PM_{2.5}$ would be reduced by approximately 80%. On the negative side, an acid waste water stream is generated which will require additional processing before disposal of the wet solids and the waste water stream.

(b) Economic Impacts

The addition of a WESP after the WFGD system would have a significant economic impact (unit is equipped with ESP and WFGD that are considered the baseline for the analysis). The capital costs of retrofitting a WESP on top of the current WFGD system is estimated at $29.1 million based on a cost of $26.5 dollars per wet standard cubic feet of flue gas. This equates to $64 per kilowatt, which is consistent with the costs reported by others for retrofit installations.

The total annual cost of $8.2 million per year is based on:

- A capital recovery factor of 0.0944 (20-year life and 7% societal cost of money per U.S. EPA guidance), and
- Annual operating and maintenance cost of $5 per standard cubic feet a minute (scfm) of flue gas.

It can be seen from Table 4 above that the incremental cost effectiveness of adding a WESP to the existing WFGD outlet duct work is greater than $88,000 per ton of $H_2SO_4$ reduced. This is a very high cost of control demonstrating that the addition of a WESP is not cost effective as BACT.

(c) Energy Impacts

The primary energy impacts of the WESP technology would be increased electrical demand for operation of the WESP and additional induced draft (ID) fan power requirements for the increase in pressure drop.

e. STEP 5. Proposed Sulfuric Acid Mist BACT Determination

Based on the Step 4 analysis, the application of WESP technology and reagent injection technology are not BACT. Either of these control options would have significant, adverse economic impacts and would provide negligible, beneficial environmental impacts, as reflected in the calculated cost effectiveness values of more than $88,000 per ton of $H_2SO_4$ removed and more than $7,000 per ton of $H_2SO_4$ removed, respectively. Therefore, ADEQ has determined an emission limit of 0.005 pounds per MMBtu heat input is BACT for $H_2SO_4$ emissions from CGS Unit 1. Compliance with this limit will be determined using EPA Conditional Test Method 13, based on the average of three test runs of at least two hours each. This limit reflects the use of low-sulfur western coals and ultra-low activity SCR catalyst and continuous performance of the existing boiler, HESP, and WFGD system in accordance with good air pollution control practice.

2. $PM_{10}$ & $PM_{2.5}$ BACT Analysis

Flue gas emitted from large, coal-fired boilers, such as CGS Unit 1, contains particulate matter. The particulate matter emitted is essentially all less than μm ($PM_{2.5}$); thus, the $PM_{10}$ and $PM_{2.5}$ emission rates are identical, and the filterable $PM_{10}$ and $PM_{2.5}$ emission rates are identical to the filterable PM emission rate. In addition, CGS Unit 1 is equipped with a WFGD system and its exhaust gases are saturated with water. There is no reference method that can be applied to determine whether any fraction of the filterable PM emissions from this unit is made up of $PM_{10}$ or $PM_{2.5}$. The EPA test method for $PM_{10}$ and $PM_{2.5}$ emissions, Reference Method 201A- Paragraph 1.5 of this method states the following:

*Limitations. This method cannot be used to measure emissions in which water droplets are present because the size separation of the water droplets may not be representative of the dry particle size released into the air. To measure filterable*

*$PM_{10}$ and $PM_{2.5}$ in emissions where water droplets are known to exist, we recommend that use of Method 5 of appendix A-3 to part 60.*
As a result, the following discussion will focus on the control of $PM_{2.5}$, but the resulting emission limit will be expressed as total particulate matter, with the filterable fraction measured using Reference Method 5.

Primary $PM_{2.5}$ Emissions

Primary or "direct" $PM_{2.5}$ emissions from CGS Unit 1 can be broken into two components with distinct physical and chemical properties in the boiler flue gas stream. Filterable $PM_{2.5}$ consists of particulate matter less than 2.5 µm in size that is collected on an appropriate filter in a stack sampling train. Condensable $PM_{2.5}$ is defined by EPA as "material that is vapor phase at stack conditions, but which condenses and/or reacts upon cooling or dilution in the ambient air to form solid or liquid particulate matter immediately after discharge from the stack. Note that all condensable particulate matter is assumed to be in the $PM_{2.5}$ size fraction."

Secondary $PM_{2.5}$ Formation and $PM_{2.5}$ Precursor Emissions

EPA has identified several gases as potential precursors of $PM_{2.5}$ and requires consideration of each in NSR permitting as follows:

- Sulfur dioxide ($SO_2$) – treated as a precursor in all areas;
- Nitrogen oxides ($NO_x$) – presumed to be a precursor in all areas unless state or EPA rebuts presumption;
- Volatile Organic Compounds (VOC) – not regulated as a precursor unless the state or EPA provides a demonstration that VOCs are a significant contributor to ambient $PM_{2.5}$ concentrations; and
- Ammonia ($NH_3$) – not regulated as a precursor, but can be regulated case-by-case in non-attainment areas.

In the *Federal Register*, EPA acknowledges that three of the four listed potential precursor pollutants are criteria pollutants that are already regulated and typically subject to limits in an NSR permitting review. Therefore, regulation of these pollutants as precursors for $PM_{2.5}$ "is not expected to add a major burden to regulated sources." The proposed SCR Project will not result in any emissions increases for these regulated precursors from CGS Unit 1. The area in which CGS is located is designated attainment, and therefore ammonia is not regulated as a precursor here. Therefore, secondary $PM_{2.5}$ emissions are not considered.

a. STEP 1. Identify All Potential Control Technologies

Primary filterable PM controls include ESPs and FFs. Acid gas controls include wet and dry FGD. Condensed acid gas controls include reagent injection (HLI and SDA) and WESP technologies.

A single piece of emissions control equipment often controls multiple pollutants, and multiple pieces of pollution control equipment work together to control emissions of various pollutants to certain levels. For these reasons, it is necessary to evaluate the control equipment system as

a whole. The following discussion of potential $PM_{2.5}$ control options will focus on control options that can enhance the removal of $PM_{2.5}$ beyond the proposed BACT for $H_2SO_4$: hot-side ESP and WFGD.

Hot-side ESPs have excellent filterable PM removal capabilities and poor vapor-phase acid gas removal capabilities. WFGD systems have excellent vapor-phase acid gas removal capabilities, and poor filterable PM control capabilities. Table 5 below presents a description of PM BACT control technologies which are potentially transferable to CGS Unit 1 for improving the control of $PM_{2.5}$.

**Table 5: Typical Control Technologies for Total PM**

| Control Technology | Primary $PM_{2.5}$ Component Controlled |
|---|---|
| Project Controls also BACT for $H_2SO_4$ | |
| Hot-side ESP | Filterable particulate |
| WFGD | Vapor phase acid gases and some filterable and condensed particulate |
| Additional Compatible Controls | |
| FF | Filterable and condensed particulate and vapor phase acid gases if capturing alkaline ash or if alkaline sorbent is injected |
| WESP | Filterable and condensed particulate |
| Reagent Injection<br>– Solid type<br>– Liquid type<br>– Gaseous Type | Vapor phase acid gases |

The addition of a FF downstream of the air heater would reduce filterable and condensed $PM_{2.5}$. The FF would also reduce vapor-phase acid gas, such as $H_2SO_4$, hydrogen chloride, and hydrogen fluoride, if the coal fly ash is alkaline, which it is for CGS Unit 1 because of the high percentage of PRB coal fired. Also, the injection of alkaline solids (e.g., lime) before the FF would enhance the removal of vapor-phase acid gas. Other additional control options effective at removing filterable and condensable $PM_{2.5}$ include the use of a WESP and the use of reagent injection.

b. STEP 2. Identify Technically Feasible Control Technologies

As noted above, filterable and condensable $PM_{2.5}$ and vapor-phase condensable gases are controlled to varying degrees using particulate matter and acid gas control systems. As identified in Step 1, filterable (solid and liquid) and condensable (acid gases) controls are considered to address $PM_{2.5}$ emissions. CGS Unit 1 $PM_{2.5}$ emissions may be further reduced through the application of FF, WESP, or reagent injection technologies. The use of these controls for $PM_{2.5}$ specifically at CGS Unit 1 is discussed below.

(1) Fabric Filter

Fabric filters separate dry particles from the boiler flue gas by

filtering the flue gas through fabric filters or "bags." The components of a FF include the fabric bags, a tube sheet to support the bags, a gas-tight enclosure, a mechanism to clean accumulated PM from the bags, and a hopper to collect accumulated particulate. Typical FF configurations at coal-fired power plants include downstream of the units air heaters or downstream of a spray dryer vessel if the FF is also being used as a component of a dry FGD system.

Fabric filters have several advantages when used for PM control from coal-fired boilers, including:

- High particulate matter control efficiencies;
- Relatively constant outlet grain loading over the entire boiler load range; and
- Simple operation and maintenance.

For CGS Unit 1, the primary PM control device is the hot-side ESP. Installing a FF is a major retrofit applications having capital and operating costs much greater than the installation of a WESP. Also installing a FF is a major retrofit application having capital and operating costs much higher than the installation of a WESP.

(2) Wet Electrostatic Precipitator

As discussed previously, WESPs are not used as the primary particulate control device for coal-fired PC boilers, but are used as a tertiary particulate control device downstream of a wet FGD system. WESPs require that the flue gas be at or near moisture saturation to prevent evaporation of moisture from the wet collection surfaces. For large flue gas flow applications, plate type WESPs are most commonly used. Membrane WESPs have been commercially demonstrated at industrial scale and have been pilot tested on coal-fired PC boiler flue gas. Table 6 summarizes the study results of a membrane WESP as compared to a metal plate WESP.

**Table 6: $PM_{2.5}$ Emissions Evaluation for Metal-Plate and Membrane WESP**

| Parameter | Metal Plate WESP | | Membrane WESP | |
|---|---|---|---|---|
| Comparative ESP Gas Velocities | Low Velocity | Moderate Velocity | Low Velocity | Moderate Velocity |
| PM Reduction % | 93 | 70 | 96 | 80 |

Based on the above data, it can be concluded that a WESP can remove approximately 70% to 90% of the $H_2SO_4$ and fine PM (filterable and condensable).

(3) Reagent Injection

Reagent injection systems are described previously under the $H_2SO_4$ BACT (refer to Section B.1.4.1). In addition to removing

$H_2SO_4$, reagent injection systems using alkaline reagents also remove hydrogen fluoride (HF) and hydrogen chloride (HCl), both of which contribute to $PM_{2.5}$ emissions. However, reagent injection systems do not reduce filterable $PM_{2.5}$, as do FFs, dry ESPs, FGDs and WESPs. Additionally, as previously discussed, all of the reagent injection technologies would increase the amount of filterable PM in the CGS Unit 1 flue gas. From a $PM_{2.5}$ emission control basis on CGS Unit 1, this increase cannot be completely controlled by the WFGD system, and as a result, reagent injection without the use of a FF before the CGS Unit 1 WFGD is rejected as being technically infeasible for the control of $PM_{2.5}$.

c. STEP 3. Rank the Technically Feasible Control Technologies

WESP technology and FF technology, with or without reagent injection, are considered technically feasible for application on CGS Unit 1 for the reduction of $PM_{2.5}$. The WESP technology would be installed after the existing WFGD system and before the wet stack. The FF technology would be installed before the existing WFGD. The retrofit difficulty and costs for the FF technology would be significantly greater than for the WESP technology. The expected achievable emission rates for both the WESP technology and FF technology would be 0.0066 lb/MMBtu for condensable and filterable $PM_{2.5}$. Note the estimated controlled emission rate of 0.0066 lb/MMBtu is much lower than permitted emission limits, but is consistent with the WESP test data presented in Step 2, Table 6, for the low velocity tests.

d. STEP 4. Evaluate the Most Effective Controls

Because the cost of the FF technology would be much greater than the WESP technology with the same achievable emission rate, only the WESP technology will be addressed in Step 4. Based on the Step 3 discussion, the highest level of total $PM_{2.5}$ control for CGS Unit 1 is the use of a WESP (assuming on average 80% control efficiency). Table 7 presents the economic impacts for reducing $PM_{2.5}$ emissions. The results, along with the environmental and energy impacts are discussed in the following subsections.

**Table 7: Summary of $PM_{2.5}$ BACT Impacts for a WESP**

| Parameter | Baseline | WESP |
|---|---|---|
| Boiler Heat Input, MMBtu/hour (HHV) | 4,719 | |
| Unit Gross Generation, kW | 410,000 | |
| Controlled Emission Rate, lb/MMBtu | 0.033 | 0.0066 |
| Potential PM Emissions, tons per year | 682 | 136 |
| WESP Total Capital Requirement, $ | n/a | $29,112,000 |
| Capital Recovery Factor (CRF) | n/a | 0.0944 |
| Annual Capital Cost, $/yr | n/a | $2,748,000 |
| Annual O&M Cost, $/yr | n/a | $5,487,000 |
| Total Annual Cost, $/yr | n/a | $8,235,000 |

| Parameter | Baseline | WESP |
|---|---|---|
| Ton Reduced, tons/ year | 0 | 546 |
| Average Cost, Effectiveness, $/ ton | n/a | $15,092 |

(1) Environmental Impacts

The primary environmental impact of adding the WESP after the WFGD is the reduction in total $PM_{2.5}$ emissions from 0.033 to 0.0066 lb/MMBtu. The addition of a WESP would reduce potential $PM_{2.5}$ emissions from 682 tons per year at 0.033 lb/MMBtu to 136 tons per year at 0.0066 lb/MMBtu, resulting in an incremental reduction in total $PM_{2.5}$ emissions of 546 tons per year. On the negative side, an acid waste water stream is generated which will require additional processing before disposal of the wet solids and the waste water stream.

(2) Economic Impacts

The addition of a WESP after the WFGD system would have a significant economic impact. The capital cost of retrofitting a WESP on top of the current WFGD system is estimated at $29.1 million based on a cost of $26.5 dollars per wet standard cubic feet of flue gas. This equates to $64 per kilowatt which is consistent with the costs reported by others for retrofit installations. The total annual cost of $8.2 million per year is based on:

- A capital recovery factor of 0.0944 (20-year life and 7% societal cost of money per U.S. EPA guidance); and
- Annual operating and maintenance cost of $5 per standard cubic feet a minute (scfm).

From Table 7, it can be seen that the incremental cost effectiveness of adding a WESP to the existing WFGD outlet duct work is greater than $15,000 per ton of $PM_{2.5}$ reduced. This is a very high cost of control demonstrating that the addition of a WESP is not cost effective as BACT.

(3) Energy Impacts

The primary energy impacts of the WESP technology would be increased electrical demand for operation of the WESP and additional ID fan power requirements for the increase in pressure drop.

e. STEP 5. Proposed $PM_{10}$ and $PM_{2.5}$ BACT Determination

Based on the Step 4 analysis, the application of WESP technology is not BACT. This control option would have significant, adverse economic impacts and would provide negligible, beneficial environmental impacts, as reflected in the calculated cost effectiveness value of more than $15,000 per ton of $PM_{10}$/ $PM_{2.5}$ removed.

Therefore, ADEQ has determined an emission limit of 0.033 pounds per MMBtu heat input, expressed as total filterable and condensable particulate matter, represents BACT for both $PM_{10}$ and $PM_{2.5}$ emissions from CGS Unit 1. Compliance with this limit will be determined using EPA Reference Methods 5 and 202, based on the average of three test runs of at least two hours each. This limit reflects the use of low-sulfur western coals and ultra-low activity SCR catalyst, and continuous performance of the existing boiler, HESP, and WFGD system in accordance with good air pollution control practice. An emission limit expressed as total filterable and condensable particulate matter is an appropriate surrogate for $PM_{10}$ and $PM_{2.5}$ emissions because, as discussed above, the reference method for filterable particulate matter in particle size ranges less than 10 µm or less than 2.5 µm is not feasible for use at Unit 1.

## IV. Monitoring Requirements

**A.** At all times, the Permittee will calibrate, maintain, and operate CEMS, in full compliance with the requirements found at 40 CFR Part 75, to accurately measure $SO_2$, $NO_X$, diluent, and stack gas volumetric flow rate from each unit.

**B.** At all times, the Permittee will calibrate, maintain, and operate CEMS, in full compliance with the requirements found at 40 CFR Part 75, to accurately measure $SO_2$ emissions and diluent at the inlet of the sulfur dioxide control device.

**C.** All valid CEMS hourly data will be used to determine compliance with the emission limitations for $NO_x$ and $SO_2$.

## V. Recordkeeping Requirements

The Permittee will maintain the following records for 5 years:

**A.** All CEMS data, including the date, place, and time of sampling or measurement; parameters sampled or measured; and results;

**B.** Daily 30-boiler-operating-day rolling emission rates for $NO_x$ and $SO_2$, when applicable, for each unit;

**C.** Records of quality assurance and quality control activities for emissions measuring systems, including, but not limited to, any records required by 40 CFR Part 75;

**D.** Records of the relative accuracy test for hourly $NO_x$ and $SO_2$ lb/hr measurement and hourly heat input measurement;

**E.** Records of all major maintenance activities conducted on emission units, air pollution control equipment, and CEMS; and

**F.** Any other records required by 40 CFR Part 75.

## VI. Testing

**A.** Within 180 days of installation and commencing operation of the SCR system on Unit 1, the Permittee will demonstrate compliance with the $PM_{10}$ emission limitation by conducting a stack test to measure $PM_{10}$ using EPA Method 5, in 40 CFR part 60, Appendix

A and Method 202 in 40 CFR Part 51, Appendix M. Subsequent testing shall be conducted annually.

**B.** Within 180 days of commencement of operation of the SCR system on Unit 1, the Permittee will demonstrate compliance with the $H_2SO_4$ emission limitation using EPA Conditional Test Method 13 (CTM-13) or an alternate test method approved by ADEQ. Subsequent testing shall be conducted annually.

## VII. Air Dispersion Modeling Analysis

This section presents a summary of the PSD ambient air dispersion modeling analysis conducted in support of this permit revision. The full modeling report, including detailed information regarding model selection, receptor location, and modeling procedures, are included in Appendix G of the application submitted by SRP in January 2016. As described in Section III.A.3.a, the proposed SCR Project will result in PSD significant emission increases of $PM_{10}$, $PM_{2.5}$, and $H_2SO_4$ and therefore an air dispersion modeling analysis was required. Because there were no emission increases of $PM_{2.5}$ precursors, the $PM_{2.5}$ air quality analysis addressed direct $PM_{2.5}$ air quality impacts.

**A.** Significant Impact Level Results

The $PM_{10}$ and $PM_{2.5}$ emission increases resulting from the Project were modeled in accordance with ADEQ's "Air Dispersion Modeling Guidelines for Arizona Air Quality Permits". The resulting ambient impacts were compared with the Class II Significance Impact Levels (SILs). In accordance with ADEQ guidance, if the maximum ambient impacts resulting from the proposed emission increase are below their respective SILs, a full impact analysis (NAAQS and PSD Increment) for that pollutant is generally not required.

**Table 8: Summary of Maximum Impacts Compared to PSD Modeling Class II Significant Impact Levels**

| Pollutant | Averaging Period | Maximum Concentration (µg/m3) | Class II Significant Impact Level (SIL) (µg/m3) | Additional Modeling Required? |
|---|---|---|---|---|
| $PM_{10}$ | 24-hour | 1.61 | 5 | No |
| | Annual | 0.35 | 1 | |
| $PM_{2.5}$ | 24-hour | 1.42 | 1.2 | Yes |
| | Annual | 0.32 | 0.3 | |

**Table 9: Summary of Maximum Impacts Compared to PSD Modeling Class I Significant Impact Levels**

| Pollutant | Averaging Period | Maximum Concentration (µg/m3) | Class I Significant Impact Level (SIL) (µg/m3) | Additional Modeling Required? |
|---|---|---|---|---|
| $PM_{10}$ | 24-hour | 0.14 | 0.30 | No |
| | Annual | 0.01 | 0.20 | |
| $PM_{2.5}$ | 24-hour | 0.08 | 0.07 | Yes |

| | | | | |
|---|---|---|---|---|
| | Annual | 0.01 | 0.06 | |

Results presented in Tables 8 and 9 above indicate that the maximum ambient impacts for $PM_{10}$ are below the Class I and Class II SILs. As a result, full NAAQS and PSD increment analyses are not required for $PM_{10}$. For $PM_{2.5}$, the maximum ambient impacts are above the Class II and Class I SILs and therefore additional modeling is required for $PM_{2.5}$. For the Class I analysis, the Permittee used the CALPUFF model to evaluate impacts on the two Class I areas located towards the direction from CGS to the receptors where AERMOD show impacts that exceeded the Class I SIL. Results of this modeling are included in the Appendix G of the PSD application that show impacts below the Class I SIL and therefore will not threaten the Class I increment.

**B.** NAAQS and PSD Increment Modeling Results

The $PM_{2.5}$ emission increases resulting from the SCR Project were modeled to demonstrate compliance with the $PM_{2.5}$ NAAQS and PSD increments. For the NAAQS analysis, the other $PM_{2.5}$ emissions points at CGS, along with nearby sources, were included in the modeling. This Project established the $PM_{2.5}$ minor source baseline date for this area, and therefore was the only source included in the increment analysis. Tables 10 and 11 below show that the maximum ambient impacts for $PM_{2.5}$ are below the applicable NAAQS and PSD increment.

**Table 10: Summary of $PM_{2.5}$ Modeled NAAQS Impacts**

| Pollutant | Averaging Period | Maximum Concentration (µg/m3) | Background Concentration (µg/m3) | Total Concentration (µg/m3) | NAAQS (µg/m3) |
|---|---|---|---|---|---|
| $PM_{2.5}$ | 24-hour | 10.49 | 12.0 | 22.96 | 35 |
| | Annual | 4.04 | 5.3 | 9.34 | 12 |

**Table 11: Summary of PM2.5 Modeled Increment Assessment**

| Pollutant | Averaging Period | Maximum Concentration for Increment (µg/m3) | Increment Concentration (µg/m3) |
|---|---|---|---|
| $PM_{2.5}$ | 24-hour | 1.42 | 9 |
| | Annual | 0.32 | 4 |

Therefore, the proposed SCR Project will not cause or contribute to a violation of the NAAQS or PSD increment.

**C.** Additional Impacts Analysis

1. Growth Impact Analysis

Pursuant to A.A.C. R18-2-407(I), the general commercial, residential, industrial, and other growth associated with a major modification must be characterized in order to allow for analyses of air quality impacts and impairment to visibility, soils,

and vegetation that would occur as a result of this growth.

The proposed SCR Project is not expected to affect commercial, residential, industrial, or other growth in the area. No new jobs are anticipated to result from the SCR Project. Any additional labor needed during the construction phase of the Project is expected to be drawn from the existing labor force. Therefore, no effects on air quality or on impairment to visibility, soils, and vegetation as a result of growth have been identified.

2. Analysis of Impairment to Soils and Vegetation

Emissions from the proposed SCR Project are not expected to result in significant impairment to soils, crops, or plant species of concern, within the vicinity of the Project site. For each pollutant of concern, the predicted ambient concentration or the predicted deposition rate is well below the secondary NAAQS and the minimum screening values established by EPA. Nothing in the scientific literature identified during this review indicates that the secondary NAAQS and minimum EPA screening values are not protective of any identified crops, and the predicted ambient concentration and deposition rate are less than the screening values established by other governmental authorities.

## VIII. LIST OF ABBREVIATIONS

A.A.C ..... Arizona Administrative Code
ADEQ ..... Arizona Department of Environmental Quality
BACT ..... Best Available Control Technology
BART ..... Best Available Retrofit Technology
BTB ..... Better than BART
CD ..... Consent Decree
CFR ..... Code of Federal Regulations
CGS ..... Coronado Generating Station
CPP ..... Clean Power Plan
CRF ..... Capital Recovery Factor
DFGD ..... Dry Flue Gas Desulfurization
EPA ..... United States Environmental Protection Agency
EPRI ..... Electric Power Research Institute
ESP ..... Electrostatic Precipitator
FF ..... Fabric Filter
FGD ..... Flue Gas Desulfurization
FIP ..... Federal Implementation Plan
FR ..... Federal Register
HHV ..... High Heat Value
HLI ..... Hydrated Lime Injection
ID ..... Induced Draft
$H_2SO_4$ ..... Sulfuric Acid
Lb ..... Pound
Lb/MMBtu ..... Pound per Million Btu
MMBtu ..... Million British thermal unit
NAAQS ..... National Ambient Air Quality Standards
NESHAP ..... National Emission Standards for Hazardous Air Pollutants
$NO_x$ ..... Nitrogen Oxides
NSPS ..... New Source Performance Standards
O&M ..... Operation and Maintenance

PC ..... Pulverized Coal
PM ..... Particulate Matter
$PM_{2.5}$ ..... Particulate Matter less than 2.5 microns
$PM_{10}$ ..... Particulate Matter less than 10 microns
PRB ..... Powder River Basin
PSD ..... Prevention of Significant Deterioration
RBLC ..... RACT/BACT/LAER Clearinghouse
RHR ..... Regional Haze Rule
RUL ..... Remaining Useful Life
SCR ..... Selective Catalytic Reduction
SDA ..... Spray Dryer Absorber
SI ..... Sorbent Injection
SIP ..... State Implementation Plan
$SO_2$ ..... Sulfur Dioxide
$SO_3$ ..... Sulfur Trioxide
SPR ..... Significant Permit Revision
SRP ..... Salt River Project
ULA ..... Ultra Low Activity
WESP ..... Wet Electrostatic Precipitator
WFGD ..... Wet Flue Gas Desulfurization

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# Appendix D
# State Implementation Plan Revision Public Comment and Hearing Documentation

D.1 Notice of Public Hearing
D.2 Public Hearing Sign-in Sheet
D.3 Public Hearing Officer Certification and Transcript
D.4 Comments Submitted by the Public
D.5 Responsiveness Summary

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# Appendix D.l
# Notice of Public Hearing

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ADEQ Arizona Department of Environmental Quality

# PUBLIC NOTICE

## YOU HAVE A VOICE IN AIR POLLUTION CONTROL IN ARIZONA

The Arizona Department of Environmental Quality (ADEQ) proposes two actions through this public notice; a revision to the Arizona State Regional Haze State Implementation Plan (SIP) and Significant Permit Revision No. 63088 to Air Quality Control Permit No. 52639 for Salt River Project- Coronado Generating Station located 6 miles northeast of St. Johns off U.S. Highway 191 in St. Johns, Apache County, Arizona. The mailing address for the facility is P.O. Box 52025, PAB 352, Phoenix, AZ 85072-2025. The significant revision to the permit is intended as a component of the SIP revision to assist in satisfying the Arizona Regional Haze Best Available Retrofit Technology (BART) requirements. The SIP and permit revisions will become effective following EPA's approval and final action rescinding the current Federal Implementation Plan. This permit revision requires SRP to select the option of either installing Selective Catalyst Reduction system on Unit 1 or shut down Unit 1 by December 31, 2029. Until the time SRP decides either of these options, the Permittee will be required to seasonally curtail the operation of Unit 1 by selecting one of four interim operational strategies. The facility is subject to the requirements of the Federal Clean Air Act, Code of Federal Regulations, Arizona Revised Statute 49-426, and the Arizona Administrative Code, Title 18, Chapter 2.

You have an opportunity to submit written comments and/or make oral comments on the permit and SIP revisions at the public hearing. ADEQ will be holding a public hearing regarding this matter. The hearing will be on August 23, 2016 at St. John's High School Auditorium, 360 Redskin Drive, St. John, AZ 85936, at 6:00 p.m. The hearing is designed to solicit comments on the proposed permit and SIP revision. ADEQ representatives, however, will be available prior to, and after the public hearing for informal discussions about the permit and SIP revisions.

The draft permit revision, technical support document, and SIP revision documents and the permit revision application are available for review Monday through Friday between 8:30 a.m. and 4:30 p.m., at the ADEQ Records Center, at 1110 West Washington Street, Phoenix, Arizona. Please call (602) 771-4380 or email recordscenter@azdeq.gov 48 hours in advance to schedule an appointment to review the file. The documents are also available at City Clerk's Office in City of St. Johns at 75 Commercial, St. Johns, AZ 85936. The draft permit revision, technical support document, and SIP revision documents may be viewed online at by accessing the notice on the Events and Notices Calendar for the date of this public notice.

The public notice period is in effect from July 21, 2016 to August 23, 2016. Comments may be submitted in writing to: Balaji Vaidyanathan, Air Quality Permits Section Manager, ADEQ, 1110 West Washington Street, 3415A-1, Phoenix, AZ 85007 or via e-mail at bv1@azdeq.gov. Persons wishing to submit written comments can also do so at the public hearing. Comments must be received by August 23, 2016. The written comment shall state the name and mailing address of the person, shall be signed by the person, their agent or attorney, and shall clearly set forth reasons why the permit revision should or should not be issued or why the SIP revision should not be finalized. Grounds for comment are limited to whether the permit revision and SIP revision meet the criteria for issuance spelled out in the state air pollution control laws or rules.

ADEQ will make a final decision on the proposed permit and SIP revision following consideration of all comments received during the public notice period. Everyone commenting will receive notification of the final decision along with a responsiveness summary. People who file comments on the permit will have the right to appeal the final decision as an appealable agency action to the Office of Administrative Hearing (OAH) pursuant to §41.1092.03, and the appeal must be filed within thirty (30) days after the issuance of the final decision. The OAH may sustain, modify, or reverse the final decision.

For questions or more information, or if you would like to receive copies of future public notices of air pollution control permits, please provide your name, address, and ZIP code, or e-mail address to Balaji Vaidyanathan, (602) 771-4527, toll free (800) 234-5677, via e-mail bv1@azdeq.gov or in writing to the ADEQ address above. In order to receive future public notices of air pollution control permits, your request should state that you wish your name to be placed on the air quality permit mailing list.

To request an auxiliary aid or service for accessible communication, please contact ADEQ at (602) 771-4791 or at HRhelp@azdeq.gov or dial 7-1-1 for TTY/TTD Services.

# NAVAJO TIMES

DINÉ BI NAALTSOOS

PO Box 310 Window Rock, AZ 86515
(928) 871-1130 Fax: (928) 871-1159

ADEQ AIR QUALITY DIVISION
16 JUL 25 AM 11:42

PAID 07/15/2016

# Invoice

| Date | Invoice # |
|---|---|
| 7/21/2016 | L16-1063 |

Bill To

**Arizona Department of Environmental Quality**
**1110 W. Washington St.**
**Phoenix, AZ 85007**
**Attn: Sylvia Williams-Nelson**

| P.O. Number | Terms | Rep |
|---|---|---|
| | | JC |

THANK YOU FOR YOUR BUSINESS!

NAVAJO TIMES
HWY 264 ROUTE 12 BLDG 53 D
WINDOW ROCK, AZ 86515
928-871 1130

Merchant ID: 5388969667 08956
Record Num.: 0008

Phone Order Sale

xxxxxxxxxxx2298 Exp: XX/XX
VISA Entry Method: Keyed CNP
Cust #: 517

Amount: $ 444.00
Tax: $ 22.10

Total: USD$ 466.10

07/15/16 13:46:13
Invl#: 000008 Appr Code: 075506
Apprvd: Online Batch#: 000089
AVS Code: Y
CVV2 Code: M
TRN Ref #: 586197747536482
Validation Code: RCGN

DESCRIPTION: L17

THANK YOU!
PLEASE COME AGAIN!

CARDHOLDER COPY

RETAIN THIS COPY FOR STATEMENT VERIFICATION

| Description | Price Each | Amount |
|---|---|---|
| You have a Voice in Air Pollution Control in Arizona - Air Quality Permit No. 63088 | 12.00 | 264.00T |
| Published: July 21, 2016 | 2.00 | 178.00T |
| Affidavit fee | 2.00 | 2.00 |
| Visa payment (L17) - $466.10 (07/15/16) | | |
| Navajo Nation Tax | 5.00% | 22.10 |

We appreciate your prompt payment. If you have any questions, please contact 928-871-1130 or 1131.

| | |
|---|---|
| **Total** | $466.10 |
| **Balance Due** | $0.00 |

**AFFIDAVIT OF PUBLICATION** Inv# L16-1063

I, Tommy Arviso, Jr., CEO/Publisher of the Navajo Times, a legal newspaper published weekly at Window Rock, Navajo Nation, Arizona, do hereby swear that a legal notice:

**You have a Voice in Air Pollution Control in Arizona – Air Quality Permit No. 63088**

was published in said Navajo Times on the following date(s):

**July 21, 2016**

and that said notice is attached to this Affidavit and is a true and exact copy of said notice as published.

Tommy Arviso, Jr.
CEO/Publisher

STATE OF ARIZONA :}

COUNTY OF APACHE :}

SUBSCRIBED AND SWORN TO before me this

21st day of July, 2016.

Olivia L. Benally, Notary Public

OFFICIAL SEAL
OLIVIA L. BENALLY
NOTARY PUBLIC STATE OF ARIZONA
APACHE COUNTY
My Commission Expires: 4/10/2018

My Commission Expires:

April 10, 2018

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# Appendix D.2
# Public Hearing Sign-In Sheet

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**ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY**

**Please PRINT CLEARLY to Receive a Copy of the Final Decision and Response Summary**

**SRP- Coronado Generating Station/Permit #63088 Tuesday, August 23, 2016**

| FACILITY/PERMITTEE COUNTY FULL NAME | MAILING ADDRESS | CITY AND STATE | ZIP CODE* |
|---|---|---|---|
| Lara Olsen | PO Box 1995 | St. Johns, Az | 85936 |
| Theodora Rottlisberger | Box 93 | St Johns Az | 85936 |
| Emma Waite | " 1624 | St Johns " | " |
| [illegible] Lawrence | POB 1889 | St Johns " | 85936 |
| Robert H. Hedrick | P.O. Box 980 | Jenkins Az | 85934 |
| Monette Butler | P.O. Box 1553 | St. Johns Az | 85936 |
| Melissa Waite | PO Box 1876 | " | " |
| Lacy Greer | P.O. Box 2237 | St. Johns | 85936 |
| Lee Ann Carter | PO Box 1407 | St Johns | 85936 |
| Lehi W. Montierth | PO Box 185 | SJ Johns | 85936 |
| Brad Iverson | PO Box 1033 | " | " |
| David Pilsipher | PO Box 1356 | Eagar Az | 85925 |
| Jim & Kristi Zieler | PO Box 268 | St Johns | 85936 |
| Roger & Terri Hays | Box 492 | St. Johns | 85936 |
| AMBER SHEPARD | PO Box 1161 | St JOHNS | 85936 |
| Carl G. Wilkins | PoBox 833 | St. Johns | 85936 |
| Karson Crosby | PO Box 1350 | St. Johns Az | 85936 |

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**ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY**

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|---|---|---|---|
| Darcy Brooks | Box 342 | St Johns, AZ | 85936 |
| Jeffrey Carter | Box 2486 | St. Johns AZ | 85936 |
| Mark Prein | 2656 Coconino Way | Lakeside AZ | 85929 |
| Ray Trail | PO Box 464 St. Johns | St Johns | 85936 |
| Kasey Nelson | PO Box 3377 | St Johns | 85936 |
| Leo Madrid | " " 4156 | " | " |
| Kyle Wahl | PO Box 3142 | St Johns AZ | 85936 |
| Reed Hancock | PO Box 2632 | St Johns AZ | 85936 |
| LARRY TYSIAC | PO BOX 1512 | CONCHO AZ | 85924 |
| Beverly Harris | P.O. Box 1473 | St. Johns, AZ | 85936 |
| STEVE VITAL | 191 TWIN KNOLL RD | LAKESIDE, AZ | 85929 |
| JESSE DEWITT | BOX 584 | EAGAR, AZ | 85925 |
| Stacy Gillaspy | 848 Durinda Dr. | Eagar, AZ | 85925 |
| KATHY MURDOCK | BOX 879 | EAGAR, AZ | 85925 |
| Justine Weber | PO Box 2272 | St. Johns AZ | 85936 |
| Deborah Boeksma | PO Box 1348 | St Johns AZ | 85936 |
| BRETT DAY | P.O. Box 2222 | St. Johns Az. | 85936 |

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# ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

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(1)

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|---|---|---|---|
| Apache John D. Shawley | P.O. Box 942 | Cesar, AZ | 85925 |
| Apache Tami Ripple | PO BOX 1300 | Eagar, AZ | 85925 |
| Apache, Steve West | 418 E Main PT Springerville, AZ 85938 | Springerville, AZ | |
| Apache, Diana Young | P.O. Box 1727 St. Johns 85936 | St. Johns, AZ | 85936 |
| Apache, Jessica Shelley | PO Box 2286 St. Johns 85936 | St Johns AZ | 85936 |
| Apache, Dana Overson | PO Box 2206 STJ Az | | 85936 |
| Apache, Ross Overson | PO Box 2206 STJ AZ | | 85931 |
| Apache, Ken Whiting | P.O. Box 665 St Johns | St Johns | 8598 |
| Apache Michael Slaght | 4162 Maricopa Dr. Lakeside 85929 | Lakeside | 85929 |
| Apache Sharon Stonestreet | P.O. Box 2491 St Johns 85936 | St. Johns | 85936 |
| APACHE JENNIFER WARNKE | PO BOX 1275 | ST JOHNS | 85936 |
| Apache KAY HAUSER | Box 397 St Johns Cy | | 85936 |
| Roger Rothlisberger | po Box 142 | St. Johns AZ | 85936 |
| Debbie Rothlisberger | PO Box 142 | St Johns AZ | 85936 |
| Bitsilleen Overson | PO Box 2734 | St Johns Az | 85936 |
| Coda Overson | P.O. Box 2734 | St. Johns Az | 85936 |
| John Brooks | Box 342 | St Johns AZ | 85936 |

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| FACILITY/PERMITTEE COUNTY FULL NAME | MAILING ADDRESS | CITY AND STATE | ZIP CODE* |
|---|---|---|---|
| JAKE UDALL | PO BOX 2412 | St. Johns AZ | 85936 |
| Carla Sherrow | 590 S. Harless | Eagar AZ | 85925 |
| David A Brown | Box 890 | St. Johns, AZ | 85936 |
| Bart Udall | P.O. Box 964 | ST Johns AZ | 85936 |
| Jay Platt | P.O. Box 426 | " " | " " |
| Paul Ramsey | PO Box 1617 | St Johns | 85936 |
| Gerald Wood | PO Box 1550 | St. Johns | 85936 |
| Tawnya Wood | PO Box 1550 | St. Johns | 85936 |
| Justin Lee | PO Box 2448 | St. Johns | 85936 |
| Jim Leslie | PO Box 2071 | St Johns | 85936 |
| Jason Rothlisberger | P.O. Box 66 | St. Johns | 85936 |
| Justin Crock | P.O. Box 4 | Eagar, AZ | 85925 |
| Tim Raban | P.O. Box 1071 | St. Johns AZ | " |
| Diane LeJeune | Box 285 | SJ | 85936 |
| Carol Wilhelm | P.O. Box 1252 | St. Johns | AZ 85936 |
| | | | |
| | | | |

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|---|---|---|---|
| Tony Romero | BOX 2176 | ST Johns | 85936 |
| Larry Chlarson | PO BOX 3192 | st Johns | 85936 |
| Kris Pulsipher | PO Box 2884 | st Johns | 85936 |
| Ken Pulsipher | PO Box 1716 | St. Johns | 85936 |
| Walter Slade | PO Box 1091 | St. Johns | 85936 |
| Rachael Tysseling | PO Box 1845 | Eagar | 85925 |
| Amber Heap | PO Box 1854 | St. Johns | 85936 |
| Aaron Sherwood | PO Box 552 | St. Johns | 85936 |
| Eve Patterson | PO Box 2366 | St Johns | 85936 |
| David Kidd | PO Box 1604 | St Johns | 85936 |
| Timothy Hinton | PO Box 1912 | St Johns | 85936 |
| Apache J Albert Brown | PO Box 1890 | St. Johns | 85936 |
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Appendix D.3
Public Hearing Officer Certification and Transcript

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ADEQ
Arizona Department
of Environmental Quality

Air Quality Division

**Public Hearing Presiding Officer Certification**

I, Wayne Bixler, the designated Presiding Officer, do hereby certify that the public hearing held by the Arizona Department of Environmental Quality was conducted on August 23, 2016, at the St. Johns High School Auditorium, 360 Redskin Drive, St. Johns, AZ, in accordance with public notice requirements by publication in *The Navajo Times* and *The White Mountain Independent* beginning July 21, 2016. Furthermore, I do hereby certify that the public hearing was recorded from the opening of the public record through concluding remarks and adjournment.

Dated this 8th day of December 2016.

Wayne Bixler

State of Arizona )
) ss.
County of Maricopa )

Subscribed and sworn to before me on this 8th day of December 2016

TAWNYA COOK
Notary Public - Arizona
Maricopa County
My Comm. Expires Mar 3, 2020

Tawnya Cook
Notary Public

My commission expires: 3/3/2020

**PUBLIC HEARING FOR**
**AIR QUALITY PERMIT NO. 63088**
**AND**
**REGIONAL HAZE SIP REVISION**
**FOR**
**SRP – CORONADO GENERATING STATION**

Today is Tuesday, August 23, 2016. The time is 6.00 pm. The location is the St. Johns High School Auditorium, 360 Redskin Drive, St. John, AZ 85936. My name is Wayne Bixler and I have been appointed by the Director of the Department of Environmental Quality to preside at this public hearing. This hearing is to provide you an opportunity to make verbal comments or submit written statements regarding the proposed issuance of Air Quality Permit No. 63088 and the associated draft Regional Haze state implementation plan revision for Salt River Project's Coronado Generating Station.

Representing the Department this evening are myself; Leonard C. Drago Deputy Director Air Quality Division, Balaji Vaidyanathan, Manager of the Facilities Emissions Control Section, Feng Mao, Senior Air Quality Modeler, and Pervinder K. Tandon, Permit Engineer. We will be available after the hearing to answers any questions you nay have.

By law, a public hearing must be conducted "on the record". Therefore, the proceedings are being recorded.

Because this is a public hearing, the purpose is to obtain comments from you. Therefore, we will not be answering questions during the public hearing. If you have questions about the matter being addressed in this hearing, please include them in your comments.

If you wish to comment, please fill out a speaker's slip which is available on the information table at the back of the room and bring it forward to us. This will allow everyone an opportunity to be heard and allow us to match the name on the official record with you, the speaker.

Individuals will be called in the order in which the speaker slips have been submitted. Please print your name clearly to help ensure that it is spelled correctly for the record.

You may also submit written comments this evening. If you have written comments, you may give them to us after the hearing. Written comments can also be mailed or hand delivered to the Department at the following address:

Balaji Vaidyanathan, Manager
Facilities Emissions Control Section
Arizona Department of Environmental Quality
1110 West Washington Street
Phoenix, Arizona 85007

Written comments that are mailed must be postmarked no later than to day. Comments that are hand delivered must be received on or before today.

By law, all comments made here or in writing are considered by the Department before making a final decision on the proposed permit and SIP revision. The Department's response to your

comments comes later in the process when the Department evaluates your verbal and written comments in writing. This document is known as the responsiveness summary. It is available at the time that the Department makes a final decision on the permit. If you wish to be notified of the decision made by the Department, please be sure to sign-in on the attendance sheet located on the information table.

The agenda for this hearing is as follows. First, Mr. Tandon will give a brief presentation on the nature and content of the proposed permit and SIP revision. Then I will begin to call speakers in the order in which I received the slips.

Now Mr. Tandon will give a brief overview of the draft permit and the SIP revision:

# Public Hearing Speech

Thank you Wayne.

Good Evening, My name is Pervinder K. Tandon, and I'm the permit engineer for this permit. I will give you a brief description of the proposed permit revision to be issued to the SRP's Coronado Generating Station. This draft Permit Number #63088, a significant permit revision to Permit No. 52639 for SRP- Coronado Generating Station, will form the basis for ADEQ's proposed revision to the SIP for Regional Haze Best Available Retrofit Technology (BART) requirements as it relates to Nitrogen Oxide emissions from the Coronado facility.

## CURRENT BART REQUIREMENTS

On December 5, 2012, EPA issued a final rule approving in part and disapproving in part ADEQ's Regional Haze SIP. EPA promulgated a Federal Implementation Plan (FIP) which required both CGS units to be equipped with selective catalytic reduction (SCR) systems for control of $NO_x$ emissions by December 5, 2017. Unit 2 is already equipped with SCR since 2014, as required by an EPA consent decree.

## BETTER THAN BART ALTERNATIVES

Through this significant permit revision, SRP proposed the following alternative operating strategies ("BART Alternative").

OS 1: Either install and commence operation of a Selective Catalytic Reduction (SCR) System on Unit 1 by December 31, 2029, or

OS 2: Shut down Unit 1 by December 31, 2029.

Until one of the strategies is selected, SRP shall be operating Unit 1 under one of four separate seasonal curtailment periods depending on the actual emission rates of $SO_2$ and $NO_x$. SRP has conducted visibility modeling to demonstrate that each of the proposed curtailment periods represents an improvement in visibility in Class I areas over the BART required by the current Regional Haze FIP.

The SIP and permit revisions will become effective following EPA's approval and final action rescinding the current Federal Implementation Plan.

Thank you.

**STATEMENT BY THE SALT RIVER PROJECT**
**CGS REGIONAL HAZE SIP/PERMIT REVISION PUBLIC HEARING**

Good evening. My name is Bill Alkema and I am the Senior Director of Power Generation at Salt River Project Agricultural Improvement and Power District. SRP is community-based, not-for-profit public power utility that provides retail electric services to more than 1 million residential, commercial, industrial, agricultural, and mining customers in Arizona.

SRP welcomes this opportunity to provide comments on ADEQ's proposed revision to the Arizona Regional Haze State Implementation Plan and the proposed Significant Permit Revision. I am commenting today because CGS is an important resource that provides critical generation for SRP customers and is an important driver for the local economy. More than 200 direct jobs and $250 million in economic activity derive from CGS. Taxes from CGS are significant sources of revenue for schools, city and county government, health care and public safety. And of course, CGS jobs support families and many other businesses throughout the regional economy. We have been proud to be a part of the St. Johns and northern Arizona community since the late 1970s. CGS is an important facility to SRP and we know it is important to this community. We appreciate the support from everyone here tonight from across the region.

SRP appreciates the considerable efforts by ADEQ to develop the State Implementation Plan revision that provides a reasonable solution for all stakeholders. SRP supports this revision and encourages ADEQ to approve it as quickly as possible and submit it to EPA for approval. SRP is also grateful for EPA's consideration of this proposal and encourages expeditious review upon ADEQ submittal.

CGS is a critical resource that allows SRP to provide customers with reliable, low-cost energy. In order to continue to provide these services, SRP must be able to respond to changes in load, regulatory uncertainty, and economic variability. In 2008, SRP entered into a Consent Decree with EPA requiring installation of nearly $500 million of pollution control upgrades to CGS Unit 1 & 2 including new scrubbers, Low- NOX burners, and Selective Catalytic Reduction technology (SCR) on Unit 2. All of these significant projects have been completed under the terms of the Consent Decree. EPA's Federal Implementation Plan requires SRP to install Selective Catalytic Reduction technology on CGS Unit 1 at a cost of $110 million. These requirements generate significant risk to SRP's recent investments. If Unit 1 must shut down on December 5, 2017, SRP and its customers will not be able to realize the full value of the additional pollution controls. These are costs ultimately borne by our customers.

Subsequent to the issuance of the Federal Implementation Plan, EPA finalized its carbon regulations on existing power plants, also known as the Clean Power Plan. Efforts to comply with the Clean Power Plan may conflict with obligations under EPA's Regional Haze Federal Implementation Plan for CGS. Furthermore, the February 2016 stay of the Clean Power Plan creates additional uncertainty. It is unclear to SRP what the Clean Power Plan compliance requirements will be and what deadlines ultimately will be established. The ability to assess Clean Power Plan requirements and deadlines would allow SRP to make more informed

resource decisions that will provide the best outcomes for SRP customers and the surrounding communities.

The proposal developed by ADEQ allows SRP to continue operations of Unit 1 and to assess the impacts of the Clean Power Plan on continued operations at CGS. This flexibility is better for SRP customers and the community, and provides greater visibility improvement than EPA's Best Available Retrofit Technology determination. SRP has sought and responded to input from ADEQ and EPA for over two years on this innovative proposal to provide an alternative that satisfies the interest of all stakeholders. SRP appreciates the tremendous effort of both ADEQ and EPA in providing critical feedback on the concept.

In conclusion, SRP supports ADEQ's proposed revision to the Regional Haze State Implementation Plan and Permit Revision. Once again, I would like to thank ADEQ, the community, and EPA for their support and efforts throughout this process. SRP appreciates this opportunity to comment on ADEQ's proposal and will submit written comments that address these issues in further detail. Thank you.

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Apache County, Arizona, appreciates the opportunity to review and submit comments concerning the Proposed Rule on Regional Haze and Visibility Impacts in Arizona, the proposed interim Best Available Retrofit Technology (BART) by SRP, the 2012 Regional Haze Federal Implementation Plan (FIP) and Clean Power Plan. While the public has an interest in reviewing and commenting on EPA Plans concerning Regional Haze and Air Quality, County governments have the additional responsibility of protecting the health, safety and welfare of their citizens. This additional responsibility includes, but is not limited to protecting the societal and economic impacts of federal actions. Apache County recognizes this responsibility with the utmost of seriousness and feel we need to address the Air Quality and Regional Haze Implementation Plan actions that effect local citizens in a thorough and serious manner.

The centerpiece of the regional haze program is state primacy. Arizona's SIP is fully consistent with the CAA and EPA's regional haze regulations. As well, the proposed SRP interim BART meets the EPA's Regional Haze Standards, preserves jobs in Apache County and has greater visibility benefits than the EPA's own proposed BART.

Apache County would also like to include as part of our comments our understanding of the visibility impairment associated with smoke produced by vegetation fires, and emphasize our commitment to and concern for public health and safety, as well as the health of our forests, shrub lands and prairies across the country, which are ultimately linked. *Blurring of the lines, no pun intended, between cumulative air-quality monitoring and the*

*impacts directly associated with Coronado Generating Station operations need to be clarified.*

*The amendments that EPA is proposing are in theory meant to reduce regional haze, however, they also have the potential to significantly restrict the use of prescribed fire, which could have serious implications for the future risk of severe wildfire and associated haze impacts. As well, the EPA's regional haze proposals do not effectively articulate how exceptional events will NOT be held against the operations of Coronado Generation Station.* Apache County is especially susceptible to changes in prescribed fire activities, effects of catastrophic wildfire and the impacts of air quality regulations to the ability for our county to maintain current enterprises, new and future industries, local tax-base and critical infrastructure.

As shown in the comments below, we do not dispute the monitoring of regional haze. We do, however, see a need for the Regional Haze Rule to better articulate the natural role of fire in America's ecosystems, clarifying how natural fire regimes, cultural burning, proactive fuels management, and forest restoration will be addressed in the rule to better account for the inherent connections between fire, ecosystem and public health, and visibility-impairing pollutants and the impacts of rule-making to industry and have them fully separated and articulated.

**Fire in America's Natural Areas:**

Fire, historically ignited by lightning and Native Americans, has shaped the structure and composition of the majority of America's ecosystems for millennia, and is indisputably a major component of natural background air quality conditions across the country. Many of these historical fires were frequent and of limited intensity, consuming dead material, recycling nutrients,

maintaining natural areas in a condition conducive to the vitality and vigor of plants and animals, and providing people with natural resources including clean water, food and materials. A century of fire suppression and litigation has led to significant shifts in the composition, structure, and function of our natural areas, resulting in fires that are uncharacteristically intense and lethal to plant communities, forest health, wildlife habitat and watershed function. Threats go beyond the fire itself, when the watershed function is reduced or impaired rainstorms can cause flooding events that damage property, threaten lives and fill municipal reservoirs with sediment. Many municipal watersheds and reservoirs for water supply are vulnerable to these intense fires.

Despite increasing expenditures on fire suppression, these intense fires represent a growing proportion of the annual area burned in the United States, creating periods of severely degraded air quality, threatening human life and property, and altering the natural landscape, with implications for the conservation of threatened and endangered species, access to clean water and availability of other natural resources.

Beneficial fire should be the primary component of any practical strategy to restore and maintain ecosystem health and resilience on a landscape scale and protect the public from severe wildfire events and related pollutants. It would be prudent to outline clear strategies that protect and enable the use of beneficial fire, rather than offering costly, cumbersome pathways that continue to treat fire as an inherently negative process only permissible under circumstances where visibility is not impaired.

Reversal of these trends requires the restoration and maintenance of forests, rangelands and prairie conditions that once both allowed for, and were maintained by, more frequent and lower intensity fires than we see today. The scale of this task

is immense. Fire itself, carefully and regularly applied under moderate conditions as either prescribed fire or managed wildfire, is the single most effective and efficient tool for restoring and maintaining the health of our country's wildlands while protecting against future catastrophic uncontrolled wildfires and related threats to public health and safety.

It stands to reason that a critical point in Haze, Emission, Ozone and other Air Quality Standards be brought to the forefront of any discussion involving federal agency regulations versus real-world outcomes.

Please note the below graphic from the EPA's website charting of Emissions from facilities within Apache County:

2011 – Arizona – Apache County – Total Reported Emissions by Facility in Metric Tons of $CO_2e$

| Facility | City | State | Total Reported Emissions | Sectors |
|---|---|---|---|---|
| Coronado Generating Station | ST JOHNS | AZ | 6,030,449 | Power Plants, Waste |
| EPNG Station 6755 Navajo, AZ | Ganado | AZ | 19,520 | Petroleum and Natural Gas Sys... |
| EPNG Station 6796 Window Ro... | St. Michaels | AZ | 91,595 | Petroleum and Natural Gas Sys... |
| Springerville Generating Station | SPRINGERVILLE | AZ | 10,479,679 | Power Plants |

The Wallow Fire burned **536,000 acres**, and based on carbon emission models and other monitoring, **68,072,000 tons** of Greenhouse Gas were emitted. Remember, that does not include the radioactive and other toxic (mercury, lead, cadmium, etc.) emissions, just Greenhouse Gas Emissions.

In this case, we chose to select Apache County, so we could compare it to our famous record-setting wildfire, the Wallow Fire.

In Apache County, the home of the Wallow Fire, in the same year of 2011 all sources of Greenhouse Gas emissions including power plants and natural gas compression and transfer stations, per the EPA's own data, was 16,621,243 metric tons of Greenhouse Gas.

Also take note, the *EPA figure is for the entire year*, the *Wallow Fire was three weeks.*

So again, let's compare:

**2011 Apache County Greenhouse Gas Emissions:**
All power sources combined for the entire year, per the EPA: 16,621,243 tons
The Wallow Fire in three weeks: 68,070,000 tons

The above referenced data and figures are unfortunately quite

indicative of unchecked federal regulatory actions and activist judicial decision.

In summary of the above data concerning fire emissions and it's impacts on Haze Regulations, it must again be stressed that the interim BART proposal of SRP is the best available solution until all aspects of monitoring, exceptional event standards, and the as of yet unexplained intricacies of the Clean Power Plan can be fully vetted.

Apache County, Arizona, feels that the health, safety and welfare of its citizens will be negatively impacted by any over-reaching and severe rulings that stem from these Federal agency mandates. The mission of the EPA is to guarantee quality of life for the American people, and can best accomplish this through open and honest communication. When a sense of fairness and equal standing of local governments is part of the equation, that mission can be accomplished. Throughout the coming planning periods, Apache County wishes to continue to be a coordinating agency and be fully apprised of all actions, hearings, plans, meetings and outcomes as the process moves forward.

Respectfully Submitted,

Doyel Shamley
Veritas Research
Apache County Natural Resource Coordinator

Good Evening, thank you for the opportunity to express our total support of CGS and it operation proposal.

By way of introduction my name is Ken Whiting, I was born in St Johns and with the exception of a few years I have lived in St Johns most of my life. During the few years I was absent, it was to obtain a bachelor of science degree in biology from ASU and a Master Degree from the College of Engineering again from ASU (specializing in Environmental Engineering,) I returned to St Johns and over the last 30 plus years of my life, I have been fully engaged in and as an Environmental Engineer, participating in the environmental regulatory arena during that time.

We are here tonight WHY?? To address 2 major issues surrounding ADEQ's / EPA's directive regarding CGS 1. 1st issue is to recognize EPA's goal is to close all coal fired power plants and our second issue directly related to the 1st , is to recognize if EPA forces CGS and eventually SGS out of operation what impact will this have on our communities and county.

1st and the main issue is EPA: tonight we need to use the Donald Trump approach, whether you like him or not and call things what they actually are, and for our purpose that is very important tonight. CGS and all other coal fired power plants have and will continue to be bombarded with additional EPA mandates. Realize each time a new regulation surfaces, it is more restrictive than the last emission standard. This not only imposes huge financial burdens on the companies who own the plants, but EPA's approach now is so obvious, we readily see, reduced emission is no longer EPA's objective, and each power plant can see the writing on the wall, if we continue this trend, of additional and more stringent regulations, compliance will no longer be achievable, leaving the only alternative for the plant, is to shut it down and walk away**. In actually we need to understand the plant is forced, out of business.** Here is a very important point. Stay with me the plant was shut down not because of harmful emission but because of noncompliance. YOU NEED TO THINK ABOUT THAT.

This is what SRP/CGS is coping with. EPA's goal is to eliminate all coal fired power plants, and EPA does this, by ratcheting down emissions limits, so low, that power plants, specifically in our area, CGS and eventually SGS **will not be able to comply**. We as US citizens, must realize each EPA directive, is a direct results of our current Obama administration, seeking to eliminate, through regulatory mandates removal of each and every coal fired power plant in the United States.

Let me give you an Example: I recall when these plants were first put into operation they were required to remove pollutants, at the PPM level which equates to tons / years. EPA found emission removal in the PPM range, was not sufficient to put CGS / SGS out of business. EPA then required a new standard, mandating emission removal to be in the range of PPB range what does that mean, when new regulations mandates a plant, currently removing a pollutant to 10 PPM, and the new regulation requires removal down to 10 PPB, a plant has to remove a 1000 times more of that particular constituent, than it used to, now, you can see how a plant struggles to meet this new mandate, but focusing on CGS,CGS again complied after another astronomical financial investment.

Given a few years for the environmental dust to settle, EPA again raised its regulatory head since PPB did not eliminate Coal (this is not a fairy tale even though it sounds like it, it is indeed a fractured fairy tale) EPA would now require removal in the PPT range that equates to the US debt, but in the opposite direction. This range was so ridiculously low, when it was promulgated, to illustrate how ridiculous this requirement was, the removal in the PPT range, even though EPA set the standard, and power plants were mandated to comply by a certain date, there was not even an instrument in existence / created or invented at that time, that was capable, of analyzing, continuously, at that level, even though EPA demanded it. **Again realize why is EPA mandated** such low emissions, you have to figure this out not by now, **because of emissions be emitted??? NO!!** but EPA knows it will result in noncompliance, why noncompliance it is so much easier to get public support by closing a plant down based on a plant's quote "noncompliance" Vs obviously using the environmental hammer to do the job.

Now we are going to move from the technical side briefly and address our second issue How will shutting down these plants determine the future and destiny of this, our area, our life as we now know it, it hinges on the necessity, of ensuring these 2 power plants survive. If EPA shuts down initially Unit 1 and ultimately CGS and SGS altogether, how will that affect the lives of every individual in this area?

1st we / you need to Understand it will not just be the workers at the plant that are affected, we need to understand these plants and their financial influence on this area is so great that without them the affects on our towns, our communities, Apache County, Navajo County and the state of Arizona will be equivalent to same effect it would have on each plant meaning many of you will have to shut down and move away. We as citizens in this area, express to ADEQ and EPA, you are not only subjecting CGS and ultimately SGS to their ultimate extinction, but also, we the people, our community, Apache county and directly and indirectly the state of Arizona to our demise!

And because of that, the regulatory agencies (ADEQ and EPA) need to emphatically know and comprehend, there is much more involved here than mere compliance, of a few PPM, PPB or PPT which will be in compliance if you accept CGS's operational proposal.

EPA / ADEQ you need to know and understand this is where we live, this is where our children live, and this is where we are going to continue to live for many generations to come.

**Now to the bottom line**, WHY we have taken of our time and means to be here tonight and I would like to complement all those who came in support of CGS's proposal to ADEQ and EPA. Why we are here tonight reminds me of an incident that happened over in east Texas a few years ago,) (I want to know the name of the dude that pushed me in the swimming pool)

We are here tonight to know the names of those individuals who are pushing us in to the swimming pool and expose their motives of why they would do this to a community. We are here to address what some people and liberal environmental organizations, along with certain state and federal agencies would like us to believe, that the pending EPA regulations, addressing the operation of CGS 1 is inevitable, and they would like us to believe we cannot influence or stop the political / environmental machine. WE know and understand certain regulations are important and needed, note the word needed, something totally different than what we are dealing with here tonight.

We also know EPA's weapon of choice, to eliminate coal fired power plants, and ultimately the destruction our way of life, is a continual, and unprecedented string of regulations, many of these regulation are superfluous, not needed or required, regulations administered under EPA's Clean Air Act, including but not limited to: such regulations as BART, BTBART, Regional Haze, CPP, SIPs FIPs and the list goes on.

It is interesting to note, how the political machine with its vast power, directs environmental initiative's that become environmental mandates / regulations, and how the regulations are promulgated so we, the public will accept the new, governmental restrictions. For example: We John Q public are lead to believe "if it is good for mother earth it must be something we should do," and again, if we do not accept that justification, ensuring we get that good feeling, the media steps into help us believe shutting down all coal fired power plants via environmental regulations are needed:

Headlines read: "EPA shuts down another one of those dirty, filthy, polluting, coal fired power plants today" and the uninformed public and I stress uninformed public cheers and bows down to that great EPA, stating we are so proud of you. Then it is too late, as John Q receives his electrical bill that doubles and triples, communities suffer, resulting in more unemployment, (talk to the state of Kentucky if you do not believe it) the collapse and abandonment of once strong communities, families now leave the area, to hopefully find a job, leaving without hope, again pacified, as they leave what we and our progenitors worked so hard for. We are lead to believe it had to happened, it was inevitable, thus leaving the political machine and its agenda to go on unchecked as far common sense would dictate.

John Q public again is rolled over, without realizing what actually just happened. We can't let that happen to us.

You need to know ASU recently conducted a very extensive and accurate study and it is available on line, please read it, you will know and realize what these plants actually provide, and when and if they are gone, the study shows the factual portrayal of what will, not may, but will result. It show the detrimental results of what will happen to you, your towns and communities, and this will happen if ADEQ/EPA does not accept SPR/CGS's proposal.

Over the last 35 plus I have observed two coal fired power who have served faithfully not only as power plants suppling power, which is indeed the literal life blood of America but these plants have provided people with a home to come

home to, to have gainful employment, insurance, schools, building of strong communities without these two plants, on this scale, none of this would have been possible.

Please note each individual, family, businesses in this room and all those who are not in this room, EPA and ADEQ's objective is to destroy your way of life, your family, your job, your community, your state. You may say, that is a little strong, you need to understand this is not given as an emotional statement, to try to get a reaction, this is so factual it is almost unbelievable, hopefully it will bring each of you, to the realization, that your little boy or girl, your wife who at this time, who have what they need, you have a home, your children get on the bus each day, they have a school to go to, with great teachers, you tuck them in bed each night, you are able to pay bills as they comes in, you have food to eat, you live in a community you enjoy,

Wait until that morning, you as plant workers walk into an all hands meeting, because CGS has received a cease and desist order from EPA, and it is announced, you have 4 weeks to find a new job, maybe some severance packages will be available, I have been around, it is better than nothing, but the money does not last that long, hopefully you get the picture, CALL AND CONTINUE TO CALL YOUR 2 SENATORS, HOUSE REP, AND MAY YOU KNOW, YOU ARE NOT RESTRICTED ONLY TO YOUR STATE REPS CALL ANY OTHER REP OF OTHER STATES AGAIN AND AGAIN, EMAIL AND FIGHT LITERALLY, TO RETAIN YOUR WAY OF LIFE. If you don't As you know all things that are worthwhile require an active effort, get and become involved.

## **In closing and in summary may I conclude**:

We, meaning the scientific world, and we, as the affected individuals, communities, county and state, we definitely, and without reservation, not only accept SRP/CGS's proposal, but mandate to EPA and ADEQ to also accept without reservation, CGS's proposal of operation. WHY This will allow CGS to meet the emission standards, as effectively, as installing a SCR and meeting SO2 requirements at the same time.

EPA and ADEQ hopefully you, not only get the picture, but you understand emissions are not as important as lives, we know, based on empirical data, the emissions produced by CGS, under their proposal, will not be in violation of any regulatory statute, IF, you accept CGS's, operational proposal, as submitted.

THANK YOU,

# 8/23/2016 ADEQ Public comment meeting at St. Johns, AZ

My name is Steve Seymore, and I am a resident of Taylor, AZ. I work for the Salt River Project as an Instrument and Electrical Supervisor at their Coronado Generating Station in St. Johns, AZ. I have worked there for the last 14 years and I have been witness to the hundreds of millions of dollars that SRP has poured into that plant during that time to maintain it as a strategic and vital source of generation for our customers in the Phoenix metropolitan areas. While many of those dollars have gone to properly maintain it per the industries best practices, the majority of those dollars have been used to ensure that we run and operate the plant with as few emissions as is reasonably possible as well. SRP has demonstrated its commitment to the clean and reliable operation of CGS not only for the environmental benefits, but for the economic benefit of the eastern region of the state, Apache County and in particular, the communities of St. Johns and Springerville/Eagar.

Coronado Generating Station was designed for base load generation, meaning that it is the 24/7 low cost type of generation that allows you to get up just after midnight, throw the switch for the lights and get a cold snack from the refrigerator and heat it up in the microwave, conventional oven, or any other means that requires electricity at that hour in the morning… especially those hot or cold still nights when wind and solar power isn't available.

During the hottest portions of the year, SRP has no greater and reliable source of generation than the Coronado Generating Station. As SRP is the sole owner and operator of the plant it is their single largest source of generation, at approximately 765 NMW's, enough generation to power nearly a half million homes. Coronado Generating Station is also the flagship of their fleet of generation. As they don't have to deal with other owners, they are free to make decisions that are in the best interests of SRP itself, it's customers, the surrounding communities and their just over 200 current employees.

We have worked collaboratively with the ADEQ and the EPA to develop this Better-Than-BART alternative and to incorporate it into a SIP revision. The modeling of the Better-Than- BART alternative suggests that over a year to years' time, we can outperform the addition of an SCR until we can determine the practical and economic feasibility of its' addition. We had originally expected to install an SCR on our # 1 Unit sometime after we did so on our #2 unit as part of a consent decree with the EPA several years ago. We spent thousands of dollars doing the prep work for the addition of the SCR in order to comply with the regional haze rule on Unit #1, and then the EPA issued a new carbon rule that sent the entire industry into a quandary as to how to comply and what the short and long term ramifications would be. Because neither the state nor the EPA could determine

how, when and if it could be equitably implemented, SRP put the brakes on going forward with the SCR until all the parties involved could determine the rules' implementation. The forward thinking arm of SRP developed this alternative and supported it with great modeling. Until the carbon rule is established in its final form, we the employees of Coronado Generating Station, feel this is a win-win proposition for SRP, CGS and its employees, Apache County, the state of Arizona, ADEQ, the EPA and its associated environmental groups.

It is our hope to ensure the environmental and economic health of this region of the state for years to come and we gratefully, and with great urgency, petition the ADEQ to approve the SIP revision as it is proposed. Upon ADEQ's approval, with the same gratitude and urgency, we also petition the EPA to give timely approval to the ADEQ State Implementation Plan (SIP), as failure to do so on either the part of ADEQ or the EPA would cause the cessation of operation of the #1 Unit at CGS by December 5, 2017 and cause a devastating and undue burden to CGS, its employees, their families and the entire region.

Now that the carbon rule has been proposed by the EPA and its environmental lap dogs, I would like to add to the proposal a caveat of sorts in the form of both an observation and a suggestion for consideration. As the narrative continually changes for the environmental movement, fist global warming, then climate change and now extreme weather, it leaves destruction of one industry after another in its wake, with none of the alarmists predictions even close to reality. Remember when Al Gore sounded the alarm that by 2013 there would be no polar ice caps and no coastal cities worldwide would escape catastrophic harm if we didn't move them inland and uphill? Damned science just won't cooperate and support their Chicken Little predictions! Not only does it expose their morbid and flawed agenda, but it leaves environmental and economic devastation in its wake. They will never admit to the scam that is global warming, climate change, extreme weather or whatever buzz words they want to attach to the next phenomenon that fits their agenda of misdirection and subversion of sound policies that are proven to grow economies and preserve environmental health.

Take our forests, for example… when we actually tended the forests with good logging and thinning practices, not only did they provide good jobs for many in the communities living in and around them, but they supported good health of our forests. When the policies of forest health and economic benefit of the same were abandoned by the environmental gurus that never lived in or around them, our forests in the West began a deliberate and steady decline. It has gotten to the point that we no longer try to prevent fires from destroying the very best natural source of carbon capture we have… our forests! Quit burning them down!

We have all witnessed in the last twenty years the devastation of the new policies of the US Forest Service, dictated directly and indirectly by the same environmental groups that purport to want to preserve them. Whether their intent is genuine or not is best left for another time and place… their policies though are not. Even when they say let it burn, its nature's way of cleaning the fuel and replenishing the soil with needed nutrients, they fail to recognize the human effect of those policies, both in terms of health and economics.

We are the ones that live in and around the forests… we are the ones that want healthy and vibrant forests and wildlife populations. We are the ones to best serve as stewards of the same, not some environmentalists that simply want to shut the forests to all but those who share their views of what they should be… for them and them alone. The forests were once the economic lifeline of these communities. We, more than anyone wanted their health and subsequent benefits for our children and future generations. The logging operations used to provide access to all points of the forest with roads and equipment to quickly extinguish fires and thin the forests to support their health with strong and vibrant stands of timber and feed for wildlife and cattle alike, all the while supporting a proud and hardworking heritage and way of life for those who wanted to live in this area and region of our great state. Sadly, we are also the ones who have witnessed the death, destruction and devastation of an entire industry and way of life… that being the timber industry. The emissions from our power plants in twenty years pale in comparison to the smoke, mercury, NOX and CO the forest fires of the last twenty years have produced… thanks to the new environmental policies dictated to and through the US Forest Service under the guise of science.

Because of our vitality, love of life and reputation for hard work, the power industry decided to invest in us and build several coal fired power plants in our region to provide low cost and reliable power for our neighbors, friends and families in the Valley/Phoenix Metropolitan areas. We have supported this industry and provided the very power that cools and heats the offices of the same environmental groups that are now trying to take yet another lifeline and source of economic stability from us… when is enough, enough? We have complied with the environmental regulations thrust upon us to this point… can't you just let us live for a while now?

My point is, your environmental policies have needlessly destroyed one industry and way of life… please don't destroy another!?

Comments at ADEQ public hearing at St. Johns High school

Good Evening Ladies and Gentleman,

My name is Steve Vital, I am here to represent a couple of entities as I wear a couple hats in our community in the different positions I hold.

First I will speak as a representative of I.B.E.W. Union Local 266 as a representative of the hourly workers at Coronado Generation Station and at SRP abroad. As a union member and representative I am often called upon to represent our hourly workers when a disagreement or issue comes up between the worker and Management and we work together to try to find a solution that works for both the employee and the company. As far as the issue that we currently face with the EPA regulations and mandates imposed on SRP to retrofit the Units at CGS with emissions controls that cost an astronomical amount of money, or shut Unit one down at the end of 2017. This issue effects both the company and our hourly workers and not to mention their families and all of the communities in the White Mountains. In my opinion every time the EPA has come to SRP with a new mandate for emissions control improvements, first with the issue they had with the Haze at the Grand Canyon and blaming a power plant almost 200 miles away for the haze. So they required the installation of the Absorber scrubbing systems on both units at CGS and an SCR on Unit 2. SRP has bent over backwards to meet each requirement the EPA has mandated on the coal fire plant in St. Johns AZ at CGS only to have the EPA change their mind and raise the bar on emissions controls requirements . Our concern is for the employees at CGS if SRP should have to shut down unit 1 at the end of 2017 and the loss of jobs that will create, effecting their livelihood. We have been fortunate enough to have great jobs at SRP's Coronado Generation Station (CGS) and would hate to see them eliminated. As I shared at the beginning, many times as a Union representative we are called to help settle disagreements between Management and employees at SRP. SRP has developed a plan called better than BART, which will reduce emissions better than the EPA's plan to install a SCR on unit 1 as they did on unit 2 at CGS and we as the Union at Local 266 agree with SRP 100% on this plan to try to keep Unit 1 running past the deadline of the end of 2017. We offer and affirm our Support to SRP in their plan submitted to the EPA to keep Unit 1 at CGS running past 2017.

Now to speak on behalf of the small school district of Concho ESD. As I serve on the school board and have done so for the past 7 ½ years. Concho ESD was recently audited by an independent Auditing Firm to comment on the financial standing of our district. Keep in mind this is an independent firm using first hand research of the community making these statements. I will be reading a quote from their findings of Concho ESD.

"Apache County Elementary SD 6 (Concho), AZ
Annual Comment on Concho ESD
Issuer Profile
Apache County Elementary SD 6 (Concho) is located in eastern Arizona. The district is headquartered in Concho, approximately 150 miles northeast of Phoenix. Apache County has a population of 71,828 and a population density of 6 people per square mile. The counties per capita personal income is $28,521 (4th quartile) and the February 2016 unemployment rate was 11.6% (4th quartile).2 The largest industry sectors that drive the local economy are local government, farm employment, and health services. A significant portion of the revenue base in both counties are the coal-fired power plants located in Joseph City (Arizona Public Service), St Johns (Salt River Project), and Springerville (Tucson Power and Electric). "

Comments at ADEQ public hearing at St. Johns High school

So as you can see by the observation of the auditor, they too realize that, these coal fired power plants are very important to these communities in the White Mountains. Not only to the communities in Apache County but also the communities in Navajo County as well. We in our very small school district of Concho ESD realize how important it is to keep CGS running for a long time past 2017. Before today I did not realize the extent of how much SRP supports Apache County as we heard one of the earlier speakers say, SRP gives twelve million dollars per year to Apache County in taxes. That is a huge amount of money to the poorest County in AZ if not the Nation. I hadn't realized how much SRP actually pays to Apache County each year. That money makes a huge difference in our communities and school districts, this is something that we do not want to lose. We Concho ESD also would like to express and affirm our support to SRP in their efforts to keep CGS the plant located in St. Johns open and running for many years to come. If you kill these plants on the Mountain, then you are also killing our communities though out the White Mountains. Please give very careful consideration and recommend to the EPA the acceptance of SRP's better than Bart plan, to keep both units at CGS running and supporting our communities for many years to come. Thank you for the opportunity to speak before you and express our concerns about the future of CGS and our communities.

Thank You,

Steve Vital
IBEW Local 266 Rep.
Concho ESD #6 Board Member
Concho and Lakeside, AZ Concerned Resident

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# Appendix D.4
# Comments Submitted by the Public

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

AUG 2 2 2016

Mr. Balaji Vaidyanathan
Air Quality Permits Section Manager
Arizona Department of Environmental Quality
1110 West Washington Street, 3415A-1
Phoenix, Arizona 85007

Dear Mr. Vaidyanathan:

The Environmental Protection Agency (EPA) appreciates the opportunity to provide comments on Arizona's revision to its State Implementation Plan (SIP) for Regional Haze and Significant Permit Revision No. 63088 to Air Quality Control Permit No. 52639 for the Coronado Generating Station (CGS). As described in your public notice on July 21, 2016, the Significant Permit Revision is a component of the SIP revision and contains several elements intended to satisfy Arizona Regional Haze Best Available Retrofit Technology (BART) requirements. We will be providing our formal comments on the Significant Permit Revision during our 45-day review period after we have considered your response to public comments and any changes you may make to the Permit based on public comments.

Thank you for the considerable amount of work by you and your staff in addressing the many complicated technical and regulatory issues raised by this SIP revision. Our comments are enclosed. Please don't hesitate to contact either Krishna Viswanathan at (520) 999-7880 or myself at (520) 498-0118 to discuss these comments further.

Sincerely,

Colleen McKaughan

Colleen McKaughan
Associate Director
Air Division

Enclosure

*Printed on Recycled Paper*

## U.S. EPA Region 9 Comments

The following are U.S.EPA Region 9's comments on the proposed revision to the draft Arizona Regional Haze SIP and draft Significant Permit Revision No. 63088 to Air Quality Control Permit No. 52639 for CGS. Our comments are based on our review of the documents made available during the public notice period starting on July 21, 2016.

We will provide our formal comments on the Significant Permit Revision during our 45-day review period. You may receive public comments on the Permit and make changes to the Permit based on those comments. Any changes to the Significant Permit Revision could have an impact on or require modifications to the SIP revision. Our initial comments are below.

1. Legal Authority: The draft Significant Permit Revision, Attachment E, cites 40 C.F.R. 52.145 as the authority for the conditions contained in the Permit. 40 C.F.R. 52.145 is the Federal Implementation Plan (FIP) for BART for CGS promulgated by EPA. Condition I.A. also provides that Attachment E will only become effective if the EPA "revokes or rescinds" the FIP. The EPA anticipates that Arizona Department of Environmental Quality (ADEQ) has adequate state law authority through its permitting rules to issue Attachment E. However, that authority is not based on the FIP promulgated by the EPA. Therefore, Attachment E should be revised to provide the correct citation to ADEQ's legal authority to issue the Significant Permit Revision.

2. Because the Significant Permit Revision, Attachment E, will be the primary element of the SIP revision, it must contain all applicable emission limits for the BART Alternative and adequate monitoring, reporting and recordkeeping (MRR) requirements to ensure continuous compliance with those emission limits. The Significant Permit Revision as drafted is either deficient or unclear concerning some key emission limits and MRR requirements.

    a. For the interim BART alternative operating scenarios required in Conditions II.B.1 and C.5 & 6, there are no specific MRR requirements to demonstrate compliance with the Unit 1 and Unit 2 emission limits in Table 1. The inclusion of these MRR compliance requirements is a necessary provision of the Permit and SIP revision. We recognize that some MRR provisions exist elsewhere in the facility's Class I operating permit and in Condition III.C, but the Significant Permit Revision should include specific MRR provisions for demonstrating compliance with the Unit 1 and 2 emission limits in the interim operating scenarios in Conditions II.C.5 & 6 and Table 1.

    b. It is not clear that the draft Significant Permit Revision includes $NO_X$, $PM_{10}$, and $SO_2$ emission limits for Unit 2 in the post-2029 operating scenarios (i.e., BART Alternative OS-1 and OS-2). The draft Significant Permit Revision also appears to omit MRR requirements for assuring compliance with the Unit 2 emission limits. We recognize that Conditions II.C.1.b and 2.b specify $NO_X$ and $SO_2$ emission limits for Unit 2. These emission limits, however, appear to be limited to the "Unit 1 Interim BART Alternative Operating Strategy Requirements." Therefore, specific emission

limits for Unit 2, including $PM_{10}$, must be included for operations after 2029, for example in Conditions III and IV. The Significant Permit Revision must also include MRR to demonstrate compliance with the Unit 2 emission limits for the period after 2029. Because the emissions from Unit 2 are included in the BART alternative, enforceable emission limits and MRR requirements for Unit 2 are necessary for the Significant Permit Revision and SIP revision.

c. Similarly, it is not clear that the draft Significant Permit Revision includes $PM_{10}$ emission limits for Units 1 and 2 for the interim BART operating scenarios. Because $PM_{10}$ emissions from Units 1 and 2 are included in the BART alternative, enforceable emission limits and MRR requirements for $PM_{10}$ for Units 1 and 2 are necessary for the Significant Permit Revision and SIP revision.

3. With respect to the draft SIP revision, we are continuing to evaluate your determination that SCR installation on Unit 1 in 2029 (BART Alternative OS-1) would achieve greater reasonable progress than BART. We appreciate the modeling that you provided to satisfy the regulatory requirement to demonstrate based on dispersion modeling that, for each impacted Class I area on the worst and best 20 percent of days, the alternative passes the following "two-prong" test:

   (i) Visibility does not decline in any Class I area, and
   (ii) There is an overall improvement in visibility, determined by comparing the average differences between BART and the alternative over all affected Class I areas."

   Although we are requesting some additional clarification of the modeling, we understand that your modeling shows visibility improvement during the times that Conditions II.C. 5 & 6 apply. In our 45-day review period following your response to public comments on the draft Significant Permit Revision, we may provide additional comments concerning your conclusions that Alternative OS-1 complies with the requirements of 40 C.F.R. 51.308(e) after 2029.

4. We recommend including certain additional plots of photochemical modeling results. We appreciate your efforts in addressing the majority of our concerns regarding the Better-than-BART (BtB) photochemical modeling. The account by Environ[1] includes several spatial plots aimed at addressing the issue of whether the small differences between modeled scenarios represent actual visibility benefits, as opposed to numerical "noise." However, because these plots (Figs. 4-9 through 4-16, for BtB scenarios 1 -4, both Prong 1 and Prong 2) appear to be of annual averages, they would necessarily smooth over any numerical artifacts that are of concern in the "noise" issue. We recommend that additional plots be prepared for nitrate differences and for sulfate differences. The plots would be of daily averages on individual days, for the subset of days for which CGS has a contribution at the most affected nearby Class I areas. Such plots would be more useful

[1] "Revised Better-than-BART Analysis for the Coronado Generating Station using the CAMx Photochemical Grid Model", Ramboll Environ US Corporation, June 2016; file CGS_BtB_CAMx2_Modeling_v2_06212016.pdf

in discerning whether differences used in the Prong 1 and Prong 2 visibility metrics behave as expected.

5. The Technical Support Document for the draft Significant Permit Revision contained an analysis of Best Available Control Technology and other provisions associated with issuing a Prevention of Significant Deterioration (PSD) permit. If CGS elects to install SCR on Unit 1 in 2029 or at any time, ADEQ must determine if PSD applies and if so, to issue a PSD permit. The Significant Permit Revision under consideration in this action does not satisfy the PSD permit requirement.

EARTHJUSTICE

ALASKA CALIFORNIA FLORIDA MID-PACIFIC NORTHEAST NORTHERN ROCKIES
NORTHWEST ROCKY MOUNTAIN WASHINGTON, DC INTERNATIONAL

August 23, 2016

***Submitted via electronic mail***

Balaji Vaidyanathan
Air Quality Permits Section Manager
Arizona Department of Environmental Quality
1110 West Washington Street, 3415A-1
Phoenix, AZ 85007

**Re: Arizona Regional Haze Plan Revision for Coronado Generating Station Unit 1**

Dear Mr. Vaidyanathan:

On behalf of National Parks Conservation Association and Sierra Club (collectively, the "Conservation Organizations"), Dr. Ranajit Sahu has prepared the attached technical comments regarding the Arizona Department of Environmental Quality's (ADEQ) proposed Best Available Retrofit Technology (BART) alternative for Coronado Generating Station Unit 1.

The current BART requirements for Coronado require Unit 1 to either install Selective Catalytic Reduction (SCR) controls or shut down by December 5, 2017. Under the BART proposal, however, Salt River Project (SRP) would delay compliance with the BART requirements until December 31, 2029. As Dr. Sahu's technical comments explain, even with seasonal curtailments, the proposal would allow Coronado Unit 1 to continue to emit large amounts of air pollution for twelve years after the December 5, 2017 BART compliance deadline. Allowing Coronado Unit 1 to do so will harm the air quality at multiple Class I areas in the region, and it will also cause Arizonans to breathe dirtier air for over a decade after the current BART compliance deadline. Dr. Sahu's technical comments also detail significant reliability, transparency, and accessibility issues regarding the modeling underlying the BART proposal. In short, ADEQ's use of CAMx has prevented Dr. Sahu from fully and adequately reviewing the modeling for this proposal. Moreover, the modeling is flawed because it is based on just one year of meteorological data, which effectively ignores the annual variability in meteorological and other conditions. For these reasons, the Coronado BART proposal is flawed and should be rejected.

In addition, ADEQ should not approve the Coronado BART alternative because it violates the Clean Air Act. The Act requires sources to install BART controls "as expeditiously as practicable but in no event later than five years after" the Environmental Protection Agency (EPA) approves a haze plan. 42 U.S.C. § 7491(b)(2)(A), (g)(4); *see also* 40 C.F.R. § 51.308(e)(1)(iv) (sources must "install and operate BART as expeditiously as practicable, but in no event later than 5 years after approval of the implementation plan revision"). The Act thus makes clear that a source must install BART controls as quickly as possible, and under no circumstances can a source delay installing BART past five years. EPA approved the BART

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determination for Coronado on December 5, 2012. 77 Fed. Reg. 72,512 (Dec. 5, 2012). Consequently, SRP must comply with the Coronado BART requirements within five years of that date. Accordingly, EPA set a December 5, 2017 compliance deadline for its Coronado BART determination. *Id.* at 72,578.

The proposed BART alternative for Coronado Unit 1 violates this five-year BART compliance deadline. To comply with the five-year deadline, SRP can either install SCR on Unit 1 by December 5, 2017, or shut down the unit by that date. ADEQ's proposal, however, would allow the unit to continue operating without installing any additional pollution controls until December 31, 2029. While ADEQ appears to believe the proposed seasonal curtailments would satisfactorily reduce Unit 1's pollution beginning in 2017, Dr. Sahu found that is not the case. Accordingly, instead of cleaning up Coronado's pollution by next year as the Act requires, ADEQ's proposal would allow Unit 1 to continue polluting for more than twelve years beyond the compliance deadline. Congress clearly set a five-year compliance deadline for BART, and specified that "in no event" may the compliance deadline be extended beyond five years after a BART determination is in place. 42 U.S.C. § 7491(g)(4) (emphasis added). ADEQ's proposal, however, would ignore the Clean Air Act's five-year BART compliance deadline by allowing Coronado Unit 1 an additional twelve years to install SCR or shut down. The proposal would thus violate the Clean Air Act and should be rejected.

In addition to violating the five-year BART compliance deadline, ADEQ's proposal would also violate the anti-backsliding requirement of Clean Air Act section 110(*l*). This section prohibits states and EPA from revising an implementation plan if the revision would weaken the existing plan's requirements. Section 110(*l*) states: "The Administrator shall not approve a revision of a plan if the revision would interfere with any applicable requirement concerning attainment and reasonable further progress . . . or any other applicable requirement of this chapter." 42 U.S.C. § 7410(*l*). The Ninth Circuit has explained that section 110(*l*) is the Act's "anti-backsliding" provision. *El Comité Para el Bienestar de Earlimart v. EPA*, 786 F.3d 688, 692 (9th Cir. 2015). This anti-backsliding provision applies to existing BART determinations, as the Act's "applicable requirement[s]" include the regional haze program's BART requirements. *See Oklahoma v. EPA*, 723 F.3d 1201, 1204, 1207 (10th Cir. 2013) (BART determinations and other regional haze provisions are "applicable requirement[s]" of the Act).

EPA has long interpreted section 110(*l*) as preventing implementation plan revisions that would increase overall air pollution or worsen air quality. For example, in *Kentucky Resources Council, Inc. v. EPA*, 467 F.3d 986 (6th Cir. 2006), EPA interpreted section 110(*l*) as allowing the agency to approve a plan revision that weakened some existing control measures while strengthening others, but only "[a]s long as actual emissions in the air are not increased." *Id.* at 995 (quoting 70 Fed. Reg. 28,429, 28,430 (May 18, 2005)) (emphasis added). The court upheld EPA's interpretation, which "allow[ed] the agency to approve a [state implementation plan] SIP revision unless the agency finds it will make the air quality worse." *Id.* (emphasis added). The Eleventh Circuit has similarly upheld EPA's interpretation of section 110(*l*) as prohibiting plan revisions that would increase emissions or worsen air quality. *Ala. Envtl. Council v. EPA*, 711 F.3d 1277, 1293 (11th Cir. 2013) (EPA interpreted section 110(*l*) to "permit approval of the SIP revision 'unless the agency finds it will make air quality worse'" (quoting 73 Fed. Reg. 60,957, 60,960 (Oct. 15, 2008))); *see also id.* at 1296 (Molloy, J., concurring in part and dissenting in

part) (EPA properly concluded a plan revision did not comply with section 110(*l*) when the agency could not rationally determine whether the revision would increase particulate emissions). Moreover, in a short discussion regarding a challenge to the Nevada regional haze plan, the Ninth Circuit indicated that a haze plan that "weakens or removes any pollution controls" would run afoul of section 110(*l*). *WildEarth Guardians v. EPA*, 759 F.3d 1064, 1074 (9th Cir. 2014).

ADEQ's proposal violates section 110(*l*) because it weakens the existing BART determination for Coronado. The proposal would do so by eliminating the requirement that Coronado Unit 1 significantly reduce its nitrogen oxides pollution by December 5, 2017, by installing highly-effective SCR controls or shutting down. Instead, the proposal would allow Unit 1 to seasonally curtail its operations beginning in December 2017, while continuing to operate without any additional pollution controls until December 31, 2029. As Dr. Sahu's technical comments show, the net effect of these new measures is an increase in Coronado's air pollution and an increase in Coronado's visibility impairment compared to the existing BART determination, continuing for more than twelve years after the BART compliance deadline. This increase in air pollution and visibility impairment weakens the existing BART determination in violation of section 110(*l*).

The twelve-year delay before Coronado Unit 1 would comply with its BART obligations would also undermine the reasonable progress goals (RPGs) for the many national parks and wilderness areas impacted by Coronado's air pollution. This delay in pollution reductions would preclude Arizona from achieving the gains to which it is committed in the current haze plan, which was upheld by the Ninth Circuit. *Ariz. ex rel. Darwin v. EPA*, 815 F.3d 519, 524 (9th Cir. 2016). When EPA set the RPGs for Arizona's Class I areas, it was premised on Coronado actually complying with the December 5, 2017 BART compliance deadline. 79 Fed. Reg. 52,420, 52,426, 52,469–70 (Sept. 3, 2014). Accordingly, if ADEQ's proposal is finalized, the RPGs must be reassessed and other sources must promptly reduce their pollution in order to ensure reasonable progress and compliance with the RPGs. The existing Coronado BART determination promises significant pollution reductions beginning December 5, 2017. As a result, if ADEQ grants SRP's request to delay Coronado's compliance obligations, other sources would have to provide additional pollution reductions beginning on that date to comply with the Act's RPG requirements.

For these reasons, the Conservation Organizations respectfully request that ADEQ not finalize the proposed Coronado BART alternative and instead leave the existing BART determination in place. SRP wishes to maximize its operational flexibility and to delay deciding whether to install SCR or shut down Coronado Unit 1 until after its Clean Power Plan obligations are finalized. However, the Clean Air Act does not provide the operational flexibility SRP would prefer. The Act requires Coronado to promptly reduce its haze pollution, and it prohibits ADEQ from replacing the existing BART determination with a plan that increases air pollution and worsens air quality by delaying BART compliance until twelve years after the deadline.

A strong haze plan for Arizona that complies with the Clean Air Act is critically important to improve visibility at the many national parks and wilderness areas in Arizona and nearby states. Moreover, a strong regional haze plan will protect public health and benefit

tourism and local economies by helping to deliver on the clean air expectations of neighboring communities and people from around the world who travel to the region's treasured landscapes.

Sincerely,

Michael Hiatt
Earthjustice
633 17th Street, Suite 1600
Denver, CO 80202
(303) 996-9617
mhiatt@earthjustice.org

*On behalf of National Parks Conservation Association and Sierra Club*

cc: Kevin Dahl, Stephanie Kodish, Nathan Miller – *National Parks Conservation Association*
Sandy Bahr, Bill Corcoran, Gloria Smith – *Sierra Club*

# Comments on the NOx BART Alternatives Analysis Proposed for the Coronado Generating Station

by

Dr. Ranajit (Ron) Sahu, Consultant[1]

August 23, 2016

## I. Introduction

As stated in the public notice relating to this action, the Arizona Department of Environmental Quality (ADEQ) has proposed two related actions - a revision to the Arizona State Regional Haze State Implementation Plan (SIP) and Significant Permit Revision No. 63088 to Air Quality Control Permit No. 52639 for Salt River Project (SRP) – for Coronado Generating Station, located 6 miles northeast of St. Johns off U.S. Highway 191 in St. Johns, Apache County, Arizona. The significant revision to the permit is intended as a component of the SIP revision to assist in satisfying the Arizona Regional Haze Best Available Retrofit Technology (BART) requirements. The SIP and permit revisions will become effective following EPA's approval and final action rescinding the current Federal Implementation Plan. The permit revision requires SRP to select the option of either installing Selective Catalyst Reduction (SCR) system on Unit 1 or shut down Unit 1 by December 31, 2029. Until the time SRP decides either of these options, the Permittee will be required to seasonally curtail the operation of Unit 1 by selecting one of four interim operational strategies.

The draft permit revision, technical support document, SIP revision documents, and the permit revision application were reviewed in the preparation of these comments. Comments are due on August 23, 2016 and are being timely submitted. The BART Alternatives analysis relies extensively on photochemical grid modeling (PGM) using the CAMx model conducted by SRP's

[1] Resume provided in Attachment A.

consultant, Ramboll Environ. While the underlying modeling report was available for review, most of the modeling support information including actual modeling input and output files, as well as details of discussions between the modeling consultant and US EPA, are not available in the public record and could not be reviewed. As of this writing, telephone calls made to US EPA Region 9's offices relating to this matter have not been returned. In addition, details of prior modeling using CALPUFF by SRP and its consultants are also not readily available in the public record. While SRP has been responsive to requests for information, details of this modeling could not be reviewed in the allocated time.

It is clear from the available record that the entire BART Alternatives analysis relies exclusively on finely-crafted curtailment periods proposed for Coronado Unit 1 based on CAMx modeling. It is also clear from discussions with the staff at ADEQ that multiple discussions were likely held between SRP/consultants and the US EPA relating to the modeling. As noted above, none of the discussions between EPA and SRP are available in the public record. CAMx is a complex PGM model requiring significant choices and options. In view of the complexity of the underlying model as well as the incomplete public record, it is simply not possible to prepare complete comments on the proposed SIP and permit revisions in the allocated 30 days. Therefore, these comments may be supplemented as additional information is made available to complete the public record.

## II. The Coronado Generating Station

The Coronado Generating Station (CGS) consists of two pulverized coal-fired, electric utility boilers (Units 1 and 2), which generate approximately 762 megawatts (MW) (net) of electricity. Units 1 and 2 were completed and started operation in 1979-1980. Units 1 and 2 are dry-bottom turbo-fired boilers with a net rated output of 380 MW and 382 MW, respectively, primarily firing low-sulfur western coals. Both units are Regional Haze Program - BART eligible units per 40 CFR § 51.301. Previously, ADEQ has determined that CGS units may reasonably be anticipated to cause or contribute to visibility impairment at a Class I area and, as such, are subject to BART.

## III. Brief Historical Background Relating to Prior BART-Related Actions at CGS

On February 28, 2011, the ADEQ submitted the state's initial Regional Haze SIP for the first planning period of the regional haze program to EPA. This submission included BART determinations for CGS Unit 1 and Unit 2. On December 5, 2012, EPA published its notice of final rule-making approving Arizona's $SO_2$ and $PM_{10}$ BART determination, but disapproving Arizona's $NO_x$ BART determination, instead establishing a $NO_x$ BART Federal Implementation Plan (FIP) for CGS Units 1 and Unit 2. The FIP imposed an average $NO_x$ emission limit of 0.065 pound per million British thermal unit applicable across both units on a 30-boiler-operating-day average basis, with a final compliance date of December 5, 2017. The rule also required SRP to install SCR systems on Unit 1 and Unit 2 by the compliance date of December 5, 2017. CGS Unit 2 is equipped with SCR (commencing operation in 2014) through a consent decree (CD) between SRP and EPA.

SRP filed a petition for administrative reconsideration of the $NO_x$ BART determination with EPA in February 2013. EPA approved this request and prepared a revised $NO_x$ FIP, which was signed by EPA on March 29, 2016 and published in the Federal Register on April 13, 2016. This action revised the $NO_x$ limits for Unit 1 to 0.065 lb/MMBtu and for Unit 2 to 0.080 lb/MMBtu, with both limits to be met on a 30-boiler-operating-day average, and maintained the initial compliance date of December 5, 2017. These limits can be achieved by using SCR as required by the original FIP noted above.

To our knowledge, SRP has elected not to proceed with SCR installation at CGS Unit 1, required to meet the NOx limit of 0.065 lb/MMBtu under the initial NOx FIP finalized in December 2012 with a 5-year compliance schedule ending in December 5, 2017 – as reaffirmed in the revised NOx FIP. Instead, it has proposed to institute one of several BART alternatives discussed below.

## IV. The Proposed BART Alternatives

Briefly, the two proposed BART Alternatives (called operating strategies (OS)) for CGS Unit 1 are as follows:

- OS1 - Either install and commence operation of a Selective Catalytic Reduction (SCR) System on Unit 1 by December 31, 2029, or
- OS2 - Shutdown Unit 1 by December 31, 2029.

Thus, the alternatives push the NOx SCR installation date to December 31, 2029, or roughly 12 years beyond the NOx FIP deadline of December 5, 2017.

For the period starting in December 5, 2017 (the current NOx FIP deadline for installing SCR and meeting the 0.065 lb/MMBtu NOx limit as noted earlier) and ending no later than December 31, 2029, the BART Alternative operating strategies include a Unit 1 interim BART Alternative operating strategy (interim operating strategy (IS)) that will involve four seasonal curtailment options for Unit 1. These options entail varying durations of curtailment of Unit 1 and are dependent on the demonstrated $NO_x$ emissions rate of Unit 1 and the $SO_2$ emissions rate of Unit 1 and Unit 2. The four options under the IS are shown in the summary Table below (Table 1, TSD).

**Proposed Interim Strategy Options**

| Interim Operating Strategy | Emission Limits, lbs/MMBtu | | CGS Unit 1 Proposed Curtailment Period |
|---|---|---|---|
| | Unit 1 $NO_x$ | Plant-wide $SO_2$ | |
| IS1 | 0.320 | 0.080 | Oct. 1 to Apr. 15 |
| IS2 | 0.320 | 0.070 | Oct. 21 to Jan. 31 |
| IS3 | 0.320 | 0.050 | Nov. 21 to Jan. 20 |
| IS4 | 0.310 | 0.060 | Nov. 21 to Jan. 20 |

Per the underlying documents, the choice and timing of which of these four IS options SRP will actually select is unknown at this time.

## V. Current Unit 1 NOx and Plant-wide SO2 Emissions at CGS

As noted above, the proposed Interim Strategies (IS1-IS4) rely on certain limits for NOx at Unit 1 and SO2 at both Units 1 and 2 ("Plantwide"). These limits are proposed on a 30-boiler day averaging basis. In order to provide context, we reviewed actual NOx and SO2 emissions for the CGS units as available in EPA's Clean Air Markets Division (CAMD), www.epa.gov/ampd. We reviewed daily/monthly data for 2014 through June 30, 2016, representing recent operating status for which data are available.

Based on our review, we find that the maximum 30-day average (which should closely approximate the 30 boiler-day average proposed) actual SO2 emissions during 2014 through mid-2016 considering both units was 0.042 lb/MMBtu, and the 95$^{th}$ percentile 30-day average SO2 for the same period for both units was 0.035 lb/MMBtu. Therefore, we note that there is significant additional SO2 reduction that might be possible at Units 1 and 2 beyond what is proposed by SRP under its IS1-IS4 options.

We also reviewed actual 30-day average NOx emissions for Unit 1 from 2014 through mid-2016. The 95$^{th}$ percentile 30-day average was 0.30 lb/MMBtu. It is clear therefore, that in the non-curtailed periods under IS1-IS4, that essentially no reductions are being proposed in the NOx rate in lb/MMBtu. It is also clear that the overall annual mass reductions under the IS strategy cannot be determined at this time, given that any one of the four options may be selected at a future date by SRP.

In summary, other than the curtailment periods proposed under the IS1-IS4 options, neither NOx nor SO2 reductions would reliably be required by SRP for 12 years between December 2017 and December 2029.

We therefore examine the basis for the proposed curtailment periods next, starting with some general comments on model selection, followed by the rationale for the proposed action, including modeling and, finally, additional technical comments on the modeling.

## VI. Model Selection and Incomplete Public Record

First, as alluded to earlier, SRP and its consultants have used a PGM, namely CAMx, in order to support the finely-crafted (with the same specific start and end dates applicable for each of the 12 interim years) curtailment time periods for each of the four IS1-IS4 options noted earlier. As support for using the CAMx model instead of the CALPUFF model, the Technical Support Document (p. 18) states:

> From a scientific perspective, CALPUFF uses a rather simple chemistry mechanism while PGMs use a significantly more complex chemistry mechanism. In July 2015, EPA proposed revisions to its modeling guidelines that would delist CALPUFF as the EPA-preferred long range transport model, mainly due to the fact that CALPUFF has highly simplified chemical transformation algorithms that have been shown to have bias in sulfate and nitrate formation (internal citation omitted). Instead, EPA proposed to recommend PGMs for applications involving secondary $PM_{2.5}$ formation, including visibility impairment due to sulfate and nitrate. Due to the reasons above, a PGM rather than CALPUFF was used for CGS Better-than-BART modeling.

First, while the above statement may well be true, we note and reiterate that EPA has only proposed revisions and this is not a final action. Thus, CALPUFF has actually not been delisted at the present time, and none of the PGMs, including CAMx, has actually been finalized as a recommended model. This is not just a matter to be glossed over. We therefore request that the entire analysis of the IS options and curtailment periods be analyzed using CALPUFF as well, and that the modeling be made available in the public record for review – along with all underlying technical information including electronic input and output files. And, importantly, as we will note below, this modeling should be done with multiple years of meteorological data (i.e., 3-5 years), which will provide some confidence that the curtailment periods chosen (as fixed time periods in each of 12 future years), are, in fact, robust enough, with regard to the modeled visibility improvements at each of the affected Class I areas.

Second, we note that while, as a general matter, it may be true that PGMs use a significantly more complex chemistry than CALPUFF and therefore they may (emphasis added) have the ability to provide more accurate predictions of sulfate and nitrate formation, it does not follow that all PGMs, including CAMx used in the present instance, will (emphasis added) in fact provide more accurate predictions in all instances, irrespective of the many other model inputs

and options chosen in the specific application. Thus, what is important is the ability to assess how the model (whether CALPUFF or CAMx) has actually been implemented in the specific instance.

Here, as noted earlier, not all of the specific details relating to both prior CALPUFF and CAMx modeling are available for review in the public record. Nor has ADEQ provided enough time for an adequate review of the modeling that has been conducted. We specifically therefore request that the public record be completed with:

(a) all modeling-related correspondence between SRP, its consultants and both the ADEQ and US EPA;

(b) all model inputs and outputs for any CALPUFF modeling that has been conducted in order to support the IS1-IS4 options. To the extent CALPUFF has not been run to support these options and the corresponding proposed curtailment time periods, we request that this be done and the results and underlying inputs/outputs be provided in the public record. We note that CALPUFF is still the current recommended model and the regulatory tool. If the concern is that CALPUFF over predicts nitrate impacts relative to sulfate impacts, then SRP should calibrate the results to match the IMPROVE network (similar to what is done with CAMx results and the MATS method); and

(c) specific information regarding who requested that CAMx be used for this BART alternative or better-than-BART analysis. Was it EPA that requested SRP use CAMx, or did SRP request CAMx? We have conflicting information on this point and have not been able to verify this with the EPA, despite our best efforts. Our attempts to verify this with the ADEQ were inconclusive.

Without this information, we note strongly that the proposed action has not been afforded meaningful public review. This significant limitation notwithstanding, we provide the following comments relating to the CAMx modeling supporting the selection of the curtailment time periods for the IS1-IS4 options.

But, before we do so, we briefly summarize the regulatory basis for how the modeling option fits within the regulatory scheme.

## VII. Conformance with Regulations for BART Alternatives

As noted in the underlying documents, the regional haze rules contain provisions whereby a state may choose to implement measures as an alternative to BART if the state can demonstrate the alternative measure achieves greater reasonable progress toward achieving natural visibility conditions than would be achieved through the installation, operation, and maintenance of BART. The requirements for alternative measures are established at 40 CFR 51.308(e)(2) and (3).

First, as explained in the RHR, however, the state must demonstrate that all necessary emission reductions will take place during the first long term strategy period (i.e., by 2018) (emphasis added) and that the emissions reductions resulting from the alternative measure will be surplus to those reductions resulting from measures adopted to meet requirements of the CAA as of the baseline date of the SIP.

We note clearly that this requirement – i.e., that all necessary emission reductions take place by 2018 – will plainly not take place prior to 2018 given that only one (as yet unspecified) of the interim strategy options IS1-IS4 will apply for the entire 12 years from 2018-2029 (encompassing more than two additional 5-year long term strategy periods!). Thus, purely from a timing standpoint, we take strong issue with ADEQ's entire proposal.

We also note that SRP had ample time (5 years) since the finalization of the NOx FIP in December 2012 in order to install SCR and achieve the required 0.065 lb/MMBtu at Coronado Unit 1 by December 5, 2017 and it, by its own choice, chose not to do so.

And, it is also clear from SRP's own analysis of the emissions reductions likely under any of the four IS options that the NOx emission reductions will be far lower than the current FIP NOx limit. The table below, reproduced from the Technical Support Document (Table 4, at p. 11) makes this clear. Compare the annual NOx emissions under the "BART Control Strategy" which is the FIP with any of the IS1-IS4 options.

**Combined Unit 1 and Unit 2 Annual Emissions (tons/year)**

| Operating Strategies | $NO_X$ | $SO_2$ | PM | Total |
|---|---|---|---|---|
| 2014 Baseline | 6,506 | 2,651 | 994 | 10,151 |
| BART Control Strategy | 2,410 | 2,651 | 994 | 6,055 |
| IS1 | 3,768 | 1,966 | 737 | 6,472 |
| IS2 | 5,053 | 2,002 | 858 | 7,912 |
| IS3 | 5,667 | 1,526 | 915 | 8,109 |
| IS4 | 5,533 | 1,831 | 915 | 8,279 |

Based on the above, we disagree with ADEQ's entire proposal. Nonetheless, we also provide further comments as below.

Second, 40 CFR § 51.308(e)(2)(i) establishes five criteria for demonstrating that BART alternative measures will achieve greater reasonable progress than would have resulted from installation and operation of BART, as follows:

- A list of all BART-eligible sources;
- A list of all BART-eligible sources that would be covered by the BART alternative;
- An analysis of BART and associated emissions reductions from the units covered by the BART alternative;
- An analysis of projected emissions reductions through application of the BART alternatives; and
- A determination that the alternative "achieves greater reasonable progress than would be achieved through the installation and operation of BART at the covered sources." The determination is to be made based either on the relevant criteria in 40 CFR § 51.308(e)(3) or on the "clear weight of evidence" as provided in 40 CFR § 51.308(e)(2)(i)(E).

As to the last criteria, 40 CFR § 51.308(e)(3) specifies two tests for determining whether the BART Alternative achieves greater reasonable progress than BART:

- If the distribution of emissions under the alternative measure is not substantially different

than under BART, and the alternative measure results in greater emissions reductions, then the alternative measure may be deemed to achieve greater reasonable progress.

- However, if the distribution of emissions is significantly different, or if the alternative measure does not result in greater emissions reductions, then a dispersion modeling analysis to determine the differences in visibility between BART and the BART Alternative may be conducted for each impacted Class I area, for the worst and best 20% of days (W20% and B20% days).

It is clear that the distribution of emissions between the NOx FIP and the proposed OS/IS1-IS4 strategies is significantly different. Hence modeling is required.

The modeling can demonstrate "greater reasonable progress" however, only if both of the following criteria are met:

- Visibility does not decline in any Class I area; and
- There is an overall improvement in visibility, determined by comparing the average differences between BART and the BART Alternative over all affected Class I areas.

We agree with the ADEQ in its determination that the BART Alternative operating strategies do not achieve greater emissions reductions than the 2016 EPA BART Reconsideration, because, although there will be greater $SO_2$ and PM emissions reductions under the alternative, there will be higher much NOx emissions as compared to BART for CGS as shown in the reproduced table above. This is not only true for annual time periods but also for the many days and months when unit operation is not curtailed.

We note that SRP has opted to perform a dispersion modeling analysis (i.e., CAMx) to demonstrate that the BART alternative would result in "greater reasonable progress" consistent with the two-prong test above.

We take issue with the technical details of the CAMx modeling, and its results, however.

## VIII. Comments on CAMx Modeling Performed

(a) The record indicates that average daily heat inputs for CGS Units 1 and 2 were derived from the Clean Air Markets Division (CAMD) heat input data for the period of 2008 to 2010, for operational hours on a daily basis and that this data set was also used to calculate the annual utilization rate using the hours of operation for each unit and the total number of hours in the period (TSD p. 8-9). However, this statement appears to be inconsistent with a later statement in the TSD (TSD p. 26) which states:

> The CGS unit 1 and 2 daily and hourly heat input data were analyzed from EPA's Acid Rain database for the 5 year period (2006-2010), centered on the BART analysis 2008 baseline year, to develop monthly and hourly emission scalars that reflect the typical seasonal and diurnal variations in heat input rates and resulting mass emission rates.

It is therefore not clear what heat inputs over what time period were actually used. More importantly, regardless of the past time period (i.e., 2008-2010 or 2006-2010) that may have been used as the basis, the modeling documentation contains no support or justification for the proposition that heat inputs in every one of the 12 future years 2017-2029 will be similar to these past historical heat inputs. And, without this showing, the emissions inputs used in the modeling are compromised and therefore any/all model predictions are of little value.

(b) The TSD at page 25 states:

> For the future year emissions scenarios, the following emission categories were assumed to remain unchanged from the 2008 base case emissions scenario:
>
> - Biogenic emissions;
> - Fire emissions;
> - Lightning emissions;
> - Sea salt emissions; and
> - Windblown dust emissions.

The technical basis for this is not clear. It is especially not clear why biogenic, fire, and windblown dust emissions cannot change or be different over 12 future years covering the modeled future (i.e., 2017-2029) or in specific years within those 12 years as compared to

emissions in 2008. There is simply no justification for assuming that at least emissions from three of the categories above will be the same in 2008 as in each year between 2017 and 2029.

The modeling did not conduct any kind of sensitivity in order to demonstrate how reasonable or robust this assumption might be. For this reason, and without any demonstration via reasonable sensitivity runs, we find this assumption untenable and therefore fairly conclude that the results of the modeling simply cannot be relied upon.

(c) The modeling documentation (reproduced below from Table 10 in the TSD at p. 28) shows the bias and error statistics comparing how bias and error in the model comport with allowable bias and error for various parameters.

**Bias and Error Statistics Averaged across IMPROVE Monitoring Sites in the 4 km CGS Domain**

| Parameters | Bias and Error | Comments |
|---|---|---|
| Annual average total visibility extinction | Bias = 14%; Error = 34% | Achieve ozone model performance goal |
| Monthly average total visibility extinction | Bias ≤ ±60%) and error ≤ 75% for all 12 months of the year | Achieve PM model performance criteria |
| | Bias ≤ ±30%) and error ≤ 55% for 9 months of the year (March-November) | Achieve PM model performance goal |
| | Bias > 30% for winter months (December - February) | Overestimation bias |
| Ammonium sulfate | Bias ≤ ±60% and error ≤ 75% for 9 months of the year (March-November) | Achieve PM model performance criteria |
| | Bias > ±60% for winter months (December-February) | Overestimation bias |
| Ammonium nitrate | Bias ≤ ±60% and error ≤ 75% for 9 months of the year (March-July; September - December) | Achieve PM model performance criteria |
| | Bias > ±60% and/or Fractional error > 75% | Underestimation bias for Summer (August) and Overestimation bias for Winter (January and February) are fairly typical of PGMs. |

We ask, however, how in spite of the large allowable bias and errors and some of the comments – especially showing underestimate bias for ammonium nitrate in the summer, etc. – one can still reliably accept the very precise start and end dates for each of the proposed IS curtailment periods. What is the likely error in the start and end dates for each curtailment period proposed, given these acceptable errors in model performance? The TSD does not discuss this. Therefore, it is not possible to know how robust the modeling is, and thus how reliable the curtailment periods are.

(d) The modeling documents note that "due to complexities" with PGM modeling, only one year of meteorological data (i.e., 2008) is modeled. This is unacceptable. It was SRPs choice or EPA's direction that led to the use of the CAMx PGM for this application. Thus, SRP accepted the complexities in the PGM inherent in the modeling. To then use "complexities" as an excuse for using just one year of meteorology to represent 12 future years is chutzpah indeed. There is ample evidence to show that all other inputs being equal, year-to-year variability can be significant.

Unless SRP demonstrates why each and every future year between 2017 and 2029 will have meteorology that is like the one year 2008, it cannot claim any kind of robustness of the results it has obtained, which it has then used to define fine-tuned curtailment periods down to two week or 10-day intervals.

Using one year of meteorological data in its modeling, no matter how much more accurate the chemistry in CAMx, simply cannot be justified and has not been justified. We ask that SRP and ADEQ show, publicly, how and why the results obtained from using just one year of meteorological data are reliable.

Without such a showing, the entire modeling exercise is quite meaningless as a representation of a 12-year future period.

(e) The modeling document states that examining annual average plots is sufficient and that trying to look at daily (or hourly) plots would result in "inconsistent time periods" because the B20 and W20 days are not the same between Class I areas.

However, we believe that it is essential and necessary to examine the hourly evolutions (animated spatial plots of SO4 and NO3) in order to confirm that the contributions (and differences) are actually from the CGS source(s). Without this, the modeling documentation is incomplete and impermissibly short-circuits meaningful review. We ask ADEQ and EPA to justify their technical review without the hourly evolution plots.

(f) When subtracting CAMx runs with and without a single source (such as Unit 1 at Coronado), many grid cells are in fact subtracting two "large" numbers and although the difference should be zero, it is instead very small value, due to numerical error. This can result in modeled noise, which can appear to make one strategy slightly better than another on some modeled days when the source does not even impact the Class I area. It can especially have a large effect on a relatively distant Class I areas. Yet, there is little to no discussion of numerical errors and uncertainties and their effects on the results.

We note that SRP's consultants have previously noted the existence of numerical errors in PGM modeling.[2] This further exacerbates the robustness or lack thereof of the conclusions from the modeling.

(g) The output metrics from CAMx and CALPUFF are vastly different. For example, CALPUFF assumes a clean background, while CAMx uses a polluted background. CALPUFF examines the peak impacts from the modeled source(s), while CAMx looks at the impacts on the peak (W20) days and the cleanest (B20) days, etc. This is yet another reason for SRP to provide comparable and parallel CALPUFF and CAMx results. Adequate regional haze CAMx modeling must use a clean background. In other instances, such as when CAMx has been used in Texas for visibility applications, it rightly assumed clean background conditions.

We believe that one should consider the entire distribution of differences, including annual average, W20 and B20, but one should also compare the impacts on days when the peak impacts occur (as is done using the CALPUFF FLAG RH methodology).

[2] Yarwood, G., et. al., Development of the CAMx Particulate Source Apportionment Technology (PSAT), prepared for Lake Michigan Air Directors Consortium, ENVIRON International Corporation, March 2005.

(h) A quick look at the summary tables in the model report (Tables 4-4 through 4-8) appears to contradict the assertion that all four IS1-IS4 "better-than-BART" BtB scenarios result in lower visibility (dv) impacts at ALL modeled Class I areas. For example, comparing the modeled dv impacts at Mount Baldy, we get:

| **dV Impacts at Mt. Baldy** | B20 Days | W20 Days | Annual Average |
|---|---|---|---|
| EPA BART | 0.0171 | 0.0137 | 0.0175 |
| BtB1 (IS1) | 0.0128 | 0.0145 | 0.0174 |
| BtB2 (IS2) | 0.0137 | 0.0139 | 0.0187 |
| BtB3 (IS3) | 0.0141 | 0.0148 | 0.0183 |
| BtB4 (IS4) | 0.0139 | 0.0155 | 0.0191 |

The W20 dv impacts (in red) are all plainly higher for the BtB cases than for BART (0.0137). And, three of the four BtB annual averages (in red) are greater than for BART (0.0175).

This result by itself demonstrates a failure to meet the regulatory requirement that the modeling demonstrate "greater reasonable progress." The regulation provides that both of the following criteria must be met in order for a BART Alterative to satisfy the requirements:

- Visibility does not decline in any (emphasis added) Class I area; and
- There is an overall improvement in visibility, determined by comparing the average differences between BART and the BART Alternative over all affected Class I areas.

ADEQ and SRP should justify how their CAMx modeling results meet the criteria that "visibility does not decline in any Class I area" when it appears SRP's models make clear that visibility would get worse at Mt. Baldy.

# Attachment A


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**CONSULTANT, ENVIRONMENTAL AND ENERGY ISSUES**

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**EXPERIENCE SUMMARY**

Dr. Sahu has over twenty eight years of experience in the fields of environmental, mechanical, and chemical engineering including: program and project management services; design and specification of pollution control equipment for a wide range of emissions sources including stationary and mobile sources; soils and groundwater remediation including landfills as remedy; combustion engineering evaluations; energy studies; multimedia environmental regulatory compliance (involving statutes and regulations such as the Federal CAA and its Amendments, Clean Water Act, TSCA, RCRA, CERCLA, SARA, OSHA, NEPA as well as various related state statutes); transportation air quality impact analysis; multimedia compliance audits; multimedia permitting (including air quality NSR/PSD permitting, Title V permitting, NPDES permitting for industrial and storm water discharges, RCRA permitting, etc.), multimedia/multi-pathway human health risk assessments for toxics; air dispersion modeling; and regulatory strategy development and support including negotiation of consent agreements and orders.

He has over twenty five years of project management experience and has successfully managed and executed numerous projects in this time period. This includes basic and applied research projects, design projects, regulatory compliance projects, permitting projects, energy studies, risk assessment projects, and projects involving the communication of environmental data and information to the public.

He has provided consulting services to numerous private sector, public sector and public interest group clients. His major clients over the past twenty five years include various trade associations as well as individual companies such as steel mills, petroleum refineries, cement manufacturers, aerospace companies, power generation facilities, lawn and garden equipment manufacturers, spa manufacturers, chemical distribution facilities, and various entities in the public sector including EPA, the US Dept. of Justice, several states, various agencies such as the California DTSC, various municipalities, etc.). Dr. Sahu has performed projects in all 50 states, numerous local jurisdictions and internationally.

In addition to consulting, Dr. Sahu has taught numerous courses in several Southern California universities including UCLA (air pollution), UC Riverside (air pollution, process hazard analysis), and Loyola Marymount University (air pollution, risk assessment, hazardous waste management) for the past seventeen years. In this time period he has also taught at Caltech, his alma mater (various engineering courses), at the University of Southern California (air pollution controls) and at California State University, Fullerton (transportation and air quality).

Dr. Sahu has and continues to provide expert witness services in a number of environmental areas discussed above in both state and Federal courts as well as before administrative bodies (please see Annex A).

**EXPERIENCE RECORD**

2000-present **Independent Consultant.** Providing a variety of private sector (industrial companies, land development companies, law firms, etc.) public sector (such as the US Department of Justice) and public interest group clients with project management, air quality consulting, waste remediation and management consulting, as well as regulatory and engineering support consulting services.

1995-2000 Parsons ES, **Associate, Senior Project Manager and Department Manager for** Air Quality/Geosciences/Hazardous Waste Groups, Pasadena. Responsible for the management of a group of approximately 24 air quality and environmental professionals, 15 geoscience, and 10 hazardous waste professionals providing full-service consulting, project management, regulatory compliance and A/E design assistance in all areas.

Parsons ES, **Manager for Air Source Testing Services**. Responsible for the management of 8 individuals in the area of air source testing and air regulatory permitting projects located in Bakersfield, California.

1992-1995 Engineering-Science, Inc. **Principal Engineer and Senior Project Manager** in the air quality department. Responsibilities included multimedia regulatory compliance and permitting (including hazardous and nuclear materials), air pollution engineering (emissions from stationary and mobile sources, control of criteria and air toxics, dispersion modeling, risk assessment, visibility analysis, odor analysis), supervisory functions and project management.

1990-1992 Engineering-Science, Inc. **Principal Engineer and Project Manager** in the air quality department. Responsibilities included permitting, tracking regulatory issues, technical analysis, and supervisory functions on numerous air, water, and hazardous waste projects. Responsibilities also include client and agency interfacing, project cost and schedule control, and reporting to internal and external upper management regarding project status.

1989-1990 Kinetics Technology International, Corp. **Development Engineer.** Involved in thermal engineering R&D and project work related to low-NOx ceramic radiant burners, fired heater NOx reduction, SCR design, and fired heater retrofitting.

1988-1989 Heat Transfer Research, Inc. **Research Engineer**. Involved in the design of fired heaters, heat exchangers, air coolers, and other non-fired equipment. Also did research in the area of heat exchanger tube vibrations.

## EDUCATION

1984-1988 Ph.D., Mechanical Engineering, California Institute of Technology (Caltech), Pasadena, CA.

1984 M. S., Mechanical Engineering, Caltech, Pasadena, CA.

1978-1983 B. Tech (Honors), Mechanical Engineering, Indian Institute of Technology (IIT) Kharagpur, India

## TEACHING EXPERIENCE

Caltech

"Thermodynamics," Teaching Assistant, California Institute of Technology, 1983, 1987.

"Air Pollution Control," Teaching Assistant, California Institute of Technology, 1985.

"Caltech Secondary and High School Saturday Program," - taught various mathematics (algebra through calculus) and science (physics and chemistry) courses to high school students, 1983-1989.

"Heat Transfer," - taught this course in the Fall and Winter terms of 1994-1995 in the Division of Engineering and Applied Science.

“Thermodynamics and Heat Transfer,” Fall and Winter Terms of 1996-1997.

U.C. Riverside, Extension

"Toxic and Hazardous Air Contaminants," University of California Extension Program, Riverside, California. Various years since 1992.

"Prevention and Management of Accidental Air Emissions," University of California Extension Program, Riverside, California. Various years since 1992.

"Air Pollution Control Systems and Strategies," University of California Extension Program, Riverside, California, Summer 1992-93, Summer 1993-1994.

"Air Pollution Calculations," University of California Extension Program, Riverside, California, Fall 1993-94, Winter 1993-94, Fall 1994-95.

"Process Safety Management," University of California Extension Program, Riverside, California. Various years since 1992-2010.

"Process Safety Management," University of California Extension Program, Riverside, California, at SCAQMD, Spring 1993-94.

"Advanced Hazard Analysis - A Special Course for LEPCs," University of California Extension Program, Riverside, California, taught at San Diego, California, Spring 1993-1994.

"Advanced Hazardous Waste Management" University of California Extension Program, Riverside, California. 2005.

Loyola Marymount University

"Fundamentals of Air Pollution - Regulations, Controls and Engineering," Loyola Marymount University, Dept. of Civil Engineering. Various years since 1993.

"Air Pollution Control," Loyola Marymount University, Dept. of Civil Engineering, Fall 1994.

"Environmental Risk Assessment," Loyola Marymount University, Dept. of Civil Engineering. Various years since 1998.

"Hazardous Waste Remediation" Loyola Marymount University, Dept. of Civil Engineering. Various years since 2006.

University of Southern California

"Air Pollution Controls," University of Southern California, Dept. of Civil Engineering, Fall 1993, Fall 1994.

"Air Pollution Fundamentals," University of Southern California, Dept. of Civil Engineering, Winter 1994.

University of California, Los Angeles

"Air Pollution Fundamentals," University of California, Los Angeles, Dept. of Civil and Environmental Engineering, Spring 1994, Spring 1999, Spring 2000, Spring 2003, Spring 2006, Spring 2007, Spring 2008, Spring 2009.

International Programs

"Environmental Planning and Management," 5 week program for visiting Chinese delegation, 1994.

"Environmental Planning and Management," 1 day program for visiting Russian delegation, 1995.

"Air Pollution Planning and Management," IEP, UCR, Spring 1996.

"Environmental Issues and Air Pollution," IEP, UCR, October 1996.

**PROFESSIONAL AFFILIATIONS AND HONORS**

President of India Gold Medal, IIT Kharagpur, India, 1983.

Member of the Alternatives Assessment Committee of the Grand Canyon Visibility Transport Commission, established by the Clean Air Act Amendments of 1990, 1992-present.

American Society of Mechanical Engineers: Los Angeles Section Executive Committee, Heat Transfer Division, and Fuels and Combustion Technology Division, 1987-present.

Air and Waste Management Association, West Coast Section, 1989-present.

**PROFESSIONAL CERTIFICATIONS**

EIT, California (#XE088305), 1993.

REA I, California (#07438), 2000.

Certified Permitting Professional, South Coast AQMD (#C8320), since 1993.

QEP, Institute of Professional Environmental Practice, since 2000.

CEM, State of Nevada (#EM-1699). Expiration 10/07/2017.

**PUBLICATIONS (PARTIAL LIST)**

"Physical Properties and Oxidation Rates of Chars from Bituminous Coals," with Y.A. Levendis, R.C. Flagan and G.R. Gavalas, *Fuel*, **67**, 275-283 (1988).

"Char Combustion: Measurement and Analysis of Particle Temperature Histories," with R.C. Flagan, G.R. Gavalas and P.S. Northrop, *Comb. Sci. Tech.* **60**, 215-230 (1988).

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"Cross Linking in Pore Structures and Its Effect on Reactivity," with G.R. Gavalas in preparation.

"Natural Frequencies and Mode Shapes of Straight Tubes," Proprietary Report for Heat Transfer Research Institute, Alhambra, CA (1990).

"Optimal Tube Layouts for Kamui SL-Series Exchangers," with K. Ishihara, Proprietary Report for Kamui Company Limited, Tokyo, Japan (1990).

"HTRI Process Heater Conceptual Design," Proprietary Report for Heat Transfer Research Institute, Alhambra, CA (1990).

"Asymptotic Theory of Transonic Wind Tunnel Wall Interference," with N.D. Malmuth and others, Arnold Engineering Development Center, Air Force Systems Command, USAF (1990).

"Gas Radiation in a Fired Heater Convection Section," Proprietary Report for Heat Transfer Research Institute, College Station, TX (1990).

"Heat Transfer and Pressure Drop in NTIW Heat Exchangers," Proprietary Report for Heat Transfer Research Institute, College Station, TX (1991).

"NOx Control and Thermal Design," Thermal Engineering Tech Briefs, (1994).

“From Purchase of Landmark Environmental Insurance to Remediation: Case Study in Henderson, Nevada,” with Robin E. Bain and Jill Quillin, presented at the AQMA Annual Meeting, Florida, 2001.

“The Jones Act Contribution to Global Warming, Acid Rain and Toxic Air Contaminants,” with Charles W. Botsford, presented at the AQMA Annual Meeting, Florida, 2001.

**PRESENTATIONS (PARTIAL LIST)**

"Pore Structure and Combustion Kinetics - Interpretation of Single Particle Temperature-Time Histories," with P.S. Northrop, R.C. Flagan and G.R. Gavalas, presented at the AIChE Annual Meeting, New York (1987).

"Measurement of Temperature-Time Histories of Burning Single Coal Char Particles," with R.C. Flagan, presented at the American Flame Research Committee Fall International Symposium, Pittsburgh, (1988).

"Physical Characterization of a Cenospheric Coal Char Burned at High Temperatures," with R.C. Flagan and G.R. Gavalas, presented at the Fall Meeting of the Western States Section of the Combustion Institute, Laguna Beach, California (1988).

"Control of Nitrogen Oxide Emissions in Gas Fired Heaters - The Retrofit Experience," with G. P. Croce and R. Patel, presented at the International Conference on Environmental Control of Combustion Processes (Jointly sponsored by the American Flame Research Committee and the Japan Flame Research Committee), Honolulu, Hawaii (1991).

"Air Toxics - Past, Present and the Future," presented at the Joint AIChE/AAEE Breakfast Meeting at the AIChE 1991 Annual Meeting, Los Angeles, California, November 17-22 (1991).

"Air Toxics Emissions and Risk Impacts from Automobiles Using Reformulated Gasolines," presented at the Third Annual Current Issues in Air Toxics Conference, Sacramento, California, November 9-10 (1992).

"Air Toxics from Mobile Sources," presented at the Environmental Health Sciences (ESE) Seminar Series, UCLA, Los Angeles, California, November 12, (1992).

"Kilns, Ovens, and Dryers - Present and Future," presented at the Gas Company Air Quality Permit Assistance Seminar, Industry Hills Sheraton, California, November 20, (1992).

"The Design and Implementation of Vehicle Scrapping Programs," presented at the 86th Annual Meeting of the Air and Waste Management Association, Denver, Colorado, June 12, 1993.

"Air Quality Planning and Control in Beijing, China," presented at the 87th Annual Meeting of the Air and Waste Management Association, Cincinnati, Ohio, June 19-24, 1994.

**Annex A**

Expert Litigation Support

1. Occasions where Dr. Sahu has provided Written or Oral testimony before Congress:

(a) In July 2012, provided expert written and oral testimony to the House Subcommittee on Energy and the Environment, Committee on Science, Space, and Technology at a Hearing entitled "Hitting the Ethanol Blend Wall – Examining the Science on E15."

2. Matters for which Dr. Sahu has provided affidavits and expert reports include:

(b) Affidavit for Rocky Mountain Steel Mills, Inc. located in Pueblo Colorado – dealing with the technical uncertainties associated with night-time opacity measurements in general and at this steel mini-mill.

(c) Expert reports and depositions (2/28/2002 and 3/1/2002; 12/2/2003 and 12/3/2003; 5/24/2004) on behalf of the United States in connection with the Ohio Edison NSR Cases. *United States, et al. v. Ohio Edison Co., et al.*, C2-99-1181 (Southern District of Ohio).

(d) Expert reports and depositions (5/23/2002 and 5/24/2002) on behalf of the United States in connection with the Illinois Power NSR Case. *United States v. Illinois Power Co., et al.*, 99-833-MJR (Southern District of Illinois).

(e) Expert reports and depositions (11/25/2002 and 11/26/2002) on behalf of the United States in connection with the Duke Power NSR Case. *United States, et al. v. Duke Energy Corp.*, 1:00-CV-1262 (Middle District of North Carolina).

(f) Expert reports and depositions (10/6/2004 and 10/7/2004; 7/10/2006) on behalf of the United States in connection with the American Electric Power NSR Cases. *United States, et al. v. American Electric Power Service Corp., et al.*, C2-99-1182, C2-99-1250 (Southern District of Ohio).

(g) Affidavit (March 2005) on behalf of the Minnesota Center for Environmental Advocacy and others in the matter of the Application of Heron Lake BioEnergy LLC to construct and operate an ethanol production facility – submitted to the Minnesota Pollution Control Agency.

(h) Expert Report and Deposition (10/31/2005 and 11/1/2005) on behalf of the United States in connection with the East Kentucky Power Cooperative NSR Case. *United States v. East Kentucky Power Cooperative, Inc*., 5:04-cv-00034-KSF (Eastern District of Kentucky).

(i) Affidavits and deposition on behalf of Basic Management Inc. (BMI) Companies in connection with the BMI vs. USA remediation cost recovery Case.

(j) Expert Report on behalf of Penn Future and others in the Cambria Coke plant permit challenge in Pennsylvania.

(k) Expert Report on behalf of the Appalachian Center for the Economy and the Environment and others in the Western Greenbrier permit challenge in West Virginia.

(l) Expert Report, deposition (via telephone on January 26, 2007) on behalf of various Montana petitioners (Citizens Awareness Network (CAN), Women's Voices for the Earth (WVE) and the Clark Fork Coalition (CFC)) in the Thompson River Cogeneration LLC Permit No. 3175-04 challenge.

(m) Expert Report and deposition (2/2/07) on behalf of the Texas Clean Air Cities Coalition at the Texas State Office of Administrative Hearings (SOAH) in the matter of the permit challenges to TXU Project Apollo's eight new proposed PRB-fired PC boilers located at seven TX sites.

(n) Expert Testimony (July 2007) on behalf of the Izaak Walton League of America and others in connection with the acquisition of power by Xcel Energy from the proposed Gascoyne Power Plant – at the State of Minnesota, Office of Administrative Hearings for the Minnesota PUC (MPUC No. E002/CN-06-1518; OAH No. 12-2500-17857-2).

(o) Affidavit (July 2007) Comments on the Big Cajun I Draft Permit on behalf of the Sierra Club – submitted to the Louisiana DEQ.

(p) Expert Report and Deposition (12/13/2007) on behalf of Commonwealth of Pennsylvania – Dept. of Environmental Protection, State of Connecticut, State of New York, and State of New Jersey (Plaintiffs) in connection with the Allegheny Energy NSR Case. *Plaintiffs v. Allegheny Energy Inc., et al.,* 2:05cv0885 (Western District of Pennsylvania).

(q) Expert Reports and Pre-filed Testimony before the Utah Air Quality Board on behalf of Sierra Club in the Sevier Power Plant permit challenge.

(r) Expert Report and Deposition (October 2007) on behalf of MTD Products Inc., in connection with *General Power Products, LLC v MTD Products Inc*., 1:06 CVA 0143 (Southern District of Ohio, Western Division) .

(s) Expert Report and Deposition (June 2008) on behalf of Sierra Club and others in the matter of permit challenges (Title V: 28.0801-29 and PSD: 28.0803-PSD) for the Big Stone II unit, proposed to be located near Milbank, South Dakota.

(t) Expert Reports, Affidavit, and Deposition (August 15, 2008) on behalf of Earthjustice in the matter of air permit challenge (CT-4631) for the Basin Electric Dry Fork station, under construction near Gillette, Wyoming before the Environmental Quality Council of the State of Wyoming.

(u) Affidavits (May 2010/June 2010 in the Office of Administrative Hearings))/Declaration and Expert Report (November 2009 in the Office of Administrative Hearings) on behalf of NRDC and the Southern Environmental Law Center in the matter of the air permit challenge for Duke Cliffside Unit 6. Office of Administrative Hearing Matters 08 EHR 0771, 0835 and 0836 and 09 HER 3102, 3174, and 3176 (consolidated).

(v) Declaration (August 2008), Expert Report (January 2009), and Declaration (May 2009) on behalf of Southern Alliance for Clean Energy in the matter of the air permit challenge for Duke Cliffside Unit 6. *Southern Alliance for Clean Energy et al., v. Duke Energy Carolinas, LLC*, Case No. 1:08-cv-00318-LHT-DLH (Western District of North Carolina, Asheville Division).

(w) Declaration (August 2008) on behalf of the Sierra Club in the matter of Dominion Wise County plant MACT.us

(x) Expert Report (June 2008) on behalf of Sierra Club for the Green Energy Resource Recovery Project, MACT Analysis.

(y) Expert Report (February 2009) on behalf of Sierra Club and the Environmental Integrity Project in the matter of the air permit challenge for NRG Limestone's proposed Unit 3 in Texas.

(z) Expert Report (June 2009) on behalf of MTD Products, Inc., in the matter of *Alice Holmes and Vernon Holmes v. Home Depot USA, Inc., et al.*

(aa) Expert Report (August 2009) on behalf of Sierra Club and the Southern Environmental Law Center in the matter of the air permit challenge for Santee Cooper's proposed Pee Dee plant in South Carolina).

(bb) Statements (May 2008 and September 2009) on behalf of the Minnesota Center for Environmental Advocacy to the Minnesota Pollution Control Agency in the matter of the Minnesota Haze State Implementation Plans.

(cc) Expert Report (August 2009) on behalf of Environmental Defense, in the matter of permit challenges to the proposed Las Brisas coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).

(dd) Expert Report and Rebuttal Report (September 2009) on behalf of the Sierra Club, in the matter of challenges to the proposed Medicine Bow Fuel and Power IGL plant in Cheyenne, Wyoming.

(ee) Expert Report (December 2009) and Rebuttal reports (May 2010 and June 2010) on behalf of the United States in connection with the Alabama Power Company NSR Case. *United States v. Alabama Power Company*, CV-01-HS-152-S (Northern District of Alabama, Southern Division).

(ff) Pre-filed Testimony (October 2009) on behalf of Environmental Defense and others, in the matter of challenges to the proposed White Stallion Energy Center coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).

(gg) Pre-filed Testimony (July 2010) and Written Rebuttal Testimony (August 2010) on behalf of the State of New Mexico Environment Department in the matter of Proposed Regulation 20.2.350 NMAC – *Greenhouse Gas Cap and Trade Provisions,* No. EIB 10-04 (R), to the State of New Mexico, Environmental Improvement Board.

(hh) Expert Report (August 2010) and Rebuttal Expert Report (October 2010) on behalf of the United States in connection with the Louisiana Generating NSR Case. *United States v. Louisiana Generating, LLC*, 09-CV100-RET-CN (Middle District of Louisiana) – Liability Phase.

(ii) Declaration (August 2010), Reply Declaration (November 2010), Expert Report (April 2011), Supplemental and Rebuttal Expert Report (July 2011) on behalf of the United States in the matter of DTE Energy Company and Detroit Edison Company (Monroe Unit 2). *United States of America v. DTE Energy Company and Detroit Edison Company*, Civil Action No. 2:10-cv-13101-BAF-RSW (Eastern District of Michigan).

(jj) Expert Report and Deposition (August 2010) as well as Affidavit (September 2010) on behalf of Kentucky Waterways Alliance, Sierra Club, and Valley Watch in the matter of challenges to the NPDES permit issued for the Trimble County power plant by the Kentucky Energy and Environment Cabinet to Louisville Gas and Electric, File No. DOW-41106-047.

(kk) Expert Report (August 2010), Rebuttal Expert Report (September 2010), Supplemental Expert Report (September 2011), and Declaration (November 2011) on behalf of Wild Earth Guardians in the matter of opacity exceedances and monitor downtime at the Public Service Company of Colorado (Xcel)'s Cherokee power plant. No. 09-cv-1862 (District of Colorado).

(ll) Written Direct Expert Testimony (August 2010) and Affidavit (February 2012) on behalf of Fall-Line Alliance for a Clean Environment and others in the matter of the PSD Air Permit for Plant Washington issued by Georgia DNR at the Office of State Administrative Hearing, State of Georgia (OSAH-BNR-AQ-1031707-98-WALKER).

(mm) Deposition (August 2010) on behalf of Environmental Defense, in the matter of the remanded permit challenge to the proposed Las Brisas coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).

(nn) Expert Report, Supplemental/Rebuttal Expert Report, and Declarations (October 2010, November 2010, September 2012) on behalf of New Mexico Environment Department (Plaintiff-Intervenor), Grand Canyon Trust and Sierra Club (Plaintiffs) in the matter of *Plaintiffs v. Public Service Company of New Mexico* (PNM), Civil No. 1:02-CV-0552 BB/ATC (ACE) (District of New Mexico).

(oo) Expert Report (October 2010) and Rebuttal Expert Report (November 2010) (BART Determinations for PSCo Hayden and CSU Martin Drake units) to the Colorado Air Quality Commission on behalf of Coalition of Environmental Organizations.

(pp) Expert Report (November 2010) (BART Determinations for TriState Craig Units, CSU Nixon Unit, and PRPA Rawhide Unit) to the Colorado Air Quality Commission on behalf of Coalition of Environmental Organizations.

(qq) Declaration (November 2010) on behalf of the Sierra Club in connection with the Martin Lake Station Units 1, 2, and 3. *Sierra Club v. Energy Future Holdings Corporation and Luminant Generation Company LLC*, Case No. 5:10-cv-00156-DF-CMC (Eastern District of Texas, Texarkana Division).

(rr) Pre-Filed Testimony (January 2011) and Declaration (February 2011) to the Georgia Office of State Administrative Hearings (OSAH) in the matter of Minor Source HAPs status for the proposed Longleaf Energy Associates power plant (OSAH-BNR-AQ-1115157-60-HOWELLS) on behalf of the Friends of the Chattahoochee and the Sierra Club).

(ss) Declaration (February 2011) in the matter of the Draft Title V Permit for RRI Energy MidAtlantic Power Holdings LLC Shawville Generating Station (Pennsylvania), ID No. 17-00001 on behalf of the Sierra Club.

(tt) Expert Report (March 2011), Rebuttal Expert Report (June 2011) on behalf of the United States in *United States of America v. Cemex, Inc.*, Civil Action No. 09-cv-00019-MSK-MEH (District of Colorado).

(uu) Declaration (April 2011) and Expert Report (July 16, 2012) in the matter of the Lower Colorado River Authority (LCRA)'s Fayette (Sam Seymour) Power Plant on behalf of the Texas Campaign for the Environment. *Texas Campaign for the Environment v. Lower Colorado River Authority,* Civil Action No. 4:11-cv-00791 (Southern District of Texas, Houston Division).

(vv) Declaration (June 2011) on behalf of the Plaintiffs MYTAPN in the matter of Microsoft-Yes, Toxic Air Pollution-No (MYTAPN) v. State of Washington, Department of Ecology and Microsoft Corporation Columbia Data Center to the Pollution Control Hearings Board, State of Washington, Matter No. PCHB No. 10-162.

(ww) Expert Report (June 2011) on behalf of the New Hampshire Sierra Club at the State of New Hampshire Public Utilities Commission, Docket No. 10-261 – the 2010 Least Cost Integrated Resource Plan (LCIRP) submitted by the Public Service Company of New Hampshire (re. Merrimack Station Units 1 and 2).

(xx) Declaration (August 2011) in the matter of the Sandy Creek Energy Associates L.P. Sandy Creek Power Plant on behalf of Sierra Club and Public Citizen. *Sierra Club, Inc. and Public Citizen, Inc. v. Sandy Creek Energy Associates, L.P.,* Civil Action No. A-08-CA-648-LY (Western District of Texas, Austin Division).

(yy) Expert Report (October 2011) on behalf of the Defendants in the matter of *John Quiles and Jeanette Quiles et al. v. Bradford-White Corporation, MTD Products, Inc., Kohler Co., et al.,* Case No. 3:10-cv-747 (TJM/DEP) (Northern District of New York).

(zz) Declaration (February 2012) and Second Declaration (February 2012) in the matter of *Washington Environmental Council and Sierra Club Washington State Chapter v. Washington State Department of Ecology and Western States Petroleum Association,* Case No. 11-417-MJP (Western District of Washington).

(aaa) Expert Report (March 2012) and Supplemental Expert Report (November 2013) in the matter of *Environment Texas Citizen Lobby, Inc and Sierra Club v. ExxonMobil Corporation et al.,* Civil Action No. 4:10-cv-4969 (Southern District of Texas, Houston Division).

(bbb) Declaration (March 2012) in the matter of *Center for Biological Diversity, et al. v. United States Environmental Protection Agency,* Case No. 11-1101 (consolidated with 11-1285, 11-1328 and 11-1336) (US Court of Appeals for the District of Columbia Circuit).

(ccc) Declaration (March 2012) in the matter of *Sierra Club v. The Kansas Department of Health and Environment*, Case No. 11-105,493-AS (Holcomb power plant) (Supreme Court of the State of Kansas).

(ddd) Declaration (March 2012) in the matter of the Las Brisas Energy Center *Environmental Defense Fund et al., v. Texas Commission on Environmental Quality,* Cause No. D-1-GN-11-001364 (District Court of Travis County, Texas, 261st Judicial District).

(eee) Expert Report (April 2012), Supplemental and Rebuttal Expert Report (July 2012), and Supplemental Rebuttal Expert Report (August 2012) on behalf of the states of New Jersey and Connecticut in the matter of the Portland Power plant *State of New Jersey and State of Connecticut (Intervenor-Plaintiff) v. RRI Energy Mid-Atlantic Power Holdings et al.,* Civil Action No. 07-CV-5298 (JKG) (Eastern District of Pennsylvania).

(fff) Declaration (April 2012) in the matter of the EPA's EGU MATS Rule, on behalf of the Environmental Integrity Project.

(ggg) Expert Report (August 2012) on behalf of the United States in connection with the Louisiana Generating NSR Case. *United States v. Louisiana Generating, LLC*, 09-CV100-RET-CN (Middle District of Louisiana) – Harm Phase.

(hhh) Declaration (September 2012) in the Matter of the Application of *Energy Answers Incinerator, Inc.* for a Certificate of Public Convenience and Necessity to Construct a 120 MW Generating Facility in Baltimore City, Maryland, before the Public Service Commission of Maryland, Case No. 9199.

(iii) Expert Report (October 2012) on behalf of the Appellants (Robert Concilus and Leah Humes) in the matter of Robert Concilus and Leah Humes v. Commonwealth of Pennsylvania Department of Environmental Protection and Crawford Renewable Energy, before the Commonwealth of Pennsylvania Environmental Hearing Board, Docket No. 2011-167-R.

(jjj) Expert Report (October 2012), Supplemental Expert Report (January 2013), and Affidavit (June 2013) in the matter of various Environmental Petitioners v. North Carolina DENR/DAQ and Carolinas Cement Company, before the Office of Administrative Hearings, State of North Carolina.

(kkk) Pre-filed Testimony (October 2012) on behalf of No-Sag in the matter of the North Springfield Sustainable Energy Project before the State of Vermont, Public Service Board.

(lll) Pre-filed Testimony (November 2012) on behalf of Clean Wisconsin in the matter of Application of Wisconsin Public Service Corporation for Authority to Construct and Place in Operation a New

Multi-Pollutant Control Technology System (ReACT) for Unit 3 of the Weston Generating Station, before the Public Service Commission of Wisconsin, Docket No. 6690-CE-197.

(mmm) Expert Report (February 2013) on behalf of Petitioners in the matter of Credence Crematory, Cause No. 12-A-J-4538 before the Indiana Office of Environmental Adjudication.

(nnn) Expert Report (April 2013), Rebuttal report (July 2013), and Declarations (October 2013, November 2013) on behalf of the Sierra Club in connection with the Luminant Big Brown Case. *Sierra Club v. Energy Future Holdings Corporation and Luminant Generation Company LLC*, Civil Action No. 6:12-cv-00108-WSS (Western District of Texas, Waco Division).

(ooo) Declaration (April 2013) on behalf of Petitioners in the matter of *Sierra Club, et al., (Petitioners) v Environmental Protection Agency et al. (Resppondents),* Case No., 13-1112, (Court of Appeals, District of Columbia Circuit).

(ppp) Expert Report (May 2013) and Rebuttal Expert Report (July 2013) on behalf of the Sierra Club in connection with the Luminant Martin Lake Case. *Sierra Club v. Energy Future Holdings Corporation and Luminant Generation Company LLC*, Civil Action No. 5:10-cv-0156-MHS-CMC (Eastern District of Texas, Texarkana Division).

(qqq) Declaration (August 2013) on behalf of A. J. Acosta Company, Inc., in the matter of *A. J. Acosta Company, Inc., v. County of San Bernardino*, Case No. CIVSS803651.

(rrr) Comments (October 2013) on behalf of the Washington Environmental Council and the Sierra Club in the matter of the Washington State Oil Refinery RACT (for Greenhouse Gases), submitted to the Washington State Department of Ecology, the Northwest Clean Air Agency, and the Puget Sound Clean Air Agency.

(sss) Statement (November 2013) on behalf of various Environmental Organizations in the matter of the Boswell Energy Center (BEC) Unit 4 Environmental Retrofit Project, to the Minnesota Public Utilities Commission, Docket No. E-015/M-12-920.

(ttt) Expert Report (December 2013) on behalf of the United States in *United States of America v. Ameren Missouri*, Civil Action No. 4:11-cv-00077-RWS (Eastern District of Missouri, Eastern Division).

(uuu) Expert Testimony (December 2013) on behalf of the Sierra Club in the matter of Public Service Company of New Hampshire Merrimack Station Scrubber Project and Cost Recovery, Docket No. DE 11-250, to the State of New Hampshire Public Utilities Commission.

(vvv) Expert Report (January 2014) on behalf of Baja, Inc., in *Baja, Inc., v. Automotive Testing and Development Services, Inc. et. al*, Civil Action No. 8:13-CV-02057-GRA (District of South Carolina, Anderson/Greenwood Division).

(www) Declaration (March 2014) on behalf of the Center for International Environmental Law, Chesapeake Climate Action Network, Friends of the Earth, Pacific Environment, and the Sierra Club (Plaintiffs) in the matter of *Plaintiffs v. the Export-Import Bank (Ex-Im Bank) of the United States*, Civil Action No. 13-1820 RC (District Court for the District of Columbia).

(xxx) Declaration (April 2014) on behalf of Respondent-Intervenors in the matter of *Mexichem Specialty Resins Inc., et al., (Petitioners) v Environmental Protection Agency et al.,* Case No., 12-1260 (and Consolidated Case Nos. 12-1263, 12-1265, 12-1266, and 12-1267), (Court of Appeals, District of Columbia Circuit).

(yyy) Direct Prefiled Testimony (June 2014) on behalf of the Michigan Environmental Council and the Sierra Club in the matter of the Application of DTE Electric Company for Authority to Implement a

Power Supply Cost Recovery (PSCR) Plan in its Rate Schedules for 2014 Metered Jurisdictional Sales of Electricity, Case No. U-17319 (Michigan Public Service Commission).

(zzz) Expert Report (June 2014) on behalf of ECM Biofilms in the matter of the US Federal Trade Commission (FTC) v. ECM Biofilms (FTC Docket #9358).

(aaaa) Direct Prefiled Testimony (August 2014) on behalf of the Michigan Environmental Council and the Sierra Club in the matter of the Application of Consumers Energy Company for Authority to Implement a Power Supply Cost Recovery (PSCR) Plan in its Rate Schedules for 2014 Metered Jurisdictional Sales of Electricity, Case No. U-17317 (Michigan Public Service Commission).

(bbbb) Declaration (July 2014) on behalf of Public Health Intervenors in the matter of *EME Homer City Generation v. US EPA* (Case No. 11-1302 and consolidated cases) relating to the lifting of the stay entered by the Court on December 30, 2011 (US Court of Appeals for the District of Columbia).

(cccc) Expert Report (September 2014), Rebuttal Expert Report (December 2014) and Supplemental Expert Report (March 2015) on behalf of Plaintiffs in the matter of *Sierra Club and Montana Environmental Information Center (Plaintiffs) v. PPL Montana LLC, Avista Corporation, Puget Sound Energy, Portland General Electric Company, Northwestern Corporation, and Pacificorp (Defendants)*, Civil Action No. CV 13-32-BLG-DLC-JCL (US District Court for the District of Montana, Billings Division).

(dddd) Expert Report (November 2014) on behalf of Niagara County, the Town of Lewiston, and the Villages of Lewiston and Youngstown in the matter of CWM Chemical Services, LLC New York State Department of Environmental Conservation (NYSDEC) Permit Application Nos.: 9-2934-00022/00225, 9-2934-00022/00231, 9-2934-00022/00232, and 9-2934-00022/00249 (pending).

(eeee) Pre-filed Direct Testimony (March 2015), Supplemental Testimony (May 2015), and Surrebuttal Testimony (December 2015) on behalf of Friends of the Columbia Gorge in the matter of the Application for a Site Certificate for the Troutdale Energy Center before the Oregon Energy Facility Siting Council.

(ffff) Expert Report (March 2015) and Rebuttal Expert Report (January 2016) on behalf of Plaintiffs in the matter of *Conservation Law Foundation v. Broadrock Gas Services LLC, Rhode Island LFG GENCO LLC, and Rhode Island Resource Recovery Corporation (Defendants)*, Civil Action No. 1:13-cv-00777-M-PAS (US District Court for the District of Rhode Island).

(gggg) Direct Prefiled Testimony (May 2015) on behalf of the Michigan Environmental Council, the Natural Resources Defense Council, and the Sierra Club in the matter of the Application of DTE Electric Company for Authority to Increase its Rates, Amend its Rate Schedules and Rules Governing the Distribution and Supply of Electric Energy and for Miscellaneous Accounting Authority, Case No. U-17767 (Michigan Public Service Commission).

(hhhh) Expert Report (July 2015) and Rebuttal Expert Report (July 2015) on behalf of Plaintiffs in the matter of *Northwest Environmental Defense Center et. al., v. Cascade Kelly Holdings LLC, d/b/a Columbia Pacific Bio-Refinery, and Global Partners LP (Defendants)*, Civil Action No. 3:14-cv-01059-SI (US District Court for the District of Oregon, Portland Division).

(iiii) Declaration (August 2015, Docket No. 1570376) in support of "Opposition of Respondent-Intervenors American Lung Association, et. al., to Tri-State Generation's Emergency Motion;" Declaration (September 2015, Docket No. 1574820) in support of "Joint Motion of the state, Local Government, and Public Health Respondent-Intervenors for Remand Without Vacatur," *White Stallion Energy Center, LLC v. US EPA*, Case No. 12-1100 (US Court of Appeals for the District of Columbia).

(jjjj) Expert Report (December 2015) and Rebuttal Expert Report (February 2016) on behalf of Plaintiffs in the matter of *Natural Resources Defense Council, Inc., Sierra Club, Inc., Environmental Law and*

*Policy Center, and Respiratory Health Association v. Illinois Power Resources LLC, and Illinois Power Resources Generating LLC (Defendants)*, Civil Action No. 1:13 CV 01181 (US District Court for the Central District of Illinois, Peoria Division).

(kkkk) Expert Report (November 2015) on behalf of Appellants in the matter of *Sierra Club, et al. v. Craig W. Butler, Director of Ohio Environmental Protection Agency et al.,* ERAC Case No. 14-256814.

(llll) Affidavit (January 2016) on behalf of Bridgewatch Detroit in the matter of *Bridgewatch Detroit v. Waterfront Petroleum Terminal Co., and Waterfront Terminal Holdings, LLC.*, in the Circuit Court for the County of Wayne, State of Michigan.

(mmmm) Expert Report (February 2016) regarding the Geyer Well Site in Pennsylvania.

3. Occasions where Dr. Sahu has provided oral testimony <u>in depositions, at trial or in similar proceedings</u> include the following:

(nnnn) Deposition on behalf of Rocky Mountain Steel Mills, Inc. located in Pueblo, Colorado – dealing with the manufacture of steel in mini-mills including methods of air pollution control and BACT in steel mini-mills and opacity issues at this steel mini-mill.

(oooo) Trial Testimony (February 2002) on behalf of Rocky Mountain Steel Mills, Inc. in Denver District Court.

(pppp) Trial Testimony (February 2003) on behalf of the United States in the Ohio Edison NSR Cases, *United States, et al. v. Ohio Edison Co., et al.*, C2-99-1181 (Southern District of Ohio).

(qqqq) Trial Testimony (June 2003) on behalf of the United States in the Illinois Power NSR Case, *United States v. Illinois Power Co., et al.*, 99-833-MJR (Southern District of Illinois).

(rrrr) Deposition (10/20/2005) on behalf of the United States in connection with the Cinergy NSR Case. *United States, et* al*. v. Cinergy Corp., et al.*, IP 99-1693-C-M/S (Southern District of Indiana).

(ssss) Oral Testimony (August 2006) on behalf of the Appalachian Center for the Economy and the Environment re. the Western Greenbrier plant, WV before the West Virginia DEP.

(tttt) Oral Testimony (May 2007) on behalf of various Montana petitioners (Citizens Awareness Network (CAN), Women's Voices for the Earth (WVE) and the Clark Fork Coalition (CFC)) re. the Thompson River Cogeneration plant before the Montana Board of Environmental Review.

(uuuu) Oral Testimony (October 2007) on behalf of the Sierra Club re. the Sevier Power Plant before the Utah Air Quality Board.

(vvvv) Oral Testimony (August 2008) on behalf of the Sierra Club and Clean Water re. Big Stone Unit II before the South Dakota Board of Minerals and the Environment.

(wwww) Oral Testimony (February 2009) on behalf of the Sierra Club and the Southern Environmental Law Center re. Santee Cooper Pee Dee units before the South Carolina Board of Health and Environmental Control.

(xxxx) Oral Testimony (February 2009) on behalf of the Sierra Club and the Environmental Integrity Project re. NRG Limestone Unit 3 before the Texas State Office of Administrative Hearings (SOAH) Administrative Law Judges.

(yyyy) Deposition (July 2009) on behalf of MTD Products, Inc., in the matter of *Alice Holmes and Vernon Holmes v. Home Depot USA, Inc., et al*.

(zzzz) Deposition (October 2009) on behalf of Environmental Defense and others, in the matter of challenges to the proposed Coleto Creek coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).

(aaaaa) Deposition (October 2009) on behalf of Environmental Defense, in the matter of permit challenges to the proposed Las Brisas coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).

(bbbbb) Deposition (October 2009) on behalf of the Sierra Club, in the matter of challenges to the proposed Medicine Bow Fuel and Power IGL plant in Cheyenne, Wyoming.

(ccccc) Deposition (October 2009) on behalf of Environmental Defense and others, in the matter of challenges to the proposed Tenaska coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH). (April 2010).

(ddddd) Oral Testimony (November 2009) on behalf of the Environmental Defense Fund re. the Las Brisas Energy Center before the Texas State Office of Administrative Hearings (SOAH) Administrative Law Judges.

(eeeee) Deposition (December 2009) on behalf of Environmental Defense and others, in the matter of challenges to the proposed White Stallion Energy Center coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).

(fffff) Oral Testimony (February 2010) on behalf of the Environmental Defense Fund re. the White Stallion Energy Center before the Texas State Office of Administrative Hearings (SOAH) Administrative Law Judges.

(ggggg) Deposition (June 2010) on behalf of the United States in connection with the Alabama Power Company NSR Case. *United States v. Alabama Power Company*, CV-01-HS-152-S (Northern District of Alabama, Southern Division).

(hhhhh) Trial Testimony (September 2010) on behalf of Commonwealth of Pennsylvania – Dept. of Environmental Protection, State of Connecticut, State of New York, State of Maryland, and State of New Jersey (Plaintiffs) in connection with the Allegheny Energy NSR Case in US District Court in the Western District of Pennsylvania. *Plaintiffs v. Allegheny Energy Inc., et al.,* 2:05cv0885 (Western District of Pennsylvania).

(iiiii) Oral Direct and Rebuttal Testimony (September 2010) on behalf of Fall-Line Alliance for a Clean Environment and others in the matter of the PSD Air Permit for Plant Washington issued by Georgia DNR at the Office of State Administrative Hearing, State of Georgia (OSAH-BNR-AQ-1031707-98-WALKER).

(jjjjj) Oral Testimony (September 2010) on behalf of the State of New Mexico Environment Department in the matter of Proposed Regulation 20.2.350 NMAC – *Greenhouse Gas Cap and Trade Provisions,* No. EIB 10-04 (R), to the State of New Mexico, Environmental Improvement Board.

(kkkkk) Oral Testimony (October 2010) on behalf of the Environmental Defense Fund re. the Las Brisas Energy Center before the Texas State Office of Administrative Hearings (SOAH) Administrative Law Judges.

(lllll) Oral Testimony (November 2010) regarding BART for PSCo Hayden, CSU Martin Drake units before the Colorado Air Quality Commission on behalf of the Coalition of Environmental Organizations.

(mmmmm) Oral Testimony (December 2010) regarding BART for TriState Craig Units, CSU Nixon Unit, and PRPA Rawhide Unit) before the Colorado Air Quality Commission on behalf of the Coalition of Environmental Organizations.

(nnnnn) Deposition (December 2010) on behalf of the United States in connection with the Louisiana Generating NSR Case. *United States v. Louisiana Generating, LLC*, 09-CV100-RET-CN (Middle District of Louisiana).

(ooooo) Deposition (February 2011 and January 2012) on behalf of Wild Earth Guardians in the matter of opacity exceedances and monitor downtime at the Public Service Company of Colorado (Xcel)'s Cherokee power plant. No. 09-cv-1862 (D. Colo.).

(ppppp) Oral Testimony (February 2011) to the Georgia Office of State Administrative Hearings (OSAH) in the matter of Minor Source HAPs status for the proposed Longleaf Energy Associates power plant (OSAH-BNR-AQ-1115157-60-HOWELLS) on behalf of the Friends of the Chattahoochee and the Sierra Club).

(qqqqq) Deposition (August 2011) on behalf of the United States in *United States of America v. Cemex, Inc.*, Civil Action No. 09-cv-00019-MSK-MEH (District of Colorado).

(rrrrr) Deposition (July 2011) and Oral Testimony at Hearing (February 2012) on behalf of the Plaintiffs MYTAPN in the matter of Microsoft-Yes, Toxic Air Pollution-No (MYTAPN) v. State of Washington, Department of Ecology and Microsoft Corporation Columbia Data Center to the Pollution Control Hearings Board, State of Washington, Matter No. PCHB No. 10-162.

(sssss) Oral Testimony at Hearing (March 2012) on behalf of the United States in connection with the Louisiana Generating NSR Case. *United States v. Louisiana Generating, LLC*, 09-CV100-RET-CN (Middle District of Louisiana).

(ttttt) Oral Testimony at Hearing (April 2012) on behalf of the New Hampshire Sierra Club at the State of New Hampshire Public Utilities Commission, Docket No. 10-261 – the 2010 Least Cost Integrated Resource Plan (LCIRP) submitted by the Public Service Company of New Hampshire (re. Merrimack Station Units 1 and 2).

(uuuuu) Oral Testimony at Hearing (November 2012) on behalf of Clean Wisconsin in the matter of Application of Wisconsin Public Service Corporation for Authority to Construct and Place in Operation a New Multi-Pollutant Control Technology System (ReACT) for Unit 3 of the Weston Generating Station, before the Public Service Commission of Wisconsin, Docket No. 6690-CE-197.

(vvvvv) Deposition (March 2013) in the matter of various Environmental Petitioners v. North Carolina DENR/DAQ and Carolinas Cement Company, before the Office of Administrative Hearings, State of North Carolina.

(wwwww) Deposition (August 2013) on behalf of the Sierra Club in connection with the Luminant Big Brown Case. *Sierra Club v. Energy Future Holdings Corporation and Luminant Generation Company LLC*, Civil Action No. 6:12-cv-00108-WSS (Western District of Texas, Waco Division).

(xxxxx) Deposition (August 2013) on behalf of the Sierra Club in connection with the Luminant Martin Lake Case. *Sierra Club v. Energy Future Holdings Corporation and Luminant Generation Company LLC*, Civil Action No. 5:10-cv-0156-MHS-CMC (Eastern District of Texas, Texarkana Division).

(yyyyy) Deposition (February 2014) on behalf of the United States in *United States of America v. Ameren Missouri*, Civil Action No. 4:11-cv-00077-RWS (Eastern District of Missouri, Eastern Division).

(zzzzz) Trial Testimony (February 2014) in the matter of *Environment Texas Citizen Lobby, Inc and Sierra Club v. ExxonMobil Corporation et al.,* Civil Action No. 4:10-cv-4969 (Southern District of Texas, Houston Division).

(aaaaaa) Trial Testimony (February 2014) on behalf of the Sierra Club in connection with the Luminant Big Brown Case. *Sierra Club v. Energy Future Holdings Corporation and Luminant Generation Company LLC*, Civil Action No. 6:12-cv-00108-WSS (Western District of Texas, Waco Division).

(bbbbbb) Deposition (June 2014) and Trial (August 2014) on behalf of ECM Biofilms in the matter of the *US Federal Trade Commission (FTC) v. ECM Biofilms* (FTC Docket #9358).

(cccccc) Deposition (February 2015) on behalf of Plaintiffs in the matter of *Sierra Club and Montana Environmental Information Center (Plaintiffs) v. PPL Montana LLC, Avista Corporation, Puget Sound Energy, Portland General Electric Company, Northwestern Corporation, and Pacificorp (Defendants)*, Civil Action No. CV 13-32-BLG-DLC-JCL (US District Court for the District of Montana, Billings Division).

(dddddd) Oral Testimony at Hearing (April 2015) on behalf of Niagara County, the Town of Lewiston, and the Villages of Lewiston and Youngstown in the matter of CWM Chemical Services, LLC New York State Department of Environmental Conservation (NYSDEC) Permit Application Nos.: 9-2934-00022/00225, 9-2934-00022/00231, 9-2934-00022/00232, and 9-2934-00022/00249 (pending).

(eeeeee) Deposition (August 2015) on behalf of Plaintiff in the matter of *Conservation Law Foundation (Plaintiff) v. Broadrock Gas Services LLC, Rhode Island LFG GENCO LLC, and Rhode Island Resource Recovery Corporation (Defendants)*, Civil Action No. 1:13-cv-00777-M-PAS (US District Court for the District of Rhode Island).

(ffffff) Testimony at Hearing (August 2015) on behalf of the Sierra Club in the matter of *Amendments to 35 Illinois Administrative Code Parts 214, 217, and 225* before the Illinois Pollution Control Board, R15-21.

(gggggg) Deposition (May 2015) on behalf of Plaintiffs in the matter of *Northwest Environmental Defense Center et. al., (Plaintiffs) v. Cascade Kelly Holdings LLC, d/b/a Columbia Pacific Bio-Refinery, and Global Partners LP (Defendants)*, Civil Action No. 3:14-cv-01059-SI (US District Court for the District of Oregon, Portland Division).

(hhhhhh) Trial Testimony (October 2015) on behalf of Plaintiffs in the matter of *Northwest Environmental Defense Center et. al., (Plaintiffs) v. Cascade Kelly Holdings LLC, d/b/a Columbia Pacific Bio-Refinery, and Global Partners LP (Defendants)*, Civil Action No. 3:14-cv-01059-SI (US District Court for the District of Oregon, Portland Division).

Balaji Vaidyanathan
Air Quality Permits Section Manager
Arizona Department of Environmental Quality
1110 W. Washington St., 3415A-1
Phoenix, AZ 85007

*Submitted via email to*: bv1@azdeq.gov

**RE: Comments on the Draft Revision to the Arizona State Regional Haze State Implementation Plan and Significant Permit Revision No. 63088 to Air Quality Control Permit No. 52639 for Salt River Project for the Coronado Generating Station**

Environmental Defense Fund ("EDF") respectfully submits the following comments on the Arizona Department of Environmental Quality's ("ADEQ") Draft Revision to the Arizona Regional Haze Plan for Salt River Project ("SRP") and Draft Significant Permit Revision for the Coronado Generating Station ("CGS").

CGS is a major source of nitrogen oxides ("$NO_X$"), sulfur dioxide ("$SO_2$"), and particulate matter ("PM")—pollutants which have significant adverse impacts on protected scenic vistas and human health. CGS is located within 300 kilometers of fifteen Class 1 Areas, including Grand Canyon, Petrified Forest, Bandelier, and Saguaro National Parks, and has significant visibility and environmental impacts on these treasured areas. CGS is also a major source of climate-disturbing carbon dioxide pollution and a significant contributor to the formation of health-harming ozone and fine particulate pollution.

1. Overview of the SRP BART Alternative Proposal

ADEQ is proposing to revise the Arizona Regional Haze SIP and Air Quality Control Permit for SRP pertaining to the Coronado Generating Station in Apache County, Arizona (the "Draft SIP Revision"). On December 5, 2012, EPA issued a final rule approving in part and disapproving in part ADEQ's Regional Haze SIP.[1] EPA also promulgated a federal implementation plan (FIP) for the CGS units with an oxides of nitrogen (NOx) emission limit of 0.065 pounds per million British thermal unit (lb/MMBtu), applicable across both CGS units on a 30-boiler-operating-day average basis. The final compliance date for the BART FIP NOx limit

[1] 77 Fed. Reg. 72512 (Dec. 5, 2012).
[2] United States v. Salt River Project Agricultural Improvement and Power District, Civil Action No. 2:08-cv-1479-JAT (D. Ariz.), August 12, 2008.

is December 5, 2017 (five years from the date of publication of the FIP) and involves installation and operation of selective catalytic reduction (SCR) systems for control of NOx emissions on both CGS units. Unit 2 was equipped with SCR in 2014, as required by a consent decree between SRP and the United States.[2]

SRP filed a petition for administrative reconsideration of the $NO_x$ BART determination for CGS with EPA in February 2013. EPA granted reconsideration of the $NO_x$ emission limit and compliance methodology (i.e., the methodology used to calculate compliance with the plant-wide average) in April 2013. On March 31, 2015, EPA proposed revisions to the $NO_x$ BART determination for the CGS units.[3] The proposal established a Unit 1 BART $NO_x$ limit of 0.065 lb/MMBtu and a Unit 2 BART $NO_x$ limit of 0.080 lb/MMBtu. Both limits are to be met on a 30-boiler-operating-day average. EPA did not propose to change the initial compliance date for the $NO_x$ BART limits, which remains December 5, 2017. EPA has taken final action on the reconsideration, which was published in the Federal Register on April 13, 2016, approving a unit-specific NOx BART limit of 0.065 lb/MMBtu for Unit 1 and a unit-specific NOx BART limit of 0.080 lb/MMBtu for Unit 2 (2016 EPA BART Reconsideration).[4,5]

On January 22, 2016, SRP submitted an Application for a Significant Permit Revision and a Regional Haze State Implementation Plan Revision for CGS, referred to as the application to ADEQ. On July 19, 2016, SRP submitted addendums to the application. In these submittals, SRP requested that ADEQ adopt the BART Alternative as a revision to the Arizona Regional Haze SIP and submit the revision to EPA for approval.

The BART Alternative consists of two alternative strategies. The first strategy requires SRP to comply with the Unit 1 interim BART alternative operating strategy—referred to herein as interim operating strategy ("IS")—followed by installation of an SCR system on Unit 1 no later than December 31, 2029, to achieve a $NO_x$ limit of 0.065 lb/MMBtu at Unit 1 on a 30-boiler-operating-day average. The interim operating strategy includes four separate seasonal curtailment periods for CGS Unit 1 coupled with options for operation at a lower sulfur dioxide ("$SO_2$") emissions rate below the BART limits for both units and a $NO_x$ emissions rate below the current permit limit for Unit 1. In each year, the length of the required curtailment period for CGS Unit 1 is dependent on the $NO_x$ emissions performance of Unit 1 and the $SO_2$ emissions performance of Units 1 and 2. The second strategy would require SRP to comply with the same IS followed by permanent cessation of operation of Unit 1 no later than December 31, 2029.

## 2. Comparison of Emissions and Visibility Impacts Under the EPA FIP vs. the SRP BART Alternative Proposal

A comparison of the emission limits for CGS under BART and the BART Alternative is summarized in this table from the ADEQ proposed SIP revision:

[2] United States v. Salt River Project Agricultural Improvement and Power District, Civil Action No. 2:08-cv-1479-JAT (D. Ariz.), August 12, 2008.
[3] 80 Fed. Reg. 17010 (Mar. 31, 2015).
[4] 81 Fed. Reg. 21735 (Apr. 13, 2016).
[5] The 2016 EPA BART Reconsideration was not challenged and is considered final.

| Control Strategy | | Unit 1 (lb/MMBtu) (30-boiler-operating-day average) | | Unit 2 $SO_2$ (lb/MMBtu) (30-boiler-operating-day average) | Unit 1 Curtailment Period |
|---|---|---|---|---|---|
| | | $NO_x$ | $SO_2$ | | |
| BART control strategy (2016 EPA BART Reconsideration for $NO_x$ and 2012 ADEQ BART for $SO_2$) | | 0.065 | 0.080 | 0.080 | N/A |
| BART Alternative Operating Strategy SCR Option (OS-1) | | | | | |
| Interim Operating Strategy | IS1 | 0.320 | 0.080 | 0.080 | Oct. 1-Apr. 15 |
| | IS2 | 0.320 | 0.070 | 0.070 | Oct. 21-Jan. 31 |
| | IS3 | 0.320 | 0.050 | 0.050 | Nov. 21-Jan. 20 |
| | IS4 | 0.310 | 0.060 | 0.060 | Nov. 21-Jan. 20 |
| Final BART Alternative Strategy | SCR Installation and Operation no later than December 31, 2019 | 0.065 | 0.080 | 0.080 | N/A |
| BART Alternative Operating Strategy Shutdown Unit 1 Option (OS-2) | | | | | |
| Interim Operating Strategy | IS1 | 0.320 | 0.080 | 0.080 | Oct. 1-Apr. 15 |
| | IS2 | 0.320 | 0.070 | 0.070 | Oct. 21-Jan. 31 |
| | IS3 | 0.320 | 0.050 | 0.050 | Nov. 21-Jan. 20 |
| | IS4 | 0.310 | 0.060 | 0.060 | Nov. 21-Jan. 20 |
| Final BART Alternative Strategy | Unit Closure no later than December 31, 2029. | 0.000 | 0.000 | 0.080 | N/A |

The ADEQ Draft SIP revision also includes the following table that compares expected emissions reductions associated with BART and the interim operating strategy:

| Strategy Comparison with | NOx Reduction | | $SO_2$ Reduction | | PM Reduction** | |
|---|---|---|---|---|---|---|
| | (tons/year) | Percentage | (tons/year) | Percentage | (tons/year) | Percentage |
| BART Control Strategy | -4,096 | 63% | 0 | 0% | 0 | 0% |
| IS1 | -2,738 | 42% | -684 | 26% | -257 | 26% |
| IS2 | -1,453 | 22% | -649 | 24% | -136 | 14% |
| IS3 | -832 | 13% | -1,125 | 42% | -79 | 8% |
| IS4 | -972 | 15% | -820 | 31% | -79 | 8% |

**Reductions in emissions presented here are for both CGS units.*

***This PM metric includes only filterable PM emissions and does not include condensable PM emissions such as the $H_2SO_4$ and other PM emissions that would result from installation and operation of SCR at Unit 1 under the BART Control Strategy.*

The ADEQ Draft SIP revision also provides a summary table of the average differences between the interim operating strategy and the EPA BART. This table shows the average visibility change across all mandatory Federal Class I areas within the air quality model domain used by SRP's consultant.

| Interim Operating Strategy | Average Best 20% Days | | Average Worst 20% Days | | Annual Average | |
|---|---|---|---|---|---|---|
| | Absolute (dv) | Relative | Absolute (dv) | Relative | Absolute (dv) | Relative |
| IS1 | 0.0017 | 21.79% | 0.00003 | 0.63% | 0.0006 | 7.88% |
| IS2 | 0.0002 | 2.50% | 0.0001 | 1.26% | 0.0001 | 1.04% |
| IS3 | 0.0004 | 3.62% | 0.0003 | 9.13% | 0.0005 | 7.90% |
| IS4 | 0.0003 | 0.35% | 0.00001 | 2.00% | 0.0001 | 2.09% |

In supplemental analysis, ADEQ notes that review of the relative contribution of $NO_X$, $SO_2$ and PM emissions to visibility impairment at Petrified Forest National Park, the nearest Class I area to GCS identifies reductions in $SO_2$ emissions as significantly more important than $NO_X$ emissions in improving visibility on a per ton basis. This analysis was based on BART emissions control strategies for other nearby sources as well as examining changes in aerosol measurements over time as major reductions in $SO_2$ and $NO_X$ emissions took place at Cholla Power plant and at Unit 2 at CGS.

The ADEQ SIP revision notes that EPA's Carbon Pollution Emission Guidelines for Existing Utility Generating Units, commonly referred to as the Clean Power Plan (CPP) was finalized in August 2015. The final rule requires states to develop plans outlining how they will comply with carbon emissions targets through 2030.

3. Evaluation of the SRP BART Proposal

*Timing*

EDF recognizes the multiple public health and environmental protections and the overlapping implementation schedules that affect most utility generating units across the country. Where appropriate, we encourage states and sources to implement comprehensive strategies that achieve public health and environmental goals in a cost-efficient manner. It is imperative that the visibility protection afforded by implementation of EPA's FIP neither be delayed nor weakened.

Also the timing of implementing and sustaining that protection through an alternative should not raise new legal uncertainties. In that regard, we are concerned with the timing of the December 31, 2026 notification deadline and the December 31, 2029 deadline for installation of an SCR on Unit 1 or shut down of Unit 1. If ADEQ finalizes the proposed permit revision for CGS, the timing of the notification step and the final installation of SCR or shut down should be coordinated with the implementation of the RHR's second planning period. For example, the notification deadline could be part of ADEQ's mid-term review and reporting on progress of the RHR implementation and implementation deadline for installation of SCR control or shutdown should then occur no later than end of the second planning period of the RHR.

Since the proposed BART alternative does not implement continuous emissions controls for $NO_X$ within the normal 5-year window, there may also be legal uncertainties with having a long period of interim emissions curtailment as the means to address visibility impairment due to NOX emissions from CGS.

*Visibility Impacts*

The demonstration that the BART Alternative achieves greater reasonable progress than EPA's BART FIP and the establishment of the Interim Operating Strategies curtailment period alternatives rely on air quality modeling that is substantially different in nature than the modeling used to establish the BART FIP, in that it uses CAMX rather than CALPUFF. Most CALPUFF evaluations use a minimum of a 3-year metrological database when calculating the impacts of a source on Class I area visibility. The use of an existing CAMX database for 2008 for the ADEQ assessment appears to use only one year of meteorological data.[6] Given the variability of regional transport and meteorological conditions from year to year, it is important that the air quality evaluation to support a finding of greater overall visibility improvement under a BART alternative be as robust as possible.

Having a robust basis for determining visibility impacts is made more critical in this BART Alternative because the alternative curtailment periods are determined by matching of visibility impacts resulting from various emissions performance criteria to the EPA BART. Given the model estimates very small changes in visibility between each case, the difference in impacts

[6] See *Technical Support Document for Regional Haze State Implementation Plan Revision for the Coronado Generating* Station, July 19, 2016; Table 6, Page 23.

that delineate one alternative curtailment period from another are within the margin of error for the model output. Having that difference calculation be consistent from year to year would provide more confidence in the resulting implementation of multiple curtailment periods.

As noted in the Draft SIP revision and associated TSD, much of the improvement in visibility under the Alternative BART interim curtailment strategies comes from reductions in SO2 emissions during the curtailments. The variation in SO2 emission is expected mainly from variation in fuel supply. Given the need to demonstrate that all interim strategies would result in better visibility than EPA's BART FIP, any ability to enhance the operations of sulfur dioxide control equipment and / or enhanced fuel supply monitoring and blending could be examined as ongoing requirements from 2017 to final installation of SCR or shut down of Unit 1.

4. Recommendations

If ADEQ issues a revised operating permit and SIP revision for an BART Alternative for NOx control at Unit 1 of CGS, EDF recommends that ADEQ link the notification date for either the SCR or shut down pathways to no later than the mid-term reporting for the second planning period of the Regional Haze Rules. In addition, the deadline for installation of SCR on or shut down of Unit1 of CGS should be no later than the end of the second reasonable progress planning period of the RHR.

EDF requests ADEQ to work with SRP and EPA to evaluate multi-year impacts of the Alternative BART curtailment periods in order to insure that any interim operations of CGS achieve more visibility improvement than EPA's BART FIP. In reviewing the TSD information on the databases used in the CAMx model, it appears that a meteorological database for 2011 may be available through the Intermountain West Data Warehouse.[7] There may also be ways to address inter-annular variability through a weight of evidence approach to assure sufficient reductions of emissions.

EDF also requests that ADEQ work with SRP to explore ongoing SO2 control equipment operations and fuel supply procedures that could achieve the maximum, reliable emissions reductions during the entire implementation period of the BART Alternative until installation of SCR or shut down of Unit 1.

Thank you for your careful consideration of these comments.

[7] www.views.cira.colostate.edu/tsdw/

Respectfully submitted,

Bruce Polkowsky
Consultant
1610 Little Raven St. Unit 308
Denver, CO 80202
(303) 520-1464

Graham McCahan
Senior Attorney
Environmental Defense Fund
2060 Broadway, Suite 300
Boulder, CO 80302
(303) 447-7228
*On behalf of Environmental Defense Fund*

CTS: 361809

**Senator Sylvia Allen**
Arizona State Senate
District 6

**Committees:**
Education, Chairman
Water & Energy, Vice Chair
Government, Vice Chair
Appropriations

# Arizona State Senate

August 12, 2016

ADEQ AIR QUALITY DIVISION
16 AUG 19 AM 11:05

Balaji Vaidyanathan
ADEQ
Air Quality Permits Section Manager
1110 W. Washington Street, 3415A-1
Phoenix, AZ 85007

Dear Mr. Vaidyanathan:

**RE: Support Coronado Generating Station Permit and Revision to Arizona Regional Haze SIP**

I write to encourage ADEQ's approval of the revision to the Arizona State Regional Haze State Implementation Plan (SIP) and Significant Permit Revision No. 63088 to Air Quality Control Permit No. 52639 for Salt River Project — Coronado Generating Station.

As a State Senator and former County Supervisor, I have worked to resist federal overreach, reduce unnecessary regulations and support jobs in rural Arizona. Arizonans in the Northeastern quarter of the state are particularly hard hit by EPA regulations' compounding threats to the economy and jobs in our region. We need solutions that both enable the economy to grow and protect the environment.

I appreciate ADEQ's consideration of this permit revision and the associated revision to the SIP. This approach is one that helps preserve jobs at the plant and actually provides more emissions reductions that the EPA's current requirements. It also helps the State of Arizona and SRP to manage the uncertainty created by the EPA's Clean Power Plan – which is on hold while the State's challenge is considered by the courts.

Because CGS is so important to our region, I respectfully urge ADEQ's approval of the permit revision and the revision to the SIP. I also encourage the EPA to expedite approval as well.

Sincerely,

Senator Sylvia Allen
Arizona Senate, District 6

1700 West Washington St. Room 303 • Phoenix, AZ 85007 • Phone: 602-926-5409 Fax: 602-417-3105
Toll free: 1-(800) 352-8404 x65409 • E-mail: sallen@azleg.gov

# NAVAJO COUNTY

CTS36 2051

## Board of Supervisors

Robert K. Black Jr. • Jesse Thompson • Jason E. Whiting • Steve Williams • Dawnafe Whitesinger

*"We are Navajo County"*

August 23, 2016

Balaji Vaidyanathan
ADEQ – Air Quality Permits Section Manager
1110 W. Washington Street, 3415A-1
Phoenix, AZ 85007

16 AUG 26 AM 10: 12
ADEQ AIR QUALITY DIVISION

Re: Support of SRP's BART Alternative Proposal

To whom it may concern:

This letter is written in support of the Salt River Project's (SRP) proposed "Best Available Retrofit Technology" (BART) alternative operating strategy to the Regional Haze Federal Implementation Plan (FIP) for the Coronado Generating Station (CGS).

SRP's proposed BART alternative operating strategy is the most practical immediate solution to provide visibility benefits and avoid a severe economic downturn. This region is already dealing with the cutback of production from a local power plant, and the possibility of another could be detrimental to the local job market and economy. Navajo County has already felt the effects of these regulations, and as a county we strongly encourage the EPA to adopt the SRP proposed BART alternative operating strategy.

CGS is a two-unit, 800 megawatt, coal-fired power plant near St. Johns, Arizona. Currently, CGS employs 213 employees, and, for every full-time employee, 2.8 indirect and induced jobs are created in the State. CGS also contributes over $12 million to Apache County every year via in-lieu tax payments and is a base load resource for SRP. With an above average rate of unemployment across the region, CGS has become an integral part of the Apache County economy that is currently one of the poorest in the country (poverty rate over 30%) according to the USDA. Ensuring continued CGS operations is of the upmost importance to whole northeast region of the state.

Under the BART alternative operating strategy, SRP would implement a curtailment period for CGS Unit 1 allowing a reduction in plant emissions at the time of year when they are most impactful to visibility. This alternative operating strategy has the potential to have greater visibility benefits than EPA's BART scenario while still striking a balance between environmental benefits and the local economy.

We hope the ADEQ will consider and approve SRP's proposed BART alternative operating strategy to ensure that CGS can continue to be a beneficial and productive asset to the region and the State of Arizona as a whole.

Sincerely,

Jason Whiting, Chairman
Navajo County Board of Supervisors

• 928.524.4053 • Fax: 928.524.4239 • P.O. Box 668 • Holbrook, AZ 86025 •
• www.navajocountyaz.gov •

**Pervinder Tandon**

**From:** Balaji Vaidyanathan
**Sent:** Wednesday, August 10, 2016 4:58 PM
**To:** Pervinder Tandon; Brian Parkey; Feng Mao
**Subject:** Fwd: Show Low's comments re SRP's response to SIP & permit #52639

FYI

Begin forwarded message:

**From:** Ann Kurasaki <akurasaki@ci.show-low.az.us>
**Date:** August 10, 2016 at 4:56:57 PM MST
**To:** <bv1@azdeq.gov>
**Subject: Show Low's comments re SRP's response to SIP & permit #52639**


**City of Show Low**
**180 North 9th Street Show Low, AZ 85901 (928) 532-4000**


August 10, 2016

Balaji Vaidyanathan
Air Quality Permits Section Manager
Arizona Department of Environmental Quality
1100 West Washington Street, 3415A-1
Phoenix, AZ 85007

Subject: Significant Permit Revision No. 63088 to Air Quality Control Permit No. 52639

Dear Mr. Vaidyanathan:

The Show Low City Council represents constituents that are directly affected by the application of the Environmental Protection Agency's regional haze regulations on Salt River Project's Coronado Generating Station. On behalf of the Council, we are writing in support of SRP's proposed alternative strategy to the BART (Best Available Retrofit Technology) requirements for regional haze regulations. We believe SRP's proposed alternative strategy is the best near-term solution that will provide visibility benefits and also avoid a severe economic downturn in our local economy.

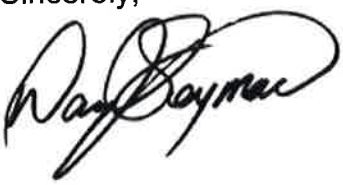
Coronado Generating Station employs 213 employees. For every full-time employee, 2.8 indirect and induced jobs are created in the region and in the state. CGS also contributes over $12 million to Apache County annually through in-lieu tax payments,

which have a ripple effect on her closest neighbor, Navajo County. This makes CGS an integral part of our two-county economy; therefore, ensuring that CGS continues operating is of the utmost importance to our region.

Under the BART alternative strategy, SRP would implement a curtailment period annually for Unit 1 at the Coronado Generating Station. The proposed operating schedule allows for planned maintenance and reduces plant emissions at the time of year when they have the most impact on visibility. In fact, the BART alternative strategy will have greater visibility benefits than EPA's BART scenario. We believe that the BART alternative strategy strikes a balance between environmental benefits and the local economy, while still allowing CGS to continue operating.

We urge ADEQ to act expeditiously to approve SRP's proposed BART alternative strategy to ensure that CGS continues to be a beneficial and productive asset to our communities, counties, and the State of Arizona. In addition, we strongly encourage EPA to adopt SRP's proposal. If you have any questions, please feel free to contact our City Manager, Ed Muder, at (928) 532-4015 or emuder@showlowaz.gov.

Sincerely,



Daryl Seymore
Mayor

CTS: 361810

# TOWN OF SPRINGERVILLE

"GATEWAY TO THE WHITE MOUNTAINS"

ADEQ AIR QUALITY DIVISION
16 AUG 19 AM 11:05

Balaji Vaidyanathan
ADEQ
Air Quality Permits Section Manager
1110 W. Washington Street, 3415A-1
Phoenix, AZ 85007

August 16, 2016

**RE: Support of SRP's BART Alternative Proposal**

This letter is written in support of SRP's proposed BART alternative operating strategy to the Regional Haze regulations for the Coronado Generating Station (CGS). SRP's proposed BART alternative operating strategy is the best near-term solution that will provide visibility benefits and avoid a severe economic downturn in the local economy. I represent individuals that are directly affected by application of EPA's Regional Haze regulations to CGS and strongly encourage the EPA to adopt the SRP proposed BART alternative operating strategy.

CGS is a two-unit baseload generation asset that is located near St. Johns, Arizona. Currently, CGS employs 213 employees and for every full-time employee, 2.8 indirect and induced jobs are created in the State. CGS contributes over $12 million to Apache County every year via in-lieu tax payments. In-lieu tax payments are an important part of the county's budget as Apache County's unemployment rate is 13%, according to U.S. Bureau of Labor Statistics. This makes CGS an integral part of Apache County's economy. Ensuring continued CGS operations is of the upmost importance to county and communities I represent.

Under the BART alternative operating strategy SRP would implement a curtailment period for CGS Unit 1. The proposed operating schedule allows for planned maintenance and will reduce plant emissions at the time of year when they are most impactful to visibility. In fact, the BART alternative operating strategy will have greater visibility benefits than EPA's BART scenario. I believe that the BART alternative operating strategy strikes a balance between environmental benefits and the local economy and still allows for continued operation of CGS.

I urge the ADEQ to act expeditiously to approve SRP's proposed BART alternative operating strategy to ensure that CGS can continue to be a beneficial and productive asset to the county and the State of Arizona.

Sincerely,

Steve West, Manager

For the council

418 East Main Street
Springerville, Arizona 85938
928-333-2656
www.springervilleaz.gov

CTS362052

ADEQ
AIR QUALITY DIVISION
16 AUG 26 AM 10: 12

16 August 2016

Balaji Vaidyanathan
ADEQ
Air Quality Permits Section Manager
1110 W. Washington Street, 3415A-1
Phoenix, AZ 85007

**RE: Support of SRP's BART Alternative Proposal**

Dear Administrator Vaidyanathan:

Please accept this letter as support of Salt River Project's (SRP) proposed BART alternative operating strategy to the Regional Haze regulations for the Coronado Generating Station (CGS). SRP's proposed BART alternative operating strategy is the best near-term solution that will provide visibility benefits and avoid a severe economic downturn in the local economy. I represent a community in eastern Arizona with residents that are directly affected by application of EPA's Regional Haze regulations to CGS and strongly encourage the EPA to adopt the SRP proposed BART alternative operating strategy.

Our area faces significant economic challenges. The percentage of people living below the poverty level in our county is 36.2%, with 33.4% of families making less than $25,000 *(U.S. Census Bureau)*. Poverty rates are only part of the picture. The unemployment rate in our county is 213% greater than the national average. From a statewide perspective, our high unemployment places Apache County among the most economically depressed areas in Arizona. Currently, CGS employs 213 employees and for every full-time employee, 2.8 indirect and induced jobs are created in the State. CGS contributes over $12 million to Apache County every year via in-lieu tax payments. In-lieu tax payments are an important part of the county's. This makes CGS an integral part of our economy. Ensuring continued CGS operations is of the upmost importance to the residents I represent.

Under the BART alternative operating strategy, SRP would implement a curtailment period for CGS Unit 1. The proposed operating schedule allows for planned maintenance and will reduce plant emissions at the time of year when they are most impactful to visibility. In fact, the BART alternative operating strategy will have greater visibility benefits than EPA's BART scenario. I believe that the BART alternative operating strategy strikes a balance between environmental benefits and the local economy and still allows for continued operation of CGS.

I urge the ADEQ to act expeditiously to approve SRP's proposed BART alternative operating strategy to ensure that CGS can continue to be a beneficial and productive asset to the county and the State of Arizona.

Best Regards,

Bryce Hamblin

Bryce Hamblin, Mayor
Town of Eagar
PO Box 1300
Eagar, AZ 85925

CTS 362121

ADEQ
AIR QUALITY DIVISION
16 AUG 30 AM 10: 19

Balaji Vaidyanathan
ADEQ
Air Quality Permits Section Manager
1110 W. Washington Street, 3415A-1
Phoenix, AZ 85007

**RE: Support of SRP's BART Alternative Proposal**

This letter is written in support of SRP's proposed BART alternative operating strategy to the Regional Haze regulations for the Coronado Generating Station (CGS). SRP's proposed BART alternative operating strategy is the best near-term solution that will provide visibility benefits and avoid a severe economic downturn in the local economy. I represent individuals that are directly affected by application of EPA's Regional Haze regulations to CGS and strongly encourage the EPA to adopt the SRP proposed BART alternative operating strategy.

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Sincerely,

CTS362050

ADEQ
AIR QUALITY DIVISION
16 AUG 26 AM 10: 13

Balaji Vaidyanathan
ADEQ
Air Quality Permits Section Manager
1110 W. Washington Street, 3415A-1
Phoenix, AZ 85007

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Sincerely,

Jeri L. Rothlisberger

Balaji Vaidyanathan
ADEQ
Air Quality Permits Section Manager
1110 W. Washington Street, 3415A-1
Phoenix, AZ 85007

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Sincerely,

ADEQ
AIR QUALITY DIVISION
16 AUG 25 AM 11:18

Balaji Vaidyanathan
ADEQ
Air Quality Permits Section Manager
1110 W. Washington Street, 3415A-1
Phoenix, AZ 85007

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I urge the ADEQ to act expeditiously to approve SRP's proposed BART alternative operating strategy to ensure that CGS can continue to be a beneficial and productive asset to the county and the State of Arizona.

Sincerely,

**SALT RIVER PROJECT**
*P.O. Box 52025*
*Phoenix, AZ 85072-2025*
*(602) 236-5262*
*Fax (602) 236-6690*
*Kelly.Barr@srpnet.com*

**KELLY J. BARR, ESQ**
*Senior Director*
*Environmental Management*
*and Chief Sustainability and*
*Compliance Executive*

*Submitted via email*

August 23, 2016

Balaji Vaidyanathan
Arizona Department of Environmental Quality
Air Quality Permits Section Manager
1110 W. Washington St., 3415A-1
Phoenix, AZ 85007
E-Mail: bv1@azdeq.gov

***RE: SRP Comments on ADEQ's Proposed Revision to the Arizona Regional Haze State Implementation Plan and Significant Permit Revision No. 63088***

Dear Mr. Vaidyanathan:

Salt River Project Agricultural Improvement and Power District ("SRP") appreciates the opportunity to comment on the Arizona Department of Environmental Quality's ("ADEQ") proposed revision to the Arizona State Regional Haze State Implementation Plan ("SIP") and Significant Permit Revision No. 63088 to Air Quality Control Permit No. 52639 ("Permit") for Salt River Project – Coronado Generating Station.

SRP is a community-based, not-for-profit public power utility that provides retail electric services to more than 1 million residential, commercial, industrial, agricultural, and mining customers in Arizona. As a vertically integrated utility, SRP provides generation, transmission, and distribution services, as well as metering and billing services.

On July 21, 2016, ADEQ announced a public comment period on two related proposed actions: a revision to the SIP for the Coronado Generating Station ("CGS") and Significant Permit Revision No. 63088 to Air Quality Control Permit No. 52639 for CGS. SRP, the owner and operator of CGS, submits these comments in support of these proposed actions.

CGS plays a critical role in the local and state economies, generating $258.9 million in gross state product and nearly $12 million of in-lieu tax payments. Those tax payments benefit local services, schools, and other public works that are vital to the community. They provide, for example, 75% and 38%, respectively, of St. John's Unified School District's and White Mountain Health Care District's property tax value. CGS also provides quality jobs to 213 local residents with total employee compensation of $29.7 million. In addition to the direct employment

associated with the generating station, there are 827 indirect jobs created by activities associated with CGS operations.[1] CGS jobs support local families and many other businesses throughout the region and the state. SRP is proud to have been for many years, and to continue to be, a part of the local economy and appreciates the community's long-standing and continuing support.

CGS itself is a vital resource that provides reliable, affordable power for SRP's customers. SRP has invested nearly $500 million in additional, advanced emission controls at CGS over the past several years pursuant to a consent decree that SRP entered into with the U.S. Environmental Protection Agency ("EPA") in 2008.[2] SRP has installed Low NOx Burners and Overfire Air and new Wet Scrubbers on Units 1 and 2 and Selective Catalytic Reduction ("SCR") on Unit 2. The provisions of EPA's regional haze Federal Implementation Plan ("FIP"), which would require SRP to install and operate SCR at Unit 1, risks stranding these investments in light of the regulatory uncertainty created by the Clean Power Plan ("CPP"). Because of the regulatory uncertainty created by EPA's Clean Power Plan ("CPP"), which raises serious questions about the future of operation of CGS Unit 1, SRP cannot prudently invest the nearly $110 million that would be necessary to construct and install SCR for Unit 1 by the FIP's December 5, 2017 compliance deadline. Final action to approve the revised SIP that ADEQ has developed would allow ADEQ and SRP to effectively address this predicament while furthering the visibility-protection goals and meeting the regional haze requirements of the Clean Air Act ("CAA" or the "Act"), as described below.

SRP recognizes and appreciates ADEQ's development of the SIP and permit revisions, as well as the commitment by EPA to consider the proposed approach reflected in these documents. SRP has worked for over two years to develop a solution that provides greater visibility improvements in federally designated Class I areas, protects SRP's customers and supports the local economy. SRP appreciates the efforts by both ADEQ and EPA and encourages timely approval of this action by both ADEQ and EPA.

## I. Introduction and Background

CGS is located approximately six miles northeast of St. Johns off U.S. Highway 191, in Apache County, Arizona. It consists of two pulverized coal-fired, electric utility steam boilers (Units 1 and 2), which generate approximately 762 megawatts ("MW") (net) of electricity.[3] Units 1 and 2, which started operation in 1979-1980, are dry-bottom turbo-fired boilers with net rated output of 380 MW and 382 MW, respectively, primarily firing low-sulfur western coals.

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[1] *Coronado and Springerville Generating Stations: An Economic Impact Study,* Dr. Anthony Evans and Professor Tim James, W.P. Cary School of Business, Arizona State University (Sept. 24, 2014).

[2] Consent Decree, *United States v. Salt River Project*, No. 2:08-cv-01479-JAT (D. Ariz. Dec. 22, 2008), ECF No. 18.

[3] Prior to installation of emission controls, CGS generation capacity was 772 MW (net).

CGS Unit 1 and Unit 2 are subject to the CAA's Regional Haze Program. ADEQ determined that the CGS units are "eligible" for the Act's best available retrofit technology ("BART") requirement and that emissions from the units may reasonably be anticipated to cause or contribute to visibility impairment at a Class I Federal area and, as such, are "subject to BART."

The CGS units are currently subject to a FIP promulgated by EPA establishing BART for emissions of nitrogen oxides ("NOx"). That FIP requires CGS to meet unit-specific NOx emission limits of 0.065 lb/MMBtu for Unit 1 (30-boiler-operating-day average) and 0.080 lb/MMBtu for Unit 2 (30-boiler-operating-day average).[4] To meet the limit for Unit 1, SRP would be required to install and operate SCR emission controls at Unit 1 by the FIP's December 5, 2017 NOx BART compliance date.[5]

CGS may also be subjected to emission control requirements pursuant to EPA's CPP. Because the CPP is currently subject to a judicial stay and is the subject of pending litigation, the questions whether and when the CPP will be implemented remain open and are unlikely to be finally or fully resolved for a considerable period. The uncertainty created by the status of the CPP and the potentially conflicting requirements under the BART FIP prompted development of a BART alternative for CGS ("BART Alternative"). This alternative would achieve greater reasonable progress toward the CAA's goal of eliminating manmade visibility impairment in mandatory Class I Federal areas than would the current BART FIP, while also providing SRP with flexibility that would allow it to postpone decisions regarding costly additional investments at CGS until ADEQ and SRP have greater certainty regarding compliance obligations for CGS under the CPP.

The BART Alternative includes two phases – the interim operating strategy and the final BART alternative options. The interim operating strategy requires SRP to curtail operation of Unit 1 for part of the year to achieve reductions in NOx, sulfur dioxide ("$SO_2$"), and particulate matter ("PM") emissions that are sufficient to provide better-than-BART visibility improvements during implementation of the interim operating strategy and sufficient to satisfy the BART rules' requirement that the BART Alternative, as a whole, will achieve greater reasonable progress than BART. The interim operating strategy will remain in effect until SRP decides on a final BART alternative option, notifies ADEQ and EPA of that decision (by no later than December 31, 2026), and implements the final compliance decision (by no later than December 31, 2029). SRP will choose either Operating Strategy 1 ("OS-1") or Operating Strategy 2 ("OS-2") as the final compliance option for CGS. Under OS-1, SRP would install an SCR system on Unit 1 that

[4] 81 Fed. Reg. 21735 (Apr. 13, 2016).

[5] As noted above, SRP installed SCR at Unit 2 and is subject to a 0.080 lb/MMBtu emission limit at that unit pursuant to a 2008 consent decree intended to resolve CAA litigation related to CGS obligations under the CAA's Prevention of Significant Deterioration provisions.

achieves a 0.065 lb/MMBtu NOx limit (30-boiler-operating-day average) by December 31, 2029. Under OS-2, SRP would permanently cease operation of Unit 1 by December 31, 2029.

## A. Overview of the Clean Air Act's Regional Haze Program

The CAA's regional haze provisions establish as a national goal "the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas which impairment results from manmade air pollution."[6] The Act directs EPA to issue regulations designed "to assure . . . reasonable progress toward meeting the national goal" and specifically to require each state to submit a SIP containing "such emission limits, schedules of compliance and other measures as may be necessary to make reasonable progress toward meeting the national goal."[7]

One aspect of the regional haze program's approach to achieving reasonable progress toward the national goal is a requirement that states determine BART for "BART-eligible" sources that are "subject to BART" – and that states establish emission limits that may be met using BART at those sources – for the purpose of controlling emissions that impair visibility in Class I Federal areas. BART-eligible sources are, generally, individual stationary sources that emit sizeable amounts of visibility-impairing pollutants, that are within certain statutorily specified source categories (including fossil-fuel fired steam electric generating units of a certain size), and that were in existence on August 7, 1977, but that had not been in operation for more than 15 years as of that date.[8] A BART-eligible source is "subject to BART" if, based on an analysis of visibility impacts, it "may reasonably be anticipated to cause or contribute to any impairment of visibility in any mandatory Class I Federal area."[9] Determining BART for a specific source generally requires consideration of five factors as they apply to that source: the costs of compliance, the energy and non-air-quality environmental impacts of compliance, any existing pollution control technology in use at the source, the remaining useful life of the source, and the degree of improvement in visibility that may reasonably be anticipated to result from the use of such technology.[10]

EPA's BART rules also permit states, instead of requiring a source to install, operate, and maintain BART, to establish a BART alternative that "achieve[s] greater reasonable progress than would be achieved through the installation and operation of BART."[11] The emission reductions necessary for a BART alternative to achieve greater reasonable progress than would

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[6] CAA § 169A(a)(1).
[7] *Id.* § 169A(a)(4), (b)(2).
[8] *Id.* § 169A(b)(2)(A); 40 C.F.R. § 51.301 (defining "existing stationary facility"); *see generally* 70 Fed. Reg. 39104 (July 6, 2005) (promulgating BART rules).
[9] 40 C.F.R. § 51.308(e)(1)(ii).
[10] CAA § 169A(g)(2); *see also* 40 C.F.R. § 51.301 (definition of BART).
[11] 40 C.F.R. § 51.308(e)(2).

be achieved through BART must take place during the period of the first long-term strategy for regional haze (which continues through December 31, 2018) and be surplus to the emission reductions resulting from measures adopted to meet requirements of the CAA as of the SIP's baseline date.[12]

The BART rules provide three different tests for determining whether a given BART alternative achieves greater reasonable progress than BART would achieve. Only one of the three tests need to be satisfied for a BART alternative to be approvable as part of a state's regional haze SIP. Pursuant to 40 C.F.R. § 51.308(e)(2)(i)(E), a state may establish a BART alternative "based on the clear weight of evidence that the trading program or other alternative measure achieves greater reasonable progress than would be achieved through the installation and operation of BART at the covered sources." The BART rules also allow a state to establish a BART alternative pursuant to either of two tests that are stated in 40 C.F.R. § 51.308(e)(3). Under that provision, a state may demonstrate that either (1) "the distribution of emissions [under the BART alternative] is not substantially different than under BART, and the alternative measure results in greater emission reductions" than BART would, or (2) "the distribution of emissions is significantly different" and dispersion modeling shows that for the worst 20 percent and best 20 percent of days for the affected Class I Federal areas,

> (i) Visibility does not decline in any Class I area, and
>
> (ii) There is an overall improvement in visibility, determined by comparing the average differences between BART and the alternative over all affected Class I areas.[13]

As described below, ADEQ assessed the BART Alternative for CGS in a manner consistent with the BART rules' most demanding test: the dispersion modeling analysis provided for under 40 C.F.R. § 51.308(e)(3). That assessment demonstrates that the BART Alternative for CGS is better than BART.

**B. History of the State and Federal Implementation Plans for CGS**

On February 28, 2011, ADEQ submitted to EPA the state's initial Regional Haze SIP for the first planning period of the regional haze program. That submission included BART determinations for CGS Units 1 and 2. On December 5, 2012, EPA published a final rule approving in part and disapproving in part ADEQ's Regional Haze SIP.[14] As to CGS, EPA approved ADEQ's $SO_2$ and PM

[12] 40 CFR § 51.308(e)(2)(iii), (iv).
[13] *Id.* CFR § 51.308(e)(3).
[14] 77 Fed. Reg. 72512 (Dec. 5, 2012).

BART determinations but disapproved ADEQ's NOx BART determination.[15] In its rule, EPA also promulgated a FIP for the CGS units with a NOx emission limit of 0.065 lb/MMBtu, applicable across both CGS units on a 30-boiler-operating-day average basis. The compliance date for that BART FIP's NOx limit was December 5, 2017 (five years from the date of publication of the FIP). To attempt to comply with that FIP, SRP would have had to install and operate SCR at Unit 1 by December 5, 2017, while continuing to operate the existing SCR system at Unit 2, but the levels of the FIP's emission rate requirements and the nature of the FIP's plantwide emission-rate averaging methodology included in the FIP would have made compliance infeasible and unachievable as a practical matter, even with the addition of SCR at Unit 1.

Because of these and other problems presented by the FIP, SRP filed a petition for administrative reconsideration of the FIP's NOx BART determination for CGS with EPA in February 2013 and, along with the State of Arizona and other petitioners, sought judicial review of the rule promulgating the NOx BART FIP in the U.S. Court of Appeals for the Ninth Circuit. That court denied SRP's petition for review in part on February 24, 2016, but reserved judgment at that time as to several of SRP's claims pending EPA's action on SRP's petition for administrative reconsideration.[16]

Previously, on April 9, 2013, EPA had informed SRP that it would grant reconsideration of the NOx emission limit and compliance methodology (i.e., the methodology used to calculate compliance with the plant-wide average). On March 31, 2015, EPA published proposed revisions to the NOx BART determination for the CGS units.[17] EPA proposed to revise the NOx BART emission limit for CGS to provide a Unit 1 NOx limit of 0.065 lb/MMBtu and a Unit 2 NOx limit of 0.080 lb/MMBtu, both of which would have to be met on a 30-boiler-operating-day average basis. EPA did not propose to change the December 5, 2017 compliance date for the NOx BART limits. EPA took final action to revise the NOx BART determination for CGS in a rule published on April 13, 2016.[18]

The final rule is the same in all substantive respects as EPA's March 31, 2015 proposed rule. After EPA took final action on reconsideration, the Ninth Circuit dismissed SRP's remaining claims as moot.[19] The SIP revision ADEQ has now proposed would provide SRP with the flexibility it needs to coordinate emission control requirements under the regional haze

[15] Arizona's regional haze SIP requires CGS Units 1 and 2 to meet a 0.03 lb/MMBtu PM emission rate. *See* 77 Fed. Reg. 42834, 42842 (July 20, 2012). The 2008 consent decree requires the CGS units to achieve a 0.030 lb/MMBtu PM emission rate. ADEQ's draft permit would require a 0.033 lb/MMBtu PM emission rate. Draft Permit at 5, § III.A.3. Apparently, this is a scrivener's error; the PM emission limit in the draft permit should be consistent with the applicable emission limit in the consent decree.

[16] *State of Arizona ex rel. Henry R. Darwin v. EPA*, 815 F.3d 519, 541-42, 544 (9th Cir. 2016).

[17] 80 Fed. Reg. 17010 (Mar. 31, 2015).

[18] 81 Fed. Reg. at 21735.

[19] Order, *State of Arizona ex rel. Henry R. Darwin v. EPA*, Nos. 13-70366 & 13-70410, ECF No. 204 (June 2, 2016).

program with additional requirements, such as the CPP, while meeting – indeed, exceeding – the applicable BART requirements. For those reasons and for the reasons described below, SRP supports ADEQ's proposed SIP and Significant Permit Revision.

## II. The Proposed Regional Haze SIP Revision Is Appropriate and Satisfies All Applicable Legal Standards.

Any revision by Arizona to its regional haze SIP must be evaluated in light of the extraordinarily broad discretion the CAA affords states in making decisions about how to implement the regional haze program. Over 40 years ago, the U.S. Supreme Court articulated the scope of discretion that states have in developing CAA SIPs:

> 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 [CAA] § 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*. [CAA] § 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.[20]

The U.S. Court of Appeals for the D.C. Circuit made even clearer that states have broad discretion in developing SIPs in the context of the regional haze program in its 2002 decision in *American Corn Growers Association v. EPA*.[21] There, the court explained that "[t]he [Regional] Haze Rule calls for states to play the lead role in designing and implementing regional haze programs . . . ."[22] Applying that principle, the court struck down key portions of the 1999 regional haze rules' BART provisions in which EPA had attempted to constrain the manner in which a state could weigh and consider one of the five statutory BART factors. That aspect of EPA's rules, the court held, was "inconsistent with the Act's provisions giving the states broad authority over BART determinations."[23] The court's decision relied, in particular, on clear

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[20] *Train v. Natural Res. Def. Council v. EPA*, 421 U.S. 60, 79 (1975) (emphases added); *see also, e.g.*, CAA § 107(a) ("Each State shall have the primary responsibility for assuring air quality within the entire geographic area comprising such State . . . ."). *Train* construed section 110(a)(2) of the CAA, which, as amended, includes section 110(a)(2)(J)'s directive that SIPs address requirements for visibility protection under sections 169A and 169B in Part C of Title I of the Act.

[21] *American Corn Growers Association v. EPA*, 291 F.3d 1 (D.C. Cir. 2002).

[22] *Id.* at 2.

[23] *Id.* at 8.

legislative history showing that Congress rejected broad EPA authority, demonstrating that "Congress intended the states to decide which sources impair visibility and what BART controls should apply to those sources."[24]

A number of recent federal appeals court decisions have affirmed the principle of state primacy in regional haze policy-making. For instance, in *North Dakota v. EPA*,[25] the U.S. Court of Appeals for the Eighth Circuit confirmed that states have primary responsibility for implementing the regional haze program and emphasized that EPA may only promulgate a FIP when the state fails to submit a SIP, submits an incomplete SIP, or submits a SIP that does not meet the Act's requirements.[26] Even in cases in which courts ultimately have declined to reverse EPA's disapproval of regional haze SIPs, courts have continued to recognize the substantial decision-making discretion that the CAA gives states under its regional haze provisions.[27]

ADEQ's proposed SIP revision and related Significant Permit Revision are well within the bounds of Arizona's discretion as the implementing state. ADEQ properly took the NOx BART emission limits provided for under the FIP and the visibility improvements that would be expected to result from the BART FIP's implementation as the starting points for its analysis of the CGS BART Alternative. As described below, the State then evaluated the emission reductions that would be achieved under the BART Alternative to project, using EPA's BART-alternative test, that the SIP revision would achieve greater reasonable progress toward the national visibility goal than would implementation of the BART FIP. Arizona conducted and completed a careful analysis that supports its determination that the BART Alternative is better than BART. SRP supports the proposed SIP and related Significant Permit Revision.

### A. ADEQ Has Demonstrated that the CGS BART Alternative Is Better than BART.

As described above, EPA's regional haze rules require that the BART "alternative measure will achieve greater reasonable progress than would have resulted from the installation and operation of BART" at the covered sources.[28] As noted above, the rules provide three different tests, any one of which a state may use to demonstrate that an alternative achieves better-than-BART reasonable progress.

The first is provided for in 40 C.F.R. § 51.308(e)(2)(i)(E), which allows a state to make a better-than-BART determination "based on the clear weight of evidence." This test allows states to

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[24] *Id.*

[25] 730 F.3d 750 (8th Cir. 2013).

[26] *Id.* at 757. In *North Dakota*, the state conceded that its SIP was based on a significant technical error. The state in that case thus failed to satisfy the CAA's basic requirements. *See id.* at 759-61.

[27] *See, e.g., Arizona*, 815 F.3d at 531.

[28] 40 C.F.R. § 51.308(e)(2)(i).

take into consideration a wide range of factors, visibility metrics, or other relevant considerations in making a better-than-BART determination.[29] ADEQ would have been justified if it had chosen to invoke the weight-of-evidence test in this proceeding, and there is ample evidence in the record to support a better-than-BART determination under that test.

Rather than rely on that test, ADEQ decided to apply a more specific and quantitative test under 40 C.F.R. § 51.308(e)(3), which provides in relevant part that a state may demonstrate that a BART alternative is better than BART by conducting air quality dispersion modeling. Under 40 C.F.R. § 51.308(e)(3), before it proceeds to dispersion modeling, a state's analysis typically begins with an evaluation of the emissions that will result from application of BART and the emissions that will result from application of the BART alternative. The rules provide that "[i]f the distribution of emissions [under the BART alternative] is not substantially different than under BART, and the alternative measure results in greater emission reductions, then the alternative measure may be deemed to achieve greater reasonable progress."[30] This analytical methodology is reasonable and is especially appropriate for assessing relatively straightforward BART alternatives that apply to a single BART source or a small group of BART sources. In such a situation, replacing BART with a BART alternative is likely to result in a "distribution of emissions" that does not differ geographically from the distribution that would result from implementation of BART. In those circumstances, a simplified analysis often is sufficient to demonstrate better-than-BART visibility improvements.

When the distribution of emissions that will result under a BART alternative is "significantly different" than the distribution that would result from implementation of BART, 40 C.F.R. § 51.308(e)(3) contemplates that a state that does not choose the weight-of-evidence test will "conduct dispersion modeling to determine differences in visibility between BART and the . . . [BART alternative] for each impacted Class I area, for the worst and best 20 percent of days."[31] The distribution of emissions under a BART alternative is often "significantly different" than the distribution of emissions under BART when the BART alternative applies to different sources, located in different geographic areas, from the sources that would be subject to BART. In those cases, dispersion modeling may be the most reliable way to compare expected visibility impacts under a BART alternative with expected visibility impacts under BART.

In this case, BART and the BART Alternative both apply solely to CGS. Accordingly, there is no difference in the geographic distribution of emissions that will result under either regulatory approach. The BART Alternative, however, targets a different, and broader, mix of visibility-impairing emissions than does the BART FIP. As Table 4 in the proposed SIP illustrates, the BART Alternative will achieve significant $SO_2$ and PM emission reductions, none of which would

[29] *See, e.g., WildEarth Guardians v. EPA*, 770 F.3d 919, 933-38 (10th Cir. 2014).
[30] 40 C.F.R. § 51.308(e)(3).
[31] *Id.*

be achieved under BART.[32] Although the BART Alternative, like the BART FIP, will also reduce NOx emissions, the BART Alternative is projected to achieve fewer total tons of NOx emission reductions than the NOx BART FIP. Accordingly, ADEQ is not in a position to determine that the BART Alternative will result "in greater emission reductions"[33] for each of the individual visibility-impairing pollutants and instead used air quality dispersion modeling to evaluate the BART Alternative.[34]

The air quality dispersion modeling shows that the BART Alternative for CGS will achieve greater reasonable progress than BART. That modeling is described in detail in ADEQ's Draft "Technical Support Document for Regional Haze State Implementation Plan Revision for the Coronado Generating Station" (July 19, 2016), included in the docket for the proposed ADEQ SIP and Permit revisions. As discussed in the SIP, The Comprehensive Air Quality Model with Extensions ("CAMx") is an advanced Photochemical Grid Model ("PGM") that includes all emissions in the modeling domain and is more appropriate than CALPUFF. In addition in July 2015, EPA proposed revisions to the modeling guidelines that would delist CALPUFF as the EPA-preferred long range transport model and recommended PGMs.[35] The modeling provided by SRP that has been revised and supplemented to respond to questions from ADEQ and EPA and evaluated by ADEQ more than satisfies the requirements of the regional haze rules.

The modeling demonstrates that under the BART Alternative, "[v]isibility does not decline in any Class I area"[36] and "[t]here is an overall improvement in visibility" averaged across all affected Class I areas, as compared to the level of visibility improvement that would result from BART.[37] The modeled visibility improvements under the BART Alternative compared to current conditions and the BART FIP case are attributable in part to the BART Alternative's very substantial $SO_2$ emission reductions, none of which would be required by or would occur under the BART FIP. As the SIP properly emphasizes, "$SO_2$-attributed visibility extinction is generally more than three times the NOx-attributed visibility extinction."[38] EPA has previously approved a SIP for the Apache Generating Station based on the same conclusion as to the relative effects

[32] Proposed SIP at 9; *see also id.* at 9-10.

[33] 40 C.F.R. § 51.308(e)(3).

[34] Although the weight-of-evidence test in 40 C.F.R. § 51.308(e)(2)(i)(E) is always available to a state, EPA has suggested that that test may be particularly appropriate where "technical or data limitations limit the ability of a state (or the EPA) to undertake a robust comparison using the test set out in 40 CFR 51.308(e)(3)." 77 Fed. Reg. 33642, 33644 n.4 (June 7, 2012). Here, ADEQ was not confronted with technical or data limitations of the sort that might have led it to rely on the weight-of-evidence test.

[35] Proposed SIP at 6.

[36] 40 C.F.R. § 51.308(e)(3)(i).

[37] *Id.* § 51.308(e)(3)(ii).

[38] Proposed SIP at 10.

of $SO_2$ and NOx emission reductions in improving visibility.[39] ADEQ supplemented its general assessment of the relative contributions of emissions of each of these pollutants to visibility impairment with an analysis of ammonium sulfate and ammonium nitrate data for all Class I Federal areas affected by CGS emissions in 2004 through 2014. ADEQ also evaluated trends in $SO_2$-attributed visibility extinction at Petrified Forest National Park and how visibility conditions have responded to emission reductions from Cholla Power Plant. Those assessments confirmed the relatively larger contribution of $SO_2$ to visibility impairment at the Class I Federal areas affected by CGS emissions and showed that visibility conditions are more responsive to $SO_2$ emission reductions than they are to NOx emission reductions.[40]

Because of the emission reductions that will be achieved during the interim operating strategy, and $SO_2$ emission reductions in particular, the BART Alternative will achieve greater reasonable progress than BART during the first implementation period, which is what the CAA and the regional haze rules require. This is true regardless of the operating scenario that SRP ultimately selects. In any event, the BART Alternative and the visibility improvements it will achieve should be considered in their entirety for purposes of determining whether the Alternative achieves greater reasonable progress than BART. Under such an approach, the fact that the BART Alternative will achieve greater visibility improvements and greater reasonable progress during implementation of the interim operating strategy than BART would achieve, combined with the fact that, under OS-1 and OS-2, the BART Alternative would achieve reasonable progress that is equal to or greater than BART, means that the Alternative, as a whole, satisfies the better-than-BART test.

In sum, the evidence in the record before ADEQ provides ample support for ADEQ's conclusion that the BART Alternative is better than BART because it provides greater reasonable progress toward visibility improvement than does BART.

### B. The BART Alternative's Compliance Schedule Is Appropriate and Justified by the Record.

As the SIP describes, and as noted above, the BART Alternative consists of two alternative operating strategies.[41] OS-1 requires implementation of the interim operating strategy seasonal curtailments from December 5, 2017, until installation and operation of an SCR system on Unit 1 (with a corresponding NOx emission limit for that unit of 0.065 lb/MMBtu on a 30-boiler-operating-day average) no later than December 31, 2029.[42] OS-2 requires

[39] *See* 79 Fed. Reg. 56322, 56327 (Sept. 19, 2014) (EPA's proposed approval of BART alternative SIP for Apache Generating Station, discussing relative contribution of $SO_2$ to visibility impairment); 80 Fed. Reg. 19220 (Apr. 10, 2015) (EPA's final approval of the Apache Generating Station BART alternative SIP).
[40] *See* Proposed SIP at 9-10.
[41] *Id.* at 2.
[42] *Id.*

implementation of the same interim operating strategy seasonal curtailments from December 5, 2017, until permanent cessation of operation of Unit 1 no later than December 31, 2029.[43] The SIP would require SRP to submit to ADEQ and EPA by December 31, 2026, a notification of SRP's selection of one of these two BART Alternative operating strategies.

The SIP's dates for notification and implementation of a final operating strategy provide SRP with what it believes should be a reasonable period of time to make critical resource planning decisions that, under the circumstances, SRP could not realistically be expected to make on a more accelerated schedule. As noted above, and as explained in the SIP, EPA's CPP and the current status of that rule create considerable uncertainty with respect to future operations at CGS. Given the judicial stay of the CPP and the likelihood that any future decision on the merits of the litigation challenges to the CPP will be subject to prolonged appellate proceedings, implementation of the CPP will be delayed by several years. Indeed, once the principal CPP litigation is resolved, if implementation of that program were to move forward, it is possible that additional challenges to individual CPP state plans, potentially including Arizona's plan, could further delay the program. For these reasons, SRP does not believe it will have sufficient certainty as to the future of CGS until late 2026. Indeed, even with a December 31, 2026 notification date for selection of a final operating scenario, SRP will have to undertake a number of pre-notification steps to prepare for installation of an SCR system on Unit 1 or for permanent shutdown of Unit 1 in order to be in a position to implement either of those options by the SIP's 2029 compliance date.

Moreover, implementing the interim operating strategy through December 31, 2029, ensures that the SIP will continue to achieve significant projected visibility improvements that are better than BART. Indeed, the longer the interim strategy is in effect, the greater the BART Alternative's overall visibility benefit will be compared to BART.

Further, there is no legal impediment to implementing the interim strategy through December 31, 2029, or to setting a notification date of December 31, 2026. There is, in fact, no provision in the BART rules that would require notification at all, and, even if the interim operating strategy were to remain in effect indefinitely, the BART Alternative would comply with the EPA regional haze rules' requirements that the BART Alternative achieve greater reasonable progress than BART and that all necessary emission reductions be achieved during the period of the first long-term strategy for regional haze.[44]

SRP recognizes that ADEQ also has an interest in promoting regulatory certainty. SRP believes that the balance ADEQ has struck by requiring notification of a final operating strategy determination by December 31, 2026, and compliance with that operating strategy by December 31, 2029, appropriately addresses the array of concerns, planning and resource

[43] *Id.*
[44] *See* 40 C.F.R. § 51.308(e)(2)(i), (iii).

uncertainties, and complex logistical considerations facing SRP and the State with respect to future operation of CGS.

### C. The SIP and the Significant Permit Revision Will Not Interfere with Any Applicable Requirement of the CAA.

Consistent with section 110(*l*) of the CAA, the SIP includes a summary of the State's demonstrations that the SIP revision will not "interfere with any applicable requirement concerning attainment and reasonable further progress (as defined in section 171 of [the CAA, 42 U.S.C. § 7501]), or any other applicable requirement of this [Act]."[45] ADEQ is correct to conclude that the SIP complies with section 110(*l*).

Section 110(*l*) mentions the CAA's reasonable further progress requirement. The reasonable further progress requirement applies only in nonattainment areas.[46] As the SIP notes, CGS is located in a county that has not been designated nonattainment for any national ambient air quality standard ("NAAQS") and that is not expected to be designated nonattainment for any NAAQS for which designations have not yet been made. Accordingly, the proposed SIP revision will not interfere with any applicable requirement concerning reasonable further progress.

The SIP also notes that EPA's Draft Guidance on Demonstration of Noninterference under Section 110(*l*) lists certain CAA requirements, including maximum achievable control technology ("MACT") standards and new source performance standards ("NSPS").[47] The SIP does not focus specifically on these two requirements of the Act, but it should be noted that the SIP will not adversely affect or otherwise interfere with compliance with MACT or NSPS requirements.

Finally, SRP notes that not only does Apache Country not rely on any additional emission reductions from CGS to ensure continued attainment of NAAQS (as the SIP correctly states), but also no other area relies on any such emission reductions for that purpose.

In sum, ADEQ is correct to determine that the SIP will not interfere with attainment of NAAQS or any other applicable CAA requirement.

## III. SRP Supports the Permit Extension.

SRP supports ADEQ's finding that an extension of the 18-month period set forth in A.A.C. R18-2-402(I)(4) is justified at the time of issuance of this permit. As explained in the application, this permit is being sought to implement the approved BART Alternative operating strategies – one of which would require the installation and operation of an SCR system at Unit 1 by December 31, 2029 – and SRP likely will not be in a position to decide whether to proceed with SCR installation until after EPA and ADEQ provide clarity regarding the requirements for CGS Unit 1

[45] 42 U.S.C. § 7410(*l*).
[46] 42 U.S.C. §§ 7501(1), 7502(c)(2).
[47] Proposed SIP at 11.

under the CPP. ADEQ's extension, which is to be followed by an updated best available control technology ("BACT") analysis at least 18 months but no more than 24 months before the expected start of construction, is consistent with the most recent guidance from EPA on granting extensions.[48]

SRP, however, requests a change in the proposed permit language in Attachment "E", Condition II.B.3, as shown below (*in underlined italics*) to address the possible, though unlikely, eventuality that the updated BACT analysis does not demonstrate that the proposed $PM_{10}$, $PM_{2.5}$, and $H_2SO_4$ emission limits still represent BACT.

> 3. In the event the construction of the SCR system does not commence within 3 years of issuance of this permit revision, the Permittee shall submit an updated BACT analysis at least 18 months but no more than 24 months prior to the expected start of construction of the SCR system that *either* demonstrates that the emission limits in the attachment still represent BACT for $PM_{10}$, $PM_{2.5}$, and $H_2SO_4$ *or proposes new BACT limits* for $PM_{10}$, $PM_{2.5}$, and $H_2SO_4$.

## IV. Requested Change to Conditions III.C.3.a and b.

Conditions III.C.3.a and b. set forth the compliance provisions for the PM emission limitation (surrogate for $PM_{10}$ and $PM_{2.5}$) in Condition III.A.3. The conditions expressly mention $PM_{10}$ but not $PM_{2.5}$. SRP requests either that the reference to "$PM_{10}$" be removed and replaced with the term "particulate matter" or that a reference to "$PM_{2.5}$" be added to the conditions so that it is clear that both $PM_{10}$ and $PM_{2.5}$ are covered.

## V. Conclusion

SRP appreciates the efforts that ADEQ has taken to develop and support the proposed SIP, the BART Alternative for CGS, and the related Significant Permit Revision. SRP supports the State's proposed actions and looks forward to final action by ADEQ and to working with ADEQ to implement the SIP.

If you have questions or need additional information regarding these comments, please contact Bill McClellan at bill.mcclellan@srpnet.com or (602) 236-5387.

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[48] *Guidance on Extension of Prevention of Significant Deterioration (PSD) Permits under 40 CFR 52.21(r)(2)* (Jan. 31, 2014).

Sincerely,

Kelly J. Barr

cc: Tim Franquist, ADEQ (via email)
Brian Parkey, ADEQ (via email)
File: ORG 5-2-8

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# Appendix D.5
# Responsiveness Summary

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# Response to Comments on the Revision to the Arizona Regional Haze State Implementation Plan for the Salt River Project Coronado Generating Station; Significant Permit Revision No. 63088 to Operating Permit No. 52639 Issued to Salt River Project - Coronado Generating Station

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# 1. INTRODUCTION

The Arizona Department of Environmental Quality (ADEQ) proposed and finalized two actions through this process: a revision to the Arizona State Regional Haze State Implementation Plan (SIP) and Significant Permit Revision No. 63088 to Air Quality Control Permit No. 52639 for Salt River Project- Coronado Generating Station located 6 miles northeast of St. Johns off U.S. Highway 191 in St. Johns, Apache County, Arizona. The SIP and permit revision will become effective following the U.S. Environmental Protection Agency's (EPA) approval of the SIP and EPA's final action rescinding the current Federal Implementation Plan (FIP).

A public notice for this permit and SIP revision was published on July 21, 2016 and ended on August 23, 2016. On August 23, 2016, a public hearing was conducted at St. Johns High School Auditorium, 360 Redskin Drive, St. Johns, Arizona, to solicit comments. Written comments were received during the public comment period and written and oral comments were received at the public hearing. All comments received have been made part of the public record and have been reviewed by ADEQ.

# 2. BART ALTERNATIVE REVISIONS IN RESPONSE TO COMMENTS

In response to comments received during the comment period, SRP submitted an addendum to ADEQ, requesting ADEQ to revise certain aspects of the proposed SIP and permit revision. More specifically, the revisions described in that addendum address these changes to the proposed SIP and permit revision:

- A reduction in the maximum permitted $SO_2$ emission rate limit for each unit from 0.080 lb/MMBtu to 0.060 lb/MMBtu (on a 30-boiler-operating-day average) beginning December 5, 2017.
- Addition of an annual plant-wide $SO_2$ emissions cap of 1,970 tons per year (tpy), effective in each year beginning in 2018. If the Unit 1 Shutdown option is selected, there will be a Unit 2 cap of 1080 tpy beginning once Unit 1 is shutdown.
- Change of the BART Alternative Operating Strategy dates:
    - The deadline for SRP to submit notification of Operating Strategy selection is December 31, 2022, changed from the proposal's deadline of December 31, 2026.
    - The deadline for SRP to install and begin operating SCR on Unit 1 (if OS-1 is selected) or to close Unit 1 permanently (if OS-2 is selected) is December 31, 2025, changed from December 31, 2029.

Table 1 and Table 2 provide an overview of the revised BART Alternative operating strategies (OS-1 and OS-2) for CGS Unit 1. The changes to the BART Alternative dates will shorten the maximum length of the interim operating period from approximately twelve years to eight years. Moreover, due to a more stringent $SO_2$ emission limit of 0.060 lb/MMBtu for each of the two units, the originally proposed interim operating strategy IS1 – which included the currently permitted $SO_2$ emission limit of 0.080 lb/MMBtu for each unit – will be removed, while the interim operating strategies IS2, IS3, and IS4 will be retained, but with the $SO_2$ emission limit under IS2 lowered from the proposed limit of 0.070 lb/MMBtu to 0.060 lb/MMBtu. Finally, the annual plant-wide $SO_2$ emissions cap of 1,970 tons per year (tpy) that has now been added to all the interim strategies, and that will also apply indefinitely after the end of the interim period if SRP selects SCR as the final compliance strategy. If SRP selects the shutdown of Unit 1 as the

final compliance strategy, the annual emissions cap for Unit 2 will be 1,080 tpy. The lower emission limit and the annual emission caps as modified will further reduce $SO_2$ emissions to provide additional visibility improvement at the affected Class I areas as compared to the original proposal. ADEQ has incorporated these revisions into this responsiveness summary.

**Table 1 Revised BART Alternative Operating Strategy SCR Option (OS-1)**

| Control Strategy | | Original Proposal | | | | Revised Proposal | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unit 1 (lb/MMBtu) (30-boiler-operating-day average) | | Unit 2 $SO_2$ (lb/MMBtu) (30-boiler-operating-day average) | Unit 1 Curtailment Period | Unit 1 (lb/MMBtu) (30-boiler-operating-day average) | | Unit 2 $SO_2$ (lb/MMBtu) (30-boiler-operating-day average) | Annual Plant-Wide $SO_2$ Cap (tons/year) | Unit 1 Curtailment Period |
| | | $NO_x$ | $SO_2$ | | | $NO_x$ | $SO_2$ | | | |
| Interim Operating Strategy | IS1 | 0.320 | 0.080 | 0.080 | Oct. 1-Apr. 15 | N/A | N/A | N/A | N/A | N/A |
| | IS2 | 0.320 | 0.070 | 0.070 | Oct. 21-Jan. 31 | 0.320 | 0.060 | 0.060 | 1,970 | Oct. 21-Jan. 31 |
| | IS3 | 0.320 | 0.050 | 0.050 | Nov. 21-Jan. 20 | 0.320 | 0.050 | 0.050 | 1,970 | Nov. 21-Jan. 20 |
| | IS4 | 0.310 | 0.060 | 0.060 | Nov. 21-Jan. 20 | 0.310 | 0.060 | 0.060 | 1,970 | Nov. 21-Jan. 20 |
| Final BART Alternative Strategy – SCR Installation | Emission Limit | 0.065 | 0.080 | 0.080 | N/A | 0.065 | 0.060 | 0.060 | 1,970 | N/A |
| | Timeline | Notification date: December 31, 2026<br>Install and operate SCR: December 31, 2029 | | | | Notification date: December 31, 2022<br>Install and operate SCR: December 31, 2025 | | | | |

**Table 2 Revised BART Alternative Operating Strategy Shutdown Option (OS-2)**

| Control Strategy | | Original Proposal | | | | Revised Proposal | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unit 1 (lb/MMBtu) (30-boiler-operating-day average) | | Unit 2 $SO_2$ (lb/MMBtu) (30-boiler-operating-day average) | Unit 1 Curtailment Period | Unit 1 (lb/MMBtu) (30-boiler-operating-day average) | | Unit 2 $SO_2$ (lb/MMBtu) (30-boiler-operating-day average) | Annual Plant-Wide $SO_2$ Cap (tons/year) | Unit 1 Curtailment Period |
| | | $NO_x$ | $SO_2$ | | | $NO_x$ | $SO_2$ | | | |
| Interim Operating Strategy | IS1 | 0.320 | 0.080 | 0.080 | Oct. 1-Apr. 15 | N/A | N/A | N/A | N/A | N/A |
| | IS2 | 0.320 | 0.070 | 0.070 | Oct. 21-Jan. 31 | 0.320 | 0.060 | 0.060 | 1,970 | Oct. 21-Jan. 31 |
| | IS3 | 0.320 | 0.050 | 0.050 | Nov. 21-Jan. 20 | 0.320 | 0.050 | 0.050 | 1,970 | Nov. 21-Jan. 20 |
| | IS4 | 0.310 | 0.060 | 0.060 | Nov. 21-Jan. 20 | 0.310 | 0.060 | 0.060 | 1,970 | Nov. 21-Jan. 20 |
| Final BART Alternative Strategy – Shutdown | Emission Limit | N/A | N/A | 0.080 | N/A | N/A | N/A | 0.060 | 1,080 | N/A |
| | Timeline | Notification date: December 31, 2026<br>Shutdown: December 31, 2029 | | | | Notification date: December 31, 2022<br>Shutdown: December 31, 2025 | | | | |

# 3. COMMENTS AND RESPONSES

This summary presents the Department's responses to the issues raised by the comments received during the public comment period.

## 3.1 General Comments and Miscellaneous

*Comment:* *Many commenters urged ADEQ to approve the proposed SIP/permit revision because the proposed BART alternative would be the most practical immediate solution to provide visibility benefits and avoid a severe economic downturn. Because CGS plays a significant role in the local and regional economy by providing reliable electricity, job opportunities, and tax revenue, the future and destiny of CGS have a significant influence on towns, local communities, Apache County, Navajo County and the state of Arizona. The proposed BART alternative would allow CGS to continue to operate without sacrificing any of the legal obligations.*

Response: ADEQ acknowledges the comment.

*Comment:* *Some commenters supported the proposed SIP/permit revision because the revision helps the State of Arizona and SRP to manage the uncertainty created by EPA's Clean Power Plan, which is currently subject to a stay issued by the U.S. Supreme Court.*

Response: ADEQ acknowledges the comment.

*Comment:* *One commenter discussed implications of fire emissions management for regional haze regulations. The commenter stated that the regional haze regulations must better understand the role of fire in ecosystems, the connections between visibility-impairing pollutants and public heath, as well as the impacts of rule-making on industry. The commenter stated that past fire suppression practices have led to an increased risk of catastrophic wildfires (such as the Wallow Fire), which emit a much larger amount of air pollutants compared to emissions from power plants. The commenter stated that prescribed or managed wildfire is the most effective and efficient tool for restoring and maintaining the health of wildland while reducing the risk of adverse health and environmental impacts due to catastrophic wildfires.*

Response: While the commenter made pertinent points on fire management for regional haze mitigation purposes, the discussion of fire management is beyond the scope of the proposed SIP/permit revision. As discussed elsewhere, the proposed SIP/permit revision is source-specific, addressing how the BART alternative for CGS complies with the legal requirements under the regional haze rule.

*Comment:* *Some commenters expressed significant concerns about over-reaching federal regulations. Using the logging industry as an example, one commenter stated that federal regulations have resulted in the death, destruction and devastation of an entire industry. Another commenter stated that EPA attempted to eliminate all coal-fired power plants by imposing unrealistically low emission limits.*

Response: ADEQ understands that the shutdown of local industries would have significant negative impacts on the local community, but these comments do not directly relate to the SIP/permit action.

### 3.2 Comments on Permit Revision

*Comment:* *One commenter stated that the draft Significant Permit Revision (Attachment E) should be revised to provide the correct citation to ADEQ's legal authority to issue the Significant Permit Revision. The commenter pointed out that such authority is not based on the FIP promulgated by the EPA.*

Response: ADEQ agrees with the commenter. Necessary changes have been made in the citations in the draft permit revision.

*Comment:* *One commenter stated that the draft Significant Permit Revision is either deficient or unclear concerning some key emission limits and monitoring, reporting and recordkeeping (MRR) requirements. In particular, the commenter pointed out three significant issues: i) there are no specific MRR requirements to demonstrate compliance with the Unit 1 and Unit 2 emission limits in the interim operating scenarios; ii) the emission limits for NOx, $PM_{10}$ and $SO_2$ for Unit 2 in the post-2029 operating scenarios are unclear, and the draft does not include MRR to demonstrate compliance with Unit 2 emission limits for the period after 2029; and iii) the $PM_{10}$ emission limits for Units 1 and 2 for the interim operating scenarios are unclear, and the draft does not include MRR requirements for $PM_{10}$ for Units 1 and 2.*

Response: The requirements mentioned in the comment were not listed in the permit revision since they are either referenced in other parts of the operating permit or, in the case of $PM_{10}$ limits, were approved as part of the Partial Regional Haze SIP Approval on December 5, 2012 (77 FR 72511). However, ADEQ agrees that leaving these requirements out of Attachment E makes this permit revision more difficult to understand and would create uncertainties in the related SIP revision. Therefore, ADEQ has changed Attachment E into a self-contained document which includes all Regional Haze requirements applicable to the facility.

*Comment:* *One commenter stated that the draft Significant Permit Revision does not satisfy PSD permitting requirements. The commenter further stated, if CGS elects to install SCR on Unit 1 in 2029 or at any time, ADEQ must determine if PSD applies and, if so, must issue a PSD permit.*

Response: Once approved by EPA, this SIP revision allows SRP to install SCR at Unit 1. Although the deadline for this decision is December 31, 2022, SRP could make a final decision much earlier. The installation of an SCR would result in a potential increase of approximately 80 tons per year of $PM_{10/2.5}$ and sulfuric acid mist, which exceeds the PSD significant level for each of these pollutants and would require a PSD permit. Therefore, ADEQ and SRP conducted the necessary PSD analysis as required by Arizona Administrative Code Title 18, Chapter 2 Article 4, and ADEQ included PSD permit conditions as part of this significant revision. As documented in the Permit Technical Support Document, this analysis included a BACT analysis for $PM_{10}$, $PM_{2.5}$, and $H_2SO_4$, a SIL analysis for $PM_{10}$ and $PM_{2.5}$, a NAAQS and increment analysis for $PM_{2.5}$, a growth impact analysis and an analysis of possible impairment to soils and vegetation.

## 3.3 Comments on Visibility Modeling

### 3.3.1 Transparency of Public Record

*Comments:* *One commenter stated that there were significant transparency and accessibility issues regarding the modeling underlying the BART proposal. The commenter stated that the public record was incomplete which prevented the commenter's consultant from fully and adequately reviewing the modeling for the proposal. The commenter also stated that ADEQ did not provide enough time for an adequate review of the modeling. The commenter requested the following public records for review: i) all modeling-related correspondence between SRP, its consultants and both the ADEQ and US EPA; ii) all model inputs and outputs for any CALPUFF modeling that has been conducted in order to support the IS1-IS4 options; and iii) specific information regarding who requested that CAMx be used for this BART alternative or better-than-BART analysis.*

Response: All modeling and related materials on which ADEQ has based its proposed SIP have been included in the record. The record supporting ADEQ's final SIP is complete and publicly available, and the public has been provided an adequate opportunity to review and comment on ADEQ's proposal. During the comment period, the commenter requested ADEQ to provide additional modeling information, and ADEQ responded to the commenter's request promptly. Regarding the CALPUFF/CAMx comments, please refer to Section 3.3.2. Regarding modeling-related correspondence between ADEQ and other parties, ADEQ will compile all email communications and transmit them to the commenter.

### 3.3.2 Model Selection (CALPUFF vs. CAMx)

*Comments:* *One commenter stated the EPA's proposed revisions to delist CALPUFF as the EPA-preferred long range transport model are not finalized yet. Therefore, the commenter requested using CALPUFF to do the entire analysis of the IS options and curtailment periods. The commenter further stated that the CALPUFF modeling must use multiple*

*years of meteorological data and all modeling files must be available in the public record for review.*

Response: ADEQ understands that EPA's proposed revisions to delist CALPUFF as the EPA-preferred long range transport (LRT) model have not been finalized yet. ADEQ agrees that CALPUFF modeling must use multiple years of meteorological data (typically three years). However, it is ADEQ's determination that it would be unnecessary and inappropriate to redo the entire modeling analysis for this SIP revision using CALPUFF. Neither the current version of 40 CFR Part 51 Appendix W (Guideline on Air Quality Model) nor 40 CFR Part 51 Appendix Y (Guidelines for BART Determinations under the Regional Haze Rule) requires the use of CALPUFF in the regional haze program:

- When EPA promulgated CALPUFF as a preferred model in 2003, EPA only approved it for long range transport for direct emissions, but EPA did not provide preferred status to CALPUFF for use of its chemistry module for generating values for secondary formed pollutants, including those that can impair visibility. EPA has specifically pointed out that the current version of Appendix W "*does not contain any explicit recommendation regarding the use of CALPUFF in the regional haze program*." 80 Fed. Reg. 45350 (July 29, 2015).

- In 2005, EPA issued guidelines for implementation of the best available retrofit technology (BART) requirements under the Regional Haze Rule. Although EPA recognized that CALPUFF had not yet been fully evaluated for secondary pollutant formation, EPA still recommended that states use CALPUFF in the BART determination process because CALPUFF was the best modeling application for use in evaluating BART at that time. However, EPA also made clear that states could use other approaches including photochemical grid models. The BART guidelines state that, "*States may consider their [Regional scale photochemical grid models] use for SIP development in the future as they are adapted and demonstrated to be appropriate for single source applications*." 70 FR 39104; 39123-39124 (July 6, 2005).

As the commenter is aware, in EPA's proposed revisions to its Guideline on Air Quality Models, EPA proposes to remove CALPUFF as the preferred model for long-range transport (involving source-receptor distances of 50 kilometers or longer) and visibility modeling and instead recommends use of photochemical grid models, like CAMx, for such purposes. 80 Fed. Reg. 45340, 45347, 45349 (July 29, 2015). EPA states that:

"*Photochemical transport models are suitable for estimating visibility and deposition since important physical and chemical processes related to the formation and transport of PM are realistically treated. Source sensitivity and apportionment techniques implemented in photochemical grid models have evolved sufficiently and provide the opportunity for estimating potential visibility and deposition impacts from one or a small group of emission sources using a full science photochemical grid model. Photochemical grid models using meteorology output from prognostic meteorological models have demonstrated skill in estimating source-receptor relationships in the near-field and over long distances.*"

Id. at 45349 (footnotes omitted). This policy is reflected in EPA's recent final regional haze rule for Texas and Oklahoma, where EPA used CAMx modeling to support its federal implementation plan for those states and where it stated that CAMx can produce more

reliable results than CALPUFF under a variety of conditions. 81 Fed. Reg. 296, 327-28 (Jan. 5, 2016). EPA's preference for photochemical grid models is also stated in its recent "Draft Guidance on Progress Tracking Metrics, Long-term Strategies, Reasonable Progress Goals and Other Requirements for Regional Haze State Implementation Plans for the Second Implementation Period" intended to inform implementation of the regional haze program during its second implementation period[1]. Accordingly, use of CAMx to evaluate the BART alternative for Coronado Generating Station is consistent with EPA's regional haze rules and EPA's current practices.

As discussed in the Technical Supporting Document for Regional Haze State Implementation Plan Revision for the Coronado Generating Station (TSD) Pgs.18-19, ADEQ has determined that the use of a photochemical grid model (PGM) rather than CALPUFF was appropriate for the CGS Better-than-BART (BTB) demonstration based on the following reasons:

- There are fundamental differences between BART assessments and the "Better than BART" demonstration for BART alternatives. BART assessments with CALPUFF are targeted towards assessing the maximum (or 98th percentile) impacts of a single facility's sources on Class I areas without considering any other emission sources. For this purpose, CALPUFF was recommended to be used for BART assessments as one of the five factors in the overall RH BART analysis. For a "Better than BART" demonstration, however, the language of 40 CFR 51.308(e) addresses "greater reasonable progress" that would be resulted from BART alternatives compared to BART. To demonstrate "greater reasonable progress," a PGM that includes modeling of all emissions in the modeling domain may be more appropriate in many circumstances than CALPUFF.

- CALPUFF has highly simplified chemical transformation algorithms that have been shown to have bias with respect to sulfate and nitrate formation. Given that the CGS BART Alternative modeling involves assessment of visibility benefits from reductions in $SO_2$ emissions and NOx emissions between the alternative strategies and the BART control strategy, accurate and unbiased treatment of sulfate and nitrate formation chemistry is needed. A PGM with full science chemistry algorithms for secondary $PM_{2.5}$ formation (e.g., sulfate and nitrate) can meet this requirement.

- Resources are available to utilize a photochemical grid model for the CGS BTB demonstration. A PGM is a tool that also requires additional time and resources to conduct a proper evaluation as compared to CALPUFF. CALPUFF may be the only tool available in many visibility modeling cases due to the large time and resource demands of photochemical modeling. For the CGS BTB demonstration, however, the databases that, in part, are necessary to perform the CAMx modeling analysis are available and adequate. The CAMx modeling for CGS extensively used a 2008 modeling database that was originally developed as part of the Western Regional Air Partnership (WRAP) West-wide Jump-Start Air Quality Modeling Study and then was adopted by the Western Air Quality Study. The 2008 modeling database is complete and comprehensive as it has been extensively reviewed by control agencies.

[1] https://www.epa.gov/sites/production/files/2016-07/documents/draft_regional_haze_guidance_july_2016.pdf (Pgs. 18,60-64)

- With advances in photochemical modeling science, a PGM can be used for a single-source application. For example, CAMx includes a subgrid-scale Plume-in-Grid (PiG) chemically reactive Gaussian puff model to treat the near-source plume dispersion, dynamics and chemistry within point-source plume, which is critical for CGS modeling. It also includes a mature, fully tested and evaluated Particulate Source Apportionment Technology (PSAT) tool for separately tracking the particulate matter impacts associated with emissions from CGS.

In summary, neither the regional haze regulations nor Appendix W requires the use of CALPUFF for regional haze modeling. In particular, there are no existing regulations or guidance which requires the use of CALPUFF to evaluate the "greater reasonable progress" that would result from the BART alternative as compared to BART. As discussed above, a PGM such as CAMx is more appropriate than CALPUFF for the CGS "greater reasonable progress" analysis because a PGM has full science chemistry algorithms for sulfate and nitrate formation, and a PGM is able to simultaneously model changes in emissions not only from CGS but also from other sources in the airshed. The availability of a robust database as well as tools such as PiG and PSAT further ensures a proper evaluation with CAMx. ADEQ is also aware that EPA and other states such as Texas have used CAMx for BART analysis under regional haze rules. For these reasons, ADEQ determined that it is not necessary to conduct CALPUFF modeling for the CGS BTB demonstration.

*Comment:* *One commenter requested all model inputs and outputs for any CALPUFF modeling that has been conducted in order to support the IS1-IS4 options. The commenter also requested specific information regarding who requested that CAMx be used for this BART alternative or better-than-BART analysis.*

Response: The determination to use CAMx resulted from a joint effort by SRP and EPA to address a unique modeling situation associated with the CGS BTB demonstration. ADEQ's decision on the CGS BTB demonstration was exclusively based on the CAMx modeling submittals from SRP to ADEQ. ADEQ does not have any CALPUFF-related modeling files in its possession.

On July 21, 2015, SRP submitted a CAMx modeling protocol to EPA Region 9 and ADEQ for review. EPA Region 9 worked with other EPA experts to provide comments to SRP. Several conference calls were held among SRP, SRP's consultants, EPA Region 9 and ADEQ to discuss CAMx modeling issues. The final SRP CAMx modeling analysis has addressed all comments from EPA. SRP also updated CAMx modeling files based on ADEQ's review and comments.

The idea to use CAMx came through collaborative discussions among the parties involved. The relevant questions are whether the use of CAMx instead of CALPUFF was appropriate and whether the CAMx modeling was conducted properly. In response to previous comments, ADEQ documented why the use of CAMx was appropriate. Moreover, ADEQ determined that the CAMx modeling was conducted properly because it followed a protocol to define the procedures to be followed, the data to be collected, and the BTB demonstration to be presented.

*Comments:* *One commenter urged SRP to provide comparable and parallel CALPUFF and CAMx results given that the output metrics from CAMx and CALPUFF are vastly different. The commenter also stated that the comparison of the model results from CALPUFF and CAMx should consider the entire distribution of differences (annual average, W20 and B20) as well as the impacts on days when the peak impacts occur.*

Response: In the TSD Pgs.31-32, ADEQ discussed fundamental differences with respect to modeling visibility impacts between CAMx and CALPUFF, differences that make CAMx and CALPUFF results not directly comparable. First, under a typical BART analysis with CALPUFF, ammonia and other precursors are more fully available to react with the facility's emissions and generate haze-causing pollutants. Comparatively, CAMx is a full photochemical model with all the other sources quantified and added to the modeling, such that emissions from other sources react with available precursors such as ammonia. This limits the amount of ammonia (and other precursors) that is available to react with CGS emissions. Second, a typical BART analysis with CALPUFF is focused on the highest impact (maximum or 98th percentile) from a facility regardless of the monitored values at the Class I area, whereas the CAMx analysis is focused on the 20% best and 20% worst monitored days regardless if the facility was having an impact during those days. Finally, CALPUFF uses a rather simple chemistry mechanism while CAMx uses a technically sophisticated chemistry mechanism. It is unclear how this ultimately impacts the model estimates between these two models as the two chemistry approaches are vastly different.

While the commenter is interested in comparable and parallel modeling results from CALPUFF and CAMx, the commenter did not provide recommendations on how to perform a comparable and parallel modeling analysis for CALPUFF and CAMx. Due to fundamental differences regarding modeling visibility impacts between the two models, ADEQ has determined it would be impossible to directly compare the model results from the two models, and any attempt at a comparison would not be meaningful.

The commenter also suggested testing a variety of output metrics. It should be noted that the output metrics are not driven by the model that is selected, but by the regulatory test that is being conducted. A BTB demonstration must demonstrate that a BART alternative will achieve greater reasonable progress toward natural visibility conditions than BART under 40 CFR 51.308(e)(3) or otherwise based on the clear weight of evidence.[2] While the "clear weight of evidence" test may examine a number of different metrics from modeling results (typically based on CALPUFF modeling), ADEQ evaluates the BTB demonstration for CGS under 40 CFR 51.308(e)(3), which specifically provides that the BTB regulatory test may be based on the two-prong test for the "Best 20%" and "Worst 20%" days (similar to the metrics used in a Regional Haze progress assessment). Consideration of annual average, 98th percentile values, peak impact, or "the entire distribution of differences" is not required under 40 CFR 51.308(e)(3).

[2] 40 CFR 51.308(e)(2)(i)(E).

## 3.3.3 Meteorological Data

*Comments:* *Two commenters expressed concerns about the use of one year of meteorological data (2008) for CAMx. One commenter stated that the CAMx modeling SRP conducted was flawed because it was based on just one year of meteorological data, which effectively ignores the annual variability in meteorological and other conditions. The commenter also stated that the "complexities" with PGM modeling should not be used as an excuse for using only one year of meteorological data. Given the variability of regional transport and meteorological conditions from year to year as well as very small changes in visibility predictions between different model scenarios, another commenter requested SRP to work with ADEQ and EPA to evaluate multi-year impacts of the Alternative BART curtailment periods in order to ensure greater overall visibility improvement under any interim operations of CGS compared to EPA's FIP. To address interannual variability, the commenter recommended either using the 2011 meteorological database from the Intermountain West Data Warehouse (IWDW) or using a weight of evidence approach.*

Response: (1) One-year vs. Multiple-years of Meteorological Data

EPA's general modeling guidance is to utilize multiple years of data for dispersion models (for example, the use of 5 years of NWS meteorological data for AERMOD and the use of 3 years of prognostic meteorological data for CALPUFF). However, neither Appendix W nor the BART Guidelines specify the meteorological period that is necessary if a PGM is used. Because PGMs are very complicated modeling analyses and very resource intensive, EPA has issued specific modeling guidance documents for PGM analyses to clarify and provide additional guidance on when and how to use the models. EPA's modeling guidance for PGMs stresses the need to pick representative periods to model that may be only one year or less of meteorology but are representative of the baseline period (in this case, 2008). The 2014 Draft Modeling guidance indicates that one full year should be modeled for Regional Haze[3]:

*"**Regional Haze** - Choose time periods which reflect the variety of meteorological conditions which represent visibility impairment on the 20% best and 20% worst days in the Class I areas being modeled (high and low concentrations necessary). This is best accomplished by modeling a full year."*

SRP's use of one year of meteorological data for CAMx modeling adhered to the above guidance. Moreover, the use of one year of meteorological data is the standard and customary practice when conducting PGM analyses for ozone or $PM_{2.5}$ SIPs, EISs, and regional haze BART or progress determinations. All of the regional haze SIPs for the first implementation period (2004-2018) that were originally due in 2007 used one meteorological year (2002) of PGM modeling for the demonstration of reasonable progress. ADEQ is not aware of any regional haze modeling with a PGM which used

[3] Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5, and Regional Haze (2014) https://www3.epa.gov/ttn/scram/guidance/guide/Draft_O3-PM-RH_Modeling_Guidance-2014.pdf (Pg. 17)

multiple years of meteorological data. In another comment that will be discussed later, the commenter cited the regional haze application of CAMx for the state of Texas. The Texas Commission on Environmental Quality (TCEQ) regional haze modeling using CAMx only used one base year of meteorological modeling. EPA's BART visibility modeling for the Texas regional haze FIP published in the Federal Register in 2016 used CAMx using one base meteorological year (2002) for the modeling. And most recently (September 7, 2016) for EPA's Cross-State Air Pollution (Transport) Rule, EPA performed PGM using one base meteorological year of modeling.

In summary, although the use of multiple years of meteorological data is always welcomed for a modeling analysis, ADEQ must consider a balance between modeling a long period and the available resources and reasonableness in the amount of computation time and other resources needed for a PGM-based analysis. Considering the complexity of meteorological data processing and validation, the 2014 Draft modeling guidance for regional haze, as well as the past regional haze modeling practices with a PGM, ADEQ determined that the use of one year of meteorological data satisfied the regulatory requirements for a BART BTB demonstration.

(2) 2008 vs. 2011 Meteorological Database

ADEQ appreciates one commenter's recommendation about the use of the 2011 meteorological database from IWDW. ADEQ was aware that IWDW released the 2011 air quality model platform in July 2016. ADEQ determined that the use of the 2011 database would be beyond the scope of a standard PGM application for regional haze modeling. Moreover, ADEQ has determined that the 2008 base meteorological year would be a better year for the CGS BART modeling than 2011, as discussed below.

EPA's PGM modeling guidance recommends that the base meteorological year not have atypical meteorological conditions, such as unusually low temperatures that would inhibit secondary PM formation processes or excessive precipitation that would wash out pollutants. Figures 1 and 2 below compare the CGS BTB 2008 base meteorological year temperature and precipitation data against a long-term (> 100-year) record to determine whether 2008 represents atypical meteorological conditions. Also included in Figures 1 and 2 is the comparison with 2011 meteorological year temperature and precipitation data that the commenter suggested. The 2008 temperatures in AZ and NM are slightly above normal but not atypical, and the 2008 precipitation amounts in AZ and NM are near normal and are not atypical. Thus, the 2008 meteorological conditions around the location of CGS are not atypical. In contrast, the 2011 meteorological year had record-setting high temperatures and drought in the Gulf States (e.g., Texas) that spilled into New Mexico, including Class I areas where CGS BTB visibility impacts are evaluated. Thus, based on this analysis, the 2008 base meteorological year would be a better year for the CGS BART modeling than 2011.

ADEQ also has some concerns about the representativeness of the 2011 monitoring data for some IMPROVE sites, due to the Wallow Fire (May 29, 2011 - July 8, 2011), the biggest wildfire recorded in Arizona. The Wallow Fire resulted in the temporary shutdown of the Mount Baldy site, and the 20% best and 20% worst days at this site for 2011 could not be determined. The Wallow Fire also had a significant impact on the visibility

conditions for some New Mexico sites such as Bandelier and San Pedro Parks (Figure 3), likely resulting in a biased determination for the 20% worst days for these sites. As the BTB modeling demonstration requires evaluation of an overall visibility impact over all affected Class I areas, the use of the 2011 atypical visibility conditions at some IMPROVE sites would prevent ADEQ from fully and adequately reviewing the BART Alternative.

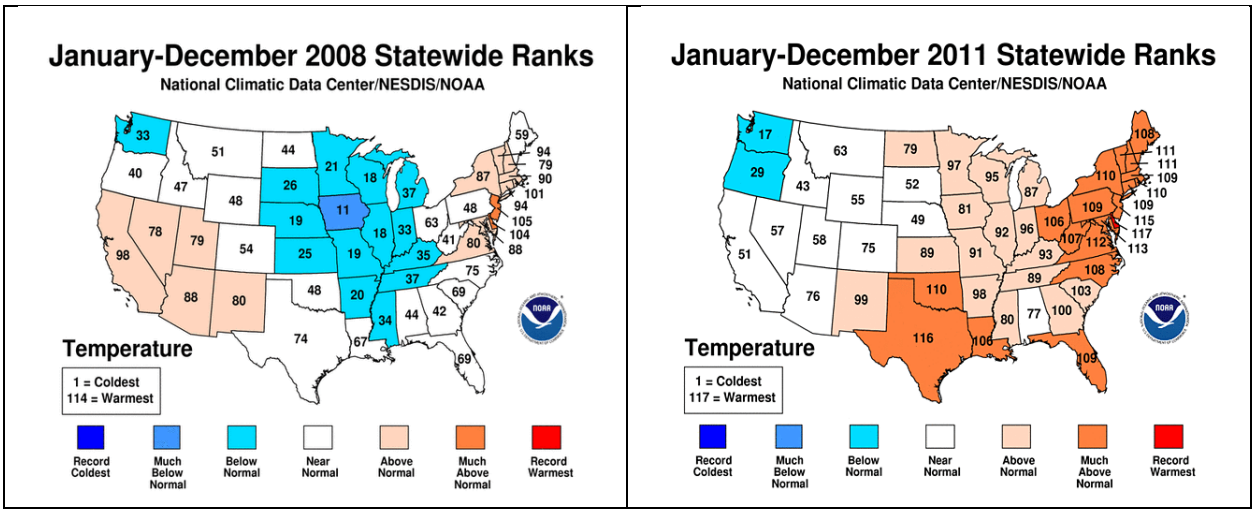



**Figure 1 Ranking of Temperature Conditions in 2008 (left) and 2011 (right) over a 100 Year Record** (Source: http://www.ncdc.noaa.gov/temp-and-precip/us-maps/)

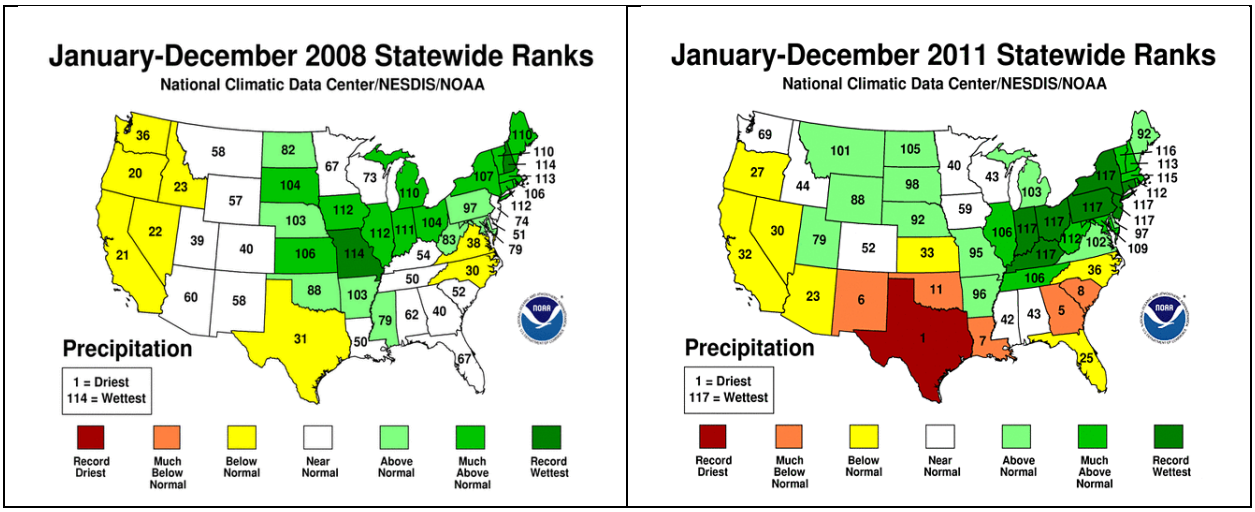
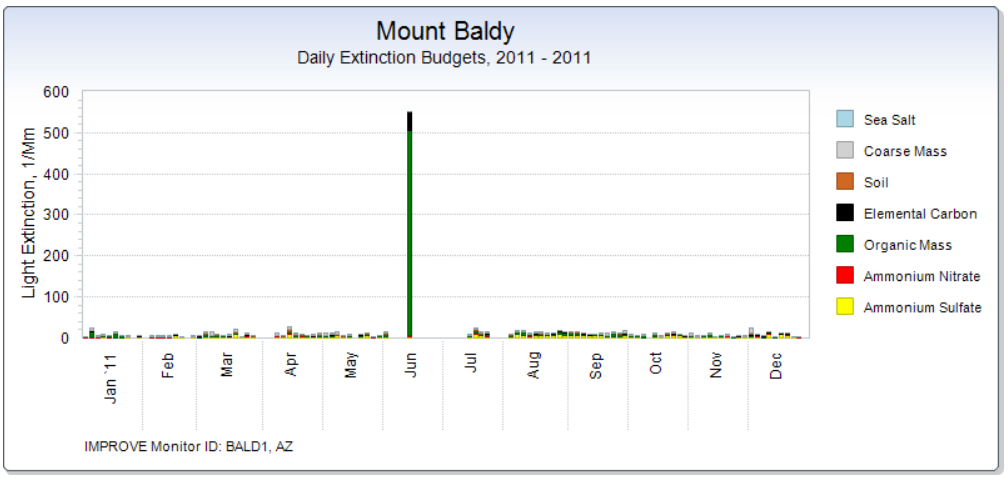
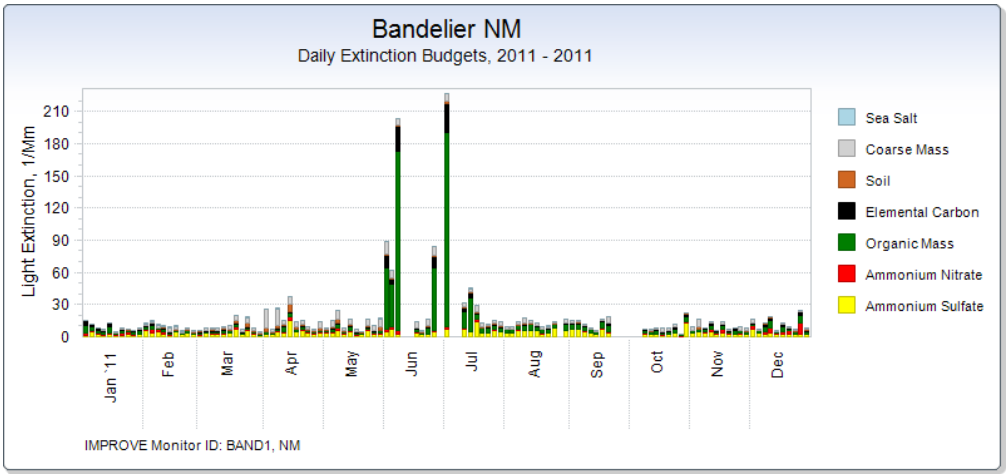



**Figure 2 Ranking of Precipitation Conditions in 2008 (left) and 2011 (right) over a 100 Year Record** (Source: http://www.ncdc.noaa.gov/temp-and-precip/us-maps/)



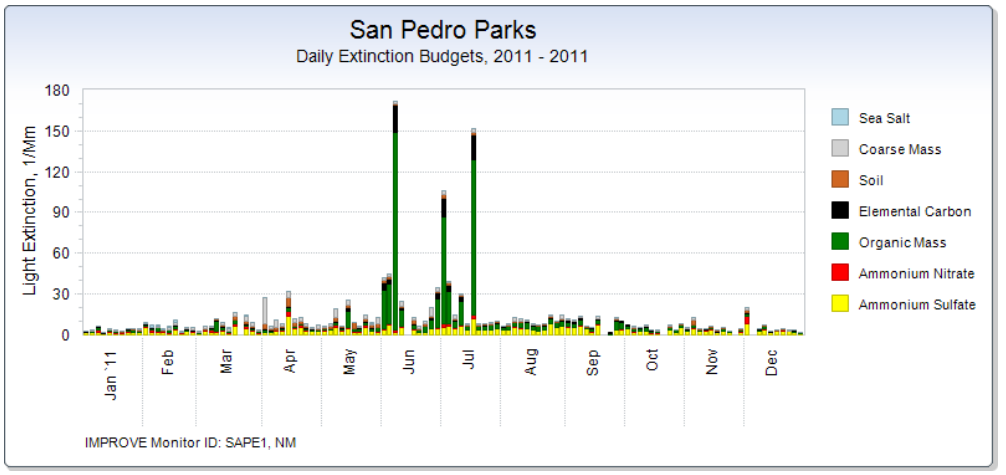




**Figure 3 Daily Extinction for Three IMPROVE Sites (Mount Baldy, Bandelier NM, and San Pedro Parks) in 2011** (Source: http://vista.cira.colostate.edu/Improve/data-page/)

### 3.3.4 Emissions

*Comment:* *One commenter stated that daily heat input rates used for annual emission estimation were inconsistent with those used for developing monthly and hourly emission scalars that reflect the typical seasonal and diurnal variations. Furthermore, the commenter stated that the modeling documentation did not provide justification for why the heat inputs for future years will be similar to historical heat inputs.*

Response: There are two emission calculations that are performed that require actual heat input data. The first is an annual actual emission analysis to address the emission reduction requirements under 40 CFR § 51.308 as well as the demonstration of noninterference with NAAQS under Section 110(l) of the CAA. These annual emission calculations utilized three recent years of heat input data (2008-2010). The second use of daily heat input data was for refining the CAMx modeling to reflect typical diurnal and seasonal variations in hourly emission rates. For this latter analysis, five years of data centered on the 2008 baseline modeling year were used to compile diurnal and seasonal hourly variations. Given that the basis for both the annual calculations and the hourly variation calculations is the same Clean Air Markets Division (CAMD) data base, there is no inconsistency in the emission calculations; there simply are two types of emission calculations that were performed.

The use of the baseline heat input value for estimating future emission is consistent with the RHR and BART Guidelines. ADEQ determined that the use of five years of heat input data centered on the 2008 baseline modeling year was appropriate and robust for estimating future emissions for CGS.

*Comment:* *One commenter stated that the modeling documentation did not provide justification for why the biogenic, fire, and windblown dust emissions for future years will remain unchanged from the 2008 base case emissions scenario. Since the modeling did not conduct a sensitivity analysis to demonstrate the robustness of this assumption, the commenter concluded that the model results were unreliable.*

Response: With the exception of climate change modeling looking far into the future (e.g., 2050-2100), it is standard practice in PGM modeling to hold biogenic, fire and windblown dust (WBD) emissions constant at the base meteorological year level (2008 in this case) when doing future year emission scenario modeling. EPA does not recommend that air agencies explicitly account for long-term climate change in the SIP demonstration because climate projections are more robust for periods at least several decades in the future while the timespan between base and future year meteorology is relatively short in most SIP demonstrations (less than 20 years).[4]

[4] https://www3.epa.gov/ttn/scram/guidance/guide/Draft_O3-PM-RH_Modeling_Guidance-2014.pdf (Pgs. 28-29)

Biogenic and WBD emissions depend on meteorological conditions (e.g., temperature, sunlight and wind speed) and land use characteristics (Leaf Area Index, Plant Functional Type, soil characteristics, surface roughness lengths). Without any basis for adjusting these parameters, the only defensible and justifiable assumption is that biogenic and WBD emissions would be the same in the base and future year modeling. For fires, it is impossible to predict what fires will be like in a future year; therefore, the most justifiable assumption is that fire emissions in the future year will be the same as in the base meteorological year.

### 3.3.5 Better-than-BART Demonstration

*Comment:* *One commenter stated that, while SRP'S CAMx model report provides spatial plots to compare visibility benefits between model scenarios, these plots were based on annual averages, which would smooth over numerical artifacts that are of concern in the "noise" issue. The commenter recommended adding plots to show nitrate/sulfate differences between model scenarios for the subset of days of concern, which would be more useful to demonstrate the actual visibility benefits from "Better-than-BART" scenarios 1-4.*

Response: Based on the comments, SRP performed additional data analyses to investigate whether the CAMx results for the CGS Better-than-BART (BTB) scenarios are influenced by numerical "noise" which may be smoothed out by averaging the results over multiple days. The analyses indicate that the CAMx modeling results for the BTB test are valid numerical results. Although the differences between the scenarios (i.e., "Prong 1" and "Prong 2" on individual days) are small, they are not artifacts of numerical "noise" but represent valid modeled responses to different CGS emissions scenarios. Please refer to Appendix A for detailed discussions.

*Comment:* *Given large allowable bias and errors in model performance, one commenter questioned the likely errors in the start and end dates for each of the proposed IS curtailment periods and challenged the reliability of the curtailment periods.*

Response: The comment implies there is a relationship between the start/end dates of the CGS curtailment periods in the BTB scenarios and the CAMx model performance, but the comment presents no evidence that this is the case. The CAMx 2008 model performance is within the range deemed acceptable in EPA's PGM modeling guidance (EPA, 1991[5]; 2007[6]; 2014[7]), the PGM peer-reviewed scientific literature (e.g., Boylan and Russell, 2006[8]; Simon, Baker and Philips, 2012[9]) and past PGM applications for ozone, PM and regional haze SIPs and visibility BART PGM modeling. Moreover, the CAMx modeling

[5] https://www3.epa.gov/ttn/scram/guidance/guide/uamreg.pdf
[6] https://www3.epa.gov/ttn/scram/guidance/guide/final-03-pm-rh-guidance.pdf
[7] https://www3.epa.gov/ttn/scram/guidance/guide/Draft_O3-PM-RH_Modeling_Guidance-2014.pdf
[8] http://capita.wustl.edu/capita/capitareports/071124_dataassimilation/cmaq_eval/jboylan_cmaq_pmeval.pdf
[9] http://www.sciencedirect.com/science/article/pii/S135223101200684X

for CGS was used to compare different scenarios in a relative sense. Any overall bias would be likely to cancel out when comparing one CGS emission scenario run to another.

*Comment:* *One commenter urged EPA and ADEQ to examine the hourly evolutions (animated spatial plots of SO4 and NO3) in order to confirm that the contributions (and differences) are actually from the CGS source(s).*

Response: The suggested analysis would be subjective and inconclusive. A more rigorous and quantitative method of determining CGS impacts was used, the CAMx Particulate Source Apportionment Tool (PSAT). PSAT uses reactive tracers (also called tagged species) that run in parallel to the CGS emissions to determine the visibility contributions from CGS.

*Comment:* *One commenter stated that the modeling documentation did not discuss numerical errors and uncertainties and their effects on the results. As stated, the modeled noise from PGM modeling can appear to make one strategy slightly better than another on some modeled days when the source does not even impact the Class I area.*

Response: As noted earlier, please refer to Appendix A for detailed discussions about the "noise" and uncertainties issues.

*Comment:* *Citing the visibility application of CAMx in Texas, the commenter stated that the CAMx modeling must use a "clean background".*

Response: The commenter suggests that the CGS CAMx modeling did not use a "clean background". However, the CGS CAMx visibility results were calculated using annual average natural background conditions, following EPA's recommended approach to determine "clean" natural background visibility values. Natural conditions could be determined based on annual average natural conditions or the average of the best days for natural conditions. While use of the 20% best days of natural conditions would result in higher calculated deciview impacts, EPA determined that the use of the annual average natural background value was more appropriate.[10] Moreover, the CGS CAMx visibility results were used to compare different control scenarios in a relative sense (absolute values are less important). It is very unlikely that the use of different methods to calculate the "clean background" would affect the BTB demonstration for CGS.

*Comment:* *One commenter stated that the BART Alternative failed to meet the regulatory requirement of "greater reasonable progress" because the model results indicated that the visibility would get worse at Mt. Baldy under the alternative as compared to the BART control.*

Response: As discussed in the TSD, the modeling has demonstrated greater reasonable progress because both of the following two criteria were met:

[10] https://www.epa.gov/sites/production/files/2015-12/documents/tx-ok_sip-fip_response_to_comments_508_compliant.pdf (Pgs. 645-646)

- Prong 1: Visibility does not decline in any Class I area, and
- Prong 2: There is an overall improvement in visibility, determined by comparing the average differences between BART and the alternative over all affected Class I areas.

The BART Alternative satisfies Prong 1 of the Better-than-BART test because the alternative control strategy would result in improved visibility at all affected Class I areas (including Mt. Baldy Wilderness Area) compared to baseline conditions.

For Prong 2 of the Better-than-BART test, the alternative control strategy must achieve an overall improvement in visibility averaged across all affected Class I areas compared to visibility in those area under the BART control strategy. ADEQ agrees that modeling indicates that visibility at Mt. Baldy Wilderness Area will not improve as much under the BART Alternative as compared to BART. However, this does not preclude approval of the BART Alternative because, as explained in the proposal, the BART Alternative would result in improved visibility at all affected Class I areas compared to baseline conditions and would result in improved visibility, on average, across all Class I Areas, compared to BART. As EPA explained in the preamble to the final BART Alternative Rule:

"*. . . within a regional haze context, not every measure taken is required to achieve a visibility improvement at every class I area. BART is one component of long term strategies to make reasonable progress, but it is not the only component. The requirement that the alternative achieves greater progress based on the average improvement at all Class I areas assures that, by definition, the alternative will achieve greater progress overall. Though there may be cases where BART could produce greater improvement at one or more class I areas, the no-degradation prong assures that the alternative will not result in worsened conditions anywhere than would otherwise exist. . . .*"[11]

In promulgating the BART Alternative requirements, EPA clearly contemplated that there could be instances where a BART alternative would result in less reasonable progress than BART at a particular Class I area, yet ensure overall greater reasonable progress than BART. This is the case with the BART Alternative for CGS.

*Comment:* *One commenter expressed his opposition to the ADEQ's entire proposal because the NOx emission reductions under any of the four IS options would be far lower than the current FIP NOx limit.*

Response: ADEQ agrees that the NOx emission reductions under any of the IS options in the proposed BART alternative would be less than the NOx emission reductions under the current BART FIP. However, the BART Alternative would result in decreases in emissions of $SO_2$ and $PM_{10}$. In this situation, where both BART and the BART Alternative would result in reduced emissions of one pollutant (or, in the case of the BART alternative, reduced emissions of two pollutants) but increased emissions of another pollutant, ADEQ determined it would not use the "greater emissions reductions" test under 40 CFR 51.308(e)(3). Instead, ADEQ chose to evaluate dispersion modeling to determine if the alternative achieves greater reasonable progress than BART under 40 CFR 51.308(e)(3).

[11] 71 FR 60612, 60621-22.

As discussed in the TSD, the modeling has demonstrated greater reasonable progress because both of the following two criteria were met:

- Visibility does not decline in any Class I area, and
- There is an overall improvement in visibility, determined by comparing the average differences between BART and the alternative over all affected Class I areas.

Moreover, as explained in the SIP TSD, Section 110(l) of the CAA does not require a BART alternative to be more stringent for emission controls for each criteria pollutant in every instance, and at every point in time, to supersede a prior BART determination. Rather, Section 110(l) provides that EPA may not approve a SIP revision if the SIP revision would interfere with any applicable requirement concerning attainment of NAAQS or any other applicable requirement of the Act. Apache County does not rely on the EPA FIP or BART Reconsideration for CGS to ensure continued attainment of the NAAQS. Neither the EPA FIP nor the BART Reconsideration represents existing control measures that have been put in place for attainment or maintenance of the NAAQS. Nor are these control measures in an RFP plan that provides for meeting the reasonable further progress milestones for a nonattainment area.

Based on the considerations described above, ADEQ has determined that the BART alternative meets all requirements of the CAA and the RHR and thus should be approved.

## 3.4 Comments on RHR and CAA Compliance

### 3.4.1 Compliance Deadlines

*Comment:* *One commenter expressed concerns about the timing of implementing and sustaining visibility protection through an alternative. The commenter was concerned with the timing of the notification deadline (December 31, 2026) and the final compliance controls deadline (December 31, 2029), as having a long period of interim emissions curtailment may create legal uncertainties. The commenter stated that the timing of the notification step and the final installation of SCR or shutdown should be coordinated with the implementation of the RHR's second planning period. In particular, the commenter recommended that the notification date should be no later than the mid-term reporting for the second planning period of the RHR, and that any final compliance controls should be placed no later than the end of the second reasonable progress planning period of the RHR.*

Response: ADEQ appreciates the comments. As presented in Section 2, the final compliance controls at Unit 1 (installation and operation of SCR at Unit 1 or the shutdown of Unit 1) will be implemented no later than December 31, 2025, three years earlier than the end date of the second planning period of the RHR. SRP also will notify ADEQ and EPA of its final compliance decision no later than December 31, 2022, one year earlier than the mid-term reporting for the second planning period of the RHR.

*Comment:* *One commenter stated that the proposed BART alternative for Coronado Unit 1 should be rejected because it would violate the five-year BART compliance deadline imposed by the Clean Air Act. In particular, the commenter pointed out that a source must install BART controls "as expeditiously as practicable", and under no circumstances can the compliance deadline be extended beyond five years after a BART determination is in place. However, the commenter stated, the proposed BART alternative would allow Unit 1 to continue polluting for more than twelve years beyond the compliance deadline.*

Response: ADEQ disagrees with these comments. The SIP revision does not delay the installation of BART controls but implements a BART alternative in accordance with 40 CFR 51.308(e)(2) and (3). The BART alternative includes interim compliance requirements and final compliance requirements. First, as documented in the TSD, the initial proposal satisfies the requirements of § 51.308(e)(3) passing the "better-than-BART" test. Second, and moreover, the lower $SO_2$ emission rate in the revised proposal will provide an even greater reduction in visibility impairment. Therefore, under both the interim and the final control strategies, the BART alternative would achieve greater reasonable progress toward natural visibility conditions than would be achieved through the installation, operation, and maintenance of BART as provided in the EPA FIP and the BART Reconsideration.

As explained in the RHR, ADEQ must demonstrate that all necessary emission reductions will take place during the first long-term strategy period. Sources subject to BART must be in compliance with the BART emission limitations as expeditiously as practical but no later than 5 years after EPA approves the implementation plan revision. The BART alternative will take effect on the same compliance date established by EPA's BART FIP, December 5, 2017. Therefore, the emission reductions from the BART alternative will occur during the first long-term planning period under Arizona's regional haze requirements, consistent with EPA's approach. In asserting incorrectly that the BART alternative would allow Unit 1 to continue polluting for more than twelve years beyond the compliance deadline, the commenter ignored the emissions reductions that will be achieved during the interim period, beginning on December 5, 2017.

In summary, the SIP revision constitutes a better-than-BART alternative that will take effect no later than 5 years after EPA published the BART FIP for CGS Unit 1 and will result in the necessary emission reductions occurring within the first long-term-strategy period for regional haze. The BART alternative satisfies the requirement that it achieve greater reasonable progress than BART and will achieve the necessary emission reductions on a schedule that is consistent with the five-year BART compliance deadline under the RHR.

*Comment:* *One commenter stated that the twelve-year delay that the commenter asserted would occur before Coronado Unit 1 would comply with its BART obligations would undermine the reasonable progress goals (RPGs) for the many national parks and wilderness areas impacted by Coronado's air pollution. If ADEQ grants SRP's request to delay Coronado's compliance obligations, the commenter stated, the RPGs must be reassessed and other sources must promptly reduce their pollution in order to ensure reasonable progress and compliance with the RPGs.*

Response: ADEQ disagrees with the comment. There is no twelve-year delay. As part of the BART alternative, the interim control strategies will take effect no later than 5 years after EPA published the BART FIP for CGS Unit 1. As explained in the TSD, during the interim period, the BART Alternative will result in improved visibility at all affected Class I areas compared with baseline conditions and will result in improved visibility, on average, across all Class I areas, compared with BART. First, as documented in the TSD, the initial proposal satisfies the requirements of § 51.308(e)(3) passing the "better-than-BART" test. Second, and moreover, the lower $SO_2$ emission rate in the revised proposal will provide an even greater reduction in visibility impairment. Therefore, in both the interim stage and the final stage, the BART alternative will achieve greater reasonable progress toward natural visibility conditions than would be achieved through the installation, operation, and maintenance of BART. ADEQ does not find any basis to conclude that the implementation of the BART alternative would undermine the RPGs for Class I areas impacted by CGS. ADEQ also does not find any reason to reassess the RPGs by incorporating any additional emission reductions from other sources.

*Comment:* *One commenter stated that the emission reductions from interim strategy options IS1-IS4 would apply for 2018-2029 and would not take place prior to 2018, failing to meet the RHR's requirement that all necessary emission reductions must take place during the first long term strategy period (i.e., by 2018).*

Response: ADEQ disagrees with the comment. The interim strategy options IS2-IS4 will take effect on the same compliance date established by EPA's BART FIP, December 5, 2017. For the first long-term strategy period, the end date is December 31, 2018. Therefore, the emission reductions from interim strategy options IS2-IS4 would take place during the period of the first long-term strategy for regional haze (i.e., by December 31, 2018).

*Comment:* *One commenter stated that the Clean Air Act does not provide the operational flexibility SRP would prefer (delay deciding whether to install SCR or shut down Coronado Unit 1). The commenter urged ADEQ not to finalize the proposed BART alternative and leave the existing BART determination in place.*

Response: ADEQ agrees that the CAA does not allow a delay, beyond the statutory and regulatory deadline for BART, to install BART controls. However, the CAA or RHR does allow flexibility to use a BART alternative instead of BART. As previously discussed, the BART Alternative for CGS would result in improved visibility at all affected Class I areas compared with baseline conditions and would result in improved visibility, on average, across all Class I areas, compared with BART. Moreover, as part of the BART alternative, the interim control strategies will take effect on the same compliance date established by EPA's BART FIP, December 5, 2017.

### 3.4.2 Anti-Backsliding Provision

*Comment:* *One commenter stated that the proposed BART alternative for Coronado Unit 1 should be rejected because it would violate the Clean Air Act's anti-backsliding provision. The commenter stated that the proposed BART alternative would result in greater air pollution and worse visibility impairment at Class I areas for 12 years after the BART compliance deadline. The commenter asserted that the existing BART determination is an "applicable requirement" under Clean Air Act Section 110(l), and that any revisions resulting in greater air pollution and worse visibility impairment are contrary to the Clean Air Act's anti-backsliding provision.*

Response: ADEQ disagrees with the comments. During the interim period, the BART Alternative would result in higher emissions of NOx. As explained in the TSD, however, Section 110(l) of the CAA does not require a BART alternative to be more stringent with respect to emission controls for each criteria pollutant in every instance, and at every point in time, to supersede a prior BART determination. In response to comments that New Mexico's 2013 RH SIP revision failed to outperform the existing BART determination for San Juan Generating Station, EPA stated that "Section 110(l) of the CAA does not prohibit a state from submitting a SIP revision that is less stringent than a FIP." Final BART SIP Approval Rule, 79 Fed. Reg. 60,985 60,989 (Oct. 9, 2014). In EPA's review of a proposed BART FIP-replacement SIP revision submitted by Oklahoma, EPA similarly stated that "[s]uch a SIP revision need not adopt the same suite of control options and techniques as EPA's FIP, nor does it necessarily have to be as stringent as EPA's FIP in all instances." 78 Fed. Reg. 51,686, 51,691 (Aug. 21, 2013). More recently, despite the fact that the BART alternative would result in higher NOx emissions than EPA's FIP, EPA approved a source-specific revision to the Arizona SIP that established a BART alternative at Arizona Electric Power Cooperative's (AEPCO) Apache Generating Station. 80 Fed. Reg. 19220 (April 10, 2015).

Section 110(l) of the CAA provides that EPA may not approve a SIP revision if the revision would interfere with any applicable requirement concerning attainment and reasonable further progress (RFP), or any other applicable requirements of the CAA. As discussed in the SIP TSD, Apache County does not rely on the EPA FIP or BART Reconsideration for CGS to continue to attain any NAAQS. The EPA FIP and BART Reconsideration do not represent existing control measures that have been established for attainment or maintenance of NAAQS or for meeting any reasonable further progress milestones for any nonattainment area.

To the extent that requirements of EPA's regional haze regulations are considered applicable requirements of the Clean Air Act for purposes of Section 110(l) of the Act, Section 110(l) is satisfied here because in both its interim stage and its final stage, the BART alternative will achieve greater reasonable progress toward natural visibility conditions than would be achieved through the installation, operation, and maintenance of BART. Therefore, the BART Alternative operating strategies will not interfere with the requirements of the Regional Haze program and do not violate Section 110(l).

## 3.5 Comments on $SO_2$ and NOx Emission Limits

Comment: *One commenter requested ADEQ to work with SRP to explore ongoing $SO_2$ control equipment operations and fuel supply procedures that could achieve the maximum, reliable emissions reductions during the entire implementation period of the interim strategies (from 2017 to final installation of SCR or shut down of Unit 1). Another commenter reviewed actual $SO_2$ emissions data during 2014 through mid-2016 for CGS units and found that the $SO_2$ emissions for both units were 0.042 lb/MMBtu, much lower than the emission limits of 0.060-0.080 lb/MMbtu proposed by SRP under its IS1-IS4 options. The commenter stated that there was significant additional $SO_2$ reduction that might be possible for both units beyond SRP's proposal.*

Response: The criteria established for approval of a BART alternative at 40 CFR § 51.308(e) do not require the maximum achievable emissions reductions at a BART eligible source as suggested by the commenter. The BART alternative that was initially proposed by SRP and was the basis for ADEQ's proposed determination, as discussed in the TSD, included two operating scenarios, each of which would provide greater reasonable progress toward natural visibility conditions. To address the comments, in the application addendum described in Section 2 herein, the BART alternative for CGS has been revised by lowering the permitted $SO_2$ emission rate limit for each unit from 0.080 lb/MMBtu to 0.060 lb/MMBtu (on a 30-boiler-operating-day average) as well as adding a plant-wide annual $SO_2$ emission cap of 1,970 tons. The emission limit of 0.060 lb/MMBtu would become effective December 5, 2017, and would apply at each unit in both the interim phase and the final phase of the BART alternative, without any termination date. The annual cap would apply to the calendar year starting January 1 and ending December 31 of each year. The first calendar year in which the annual cap is effective starts January 1, 2018, and the annual cap would also apply in each year thereafter, in both the interim phase and the final phase of the BART alternative, without any termination date.

Reflecting the proposal made in the addendum, the revised BART alternative removes the interim control strategy IS1 but retains the interim control strategies IS2, IS3 and IS4 (see Table 1). For IS3 and IS4, the $SO_2$ emission limits are kept unchanged because the $SO_2$ emission limits under those two strategies are already equal to or lower than 0.060 lb/MMBtu (on a 30-boiler-operating-day average). For IS2, the $SO_2$ emission limit in the final BART alternative, as revised in response to comments, decreases from 0.070 lb/MMBtu to 0.060 lb/MMBtu (hereinafter referred to as "Modified IS2").

The proposed revisions do not affect the interim control strategies IS3 and IS4 since the new $SO_2$ limit of 0.060 lb/MMBtu is equal to or higher than that allowed by IS3 and IS4, and the annual plant-wide emission cap of 1,970 tons is higher than the annual emissions estimated for IS3 and IS4 (see TSD pg. 10). Plant-wide annual $SO_2$ emissions under Modified IS2 are expected to be even lower than plant-wide annual $SO_2$ emissions under IS4 due to the fact that Modified IS2 has an identical $SO_2$ emission rate limit but a longer curtailment period than IS4 does. Therefore, plant-wide annual $SO_2$ emissions under Modified IS2 are expected to be below the annual plant-wide $SO_2$ emissions cap of 1,970 tons per year.

The proposed revisions will significantly reduce $SO_2$ emissions as compared to the BART when the final strategy under the BART Alternative (SCR or shutdown) is in place. As shown in the SIP TSD, the combined annual emissions of Unit 1 and Unit 2 for the BART were estimated as 2,651 tons per year (tpy) (see TSD pg. 11). When SCR is in place, the revised annual cap is projected to reduce plant-wide $SO_2$ emissions by 681 tpy (or approximately 26%) compared to the BART. Alternatively, if Unit 1 is shut down, the revised annual cap is projected to reduce plant-wide $SO_2$ emissions by 1,571 tpy (or approximately 59%) compared to the BART. For detailed calculations, please see Table 3.

Table 3 Annual $SO_2$ Emissions for Revised BART Alternative

| Scenario | Unit | Annual Emission (tons/year ) | Combined Emission of Unit 1 and Unit 2 (tons/year) | Emission Reduction Relative to BART (tons/year) |
|---|---|---|---|---|
| BART Control Strategy | Unit 1 | 1,285[a] | 2,651[a] | - |
| | Unit 2 | 1,366[a] | | |
| Revised BART Alternative -SCR | Unit 1 | 964[b] | 1,970 (annual emission cap) | 681 |
| | Unit 2 | 1,025[b] | | |
| Revised BART Alternative - Shutdown | Unit 1 | 0 | 1,080 (annual emission cap) | 1,571 |
| | Unit 2 | 1,025[b] | | |

[a] *TSD pgs. 10,11.*
[b] *Assuming the same heat input and annual utilization rate, the emission rate for Revised BART Alternative = the emission rate for BART Control Strategy * (0.06/0.08).*

As shown in the SIP TSD, the Interagency Monitoring of Protected Visual Environments (IMPROVE) monitoring data collected from CGS-affected Class I areas indicate that ammonium sulfate plays a more significant role in visibility impairment than ammonium nitrate in those areas. As ADEQ determined, the ratio of $SO_2$-attributed visibility extinction to NOx-attributed visibility extinction averaged over all Class I areas potentially affected by CGS is 4.2:1. ADEQ also observed that ammonium sulfate accounts for 15%-30% of aerosol light extinction whereas ammonium nitrate's contribution is only 4%-8% for Class I areas potentially affected by CGS. Compared to the original proposal, the revised BART Alternative will further reduce $SO_2$ emissions to provide additional visibility improvement at affected Class I areas.

Comment: *One commenter reviewed actual NOx emissions data during 2014 through mid-2016 for CGS units and found that the 95th percentile 30-day average was 0.30 lb/MMBtu. The commenter stated no reductions are being proposed in the NOx rate in lb/MMBtu in the noncurtailed periods under IS1-IS4.*

Response: In the BART Alternative, the NOx emission limits for Unit 1 for IS2, IS3, and IS4 are 0.320 lb/MMBtu, 0.320 lb/MMBtu, and 0.310 lb/MMBtu (on a 30-boiler-operating-day average basis), respectively. (Note that IS1 is removed.) Relative to the actual NOx emission data the commenter provided, there is little opportunity for CGS to further reduce

NOx emissions from Unit 1. Although the historic 95$^{th}$ percentile emission rate may be 0.30 lb/MMBtu, it would not be appropriate to set an emission limit at that level. It is necessary to add a margin of compliance when setting emission limits so that a source has sufficient operational flexibility. As discussed elsewhere in this document, the BART Alternative has been revised to further reduce $SO_2$ emissions to achieve greater visibility benefits compared to BART.

## Appendix A: Memorandum SRP Submitted to ADEQ Regarding Numerical Noise Issues Associated with CAMx Modeling

Date September 22, 2016

# MEMORANDUM

To:
From: Lynsey Parker and Ralph Morris
Subject: To address the EPA comment regarding whether the CGS Better-than-BART CAMx analysis is influenced by numerical "noise".

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## Purpose and summary of analysis

This analysis was performed to address EPA's comment regarding whether the CAMx results for the CGS Better-than-BART (BTB) scenarios are influenced by numerical "noise" which may be smoothed out by averaging the results over multiple days. CAMx results were plotted for total visibility impacts, as well as nitrate and sulfate visibility impacts separately, for two individual days which were selected based on the magnitude of the CGS impacts at the most affected Class I areas on those days. Spatial plots of visibility impacts and differences in visibility impacts between various emission scenarios, show reasonable patterns resembling dispersed plumes with smooth visibility impact gradients, indicating that model results are not influenced by noise. A close examination of the differences between two model runs with identical emission rates suggests that the noise threshold is bounded by ± 0.0000005 dv (±5e-7). This is one to two orders of magnitude lower than the smallest results from the CGS two-prong BTB test.

## Approach

Two days from the annual CAMx simulation were identified based on their sizable contribution to the average best 20% (B20%) and worst 20% (W20%) delta deciviews. The methodology for the selection of days is described below. For the two selected days, spatial plots were generated to report delta deciviews for each emissions scenario: Baseline, EPA BART, CGS scenarios [BTB1, BTB2, BTB3, BTB4], and spatial plots of the differences between the scenarios analogous to the Prong 1 and Prong 2 BTB tests were generated. Emissions rates for the six scenarios, along with the shutdown periods for unit 1 are presented in Table 1. Since January 13 falls within the unit 1 shutdown period, emissions from unit 1 on that day (and previous days) are zero. Note that the differences plots are not the true Prong 1 and Prong 2 BTB tests, since those tests are defined to be applied to the average of B20% and W20% days and not individual days. In addition, to provide a deeper understanding of the results, delta deciviews and "Prong 1" and "Prong 2" differences plots were also calculated based on CGS nitrate-only impacts and CGS sulfate-only impacts. All spatial plots were examined for evidence of numerical "noise".

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**Table 1. CGS emission rates and unit 1 shutdown periods for the CGS Baseline, EPA BART and four proposed alternative Better-than-BART emission scenarios. (Report Table 4-1)**

| Scenario | $NO_X$ (lb/MMBtu) | | $SO_2$ (lb/MMBtu) | | unit 1 Shutdown Period |
|---|---|---|---|---|---|
| | unit#1 | unit#2 | unit#1 | unit#2 | |
| Baseline | 0.320 | 0.080 | 0.080 | 0.080 | None |
| EPA BART | 0.065 | 0.080 | 0.080 | 0.080 | None |
| BtB1 | 0.320 | 0.080 | 0.080 | 0.080 | Oct 1 – Apr 15 |
| BtB2 | 0.320 | 0.080 | 0.070 | 0.070 | Oct 21 – Jan 31 |
| BtB3 | 0.320 | 0.080 | 0.050 | 0.050 | Nov 21 – Jan 20 |
| BtB4 | 0.310 | 0.080 | 0.060 | 0.060 | Nov 21 – Jan 20 |

**Method for selection of individual days:**

1) Identify the Class I areas with maximum CGS visibility impacts for the Baseline scenario from Table 2
   a) For the B20% days, Superstition Wilderness has the maximum delta deciview impact
   b) For the W20% days, Mount Baldy Wilderness has the maximum delta deciview impact
2) From intermediate post-processing files, the single B20% and W20% days with highest delta deciview impacts at Superstition Wilderness and Mount Baldy Wilderness areas, respectively, were identified and are presented in Table 3
   a) Superstition Wilderness (supe) highest single B20% day delta deciview impact was on January 13 (2008013)
   b) Mount Baldy (moba) highest single W20% day delta deciview impact was on May 15 (2008136)

**Table 2. CGS visibility impacts from Baseline emissions. (Report Table 4-3)**

| | Delta Dv | | |
|---|---|---|---|
| | Average Best 20% Days* | Average Worst 20% Days* | Annual Average |
| Class I Area | Absolute (dv) | Absolute (dv) | Absolute (dv) |
| Bandalier NM | 0.0063 | 0.0170 | 0.0096 |
| Bosque | 0.0063 | 0.0049 | 0.0104 |
| Chiricahua NM | 0.0081 | 0.0015 | 0.0040 |
| Chiricahua Wild | 0.0092 | 0.0015 | 0.0041 |
| Galiuro Wild | 0.0051 | 0.0016 | 0.0031 |
| Gila Wild | 0.0151 | 0.0030 | 0.0140 |
| Grand Canyon NP | 0.0006 | 0.0030 | 0.0044 |
| Mazatzal Wild | 0.0167 | 0.0039 | 0.0053 |
| Mesa Verde NP | 0.0013 | 0.0063 | 0.0071 |
| Mount Baldy Wild | 0.0209 | **0.0172** | 0.0226 |
| Petrified Forest NP | 0.0087 | 0.0147 | 0.0406 |
| Pine Mountain Wild | 0.0133 | 0.0025 | 0.0052 |
| Saguro NP | 0.0041 | 0.0013 | 0.0023 |
| San Pedro Parks Wild | 0.0080 | 0.0134 | 0.0126 |
| Sierra Ancha Wild | * | * | 0.0087 |
| Superstition Wild | **0.0224** | 0.0027 | 0.0060 |
| Sycamore Canyon Wild | 0.0058 | 0.0037 | 0.0050 |
| Maximum | **0.0224** | **0.0172** | 0.0406 |
| Cumulative (sum) | 0.1521 | 0.0982 | 0.1649 |
| Average | 0.0095 | 0.0061 | 0.0097 |
| Minimum | 0.0006 | 0.0013 | 0.0023 |

** Best and Worst Days of Monitored visibility, from MATS (IMPROVE) database, some sites/years lack data*

**Table 3. Highest individual baseline visibility impact.**

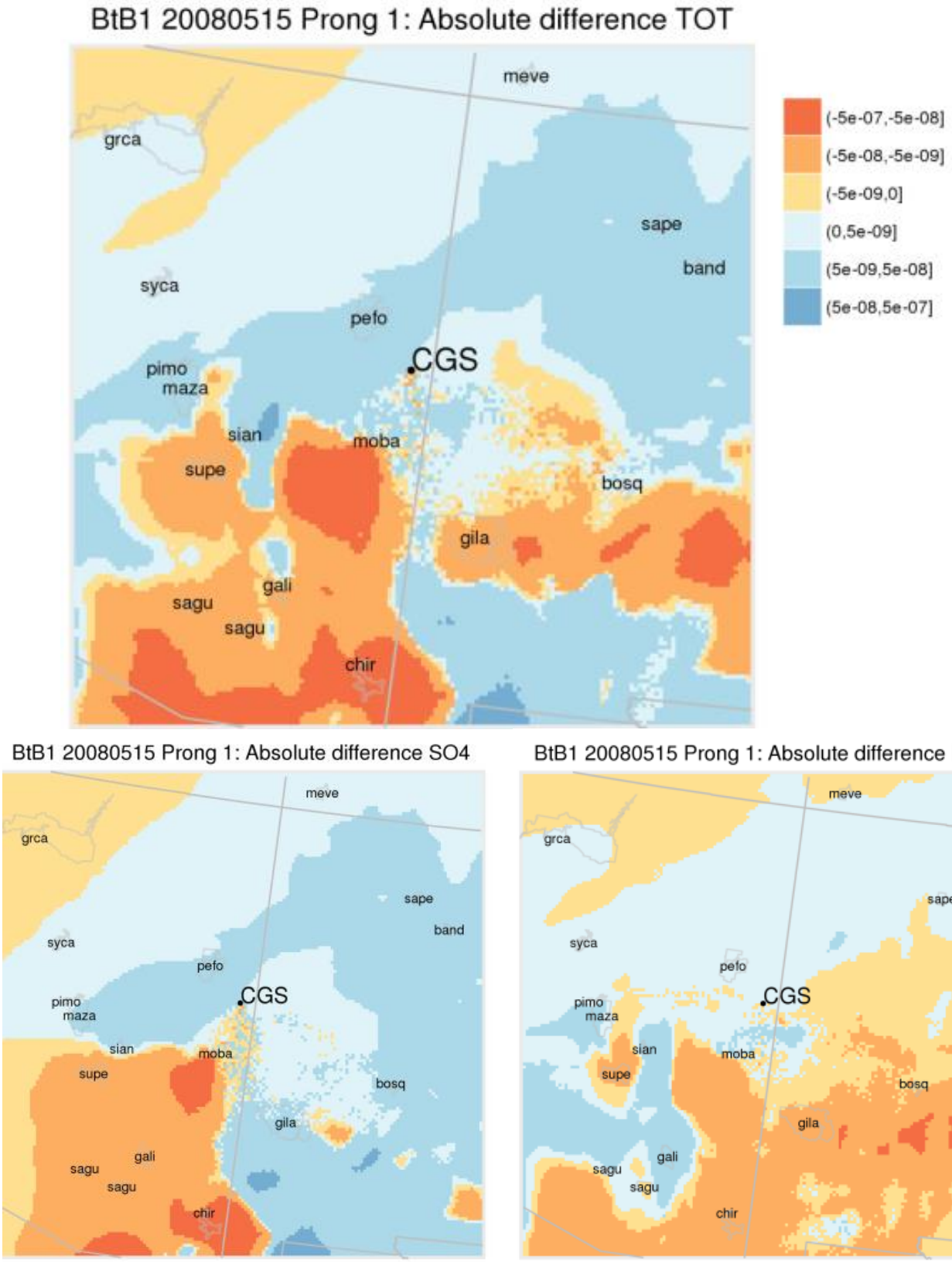
| Class I Area | Day Type | date | date | bext | delta deciview | Back bext | bso4 | bno3 | bnhy |
|---|---|---|---|---|---|---|---|---|---|
| supe | B20% Day | 2008013 | Jan 13 | 0.2211 | 0.1427 | 15.3829 | 0.0773 | 0.0086 | 0.1352 |
| moba | W20% Day | 2008136 | May 15 | 0.1357 | 0.0979 | 13.7916 | 0.0566 | 0.0307 | 0.0484 |

## Comparison of results for two model runs with identical emissions

The only spatial plots that show evidence of numerical "noise", (identified by pixilation in the plots) are the "Prong 1" plots for the CGS BTB1 scenario on May 15 which is a day when the Baseline and BTB1 emissions are identical. Results of "Prong 1" for this case are essentially zero throughout the modeling domain and across all Class I areas. This result indicates that the numerical "noise" threshold is bounded by ± 0.0000005 dv (±5e-7). This is one to two orders of magnitude lower than the smallest result from the CGS two-prong BTB test.

Figure 1 presents the differences between BTB1 scenario and the baseline scenario (i.e. Baseline minus BTB1, which is the Prong 1 Better-than-BART test applied to a single day rather than an average over the B20% or W20% days) for total visibility impact, as well as the sulfate and nitrate contributions. The observed visibility differences are very small, and some pixilation occurs at values of 5e-8 dv. All of the differences are bounded by a value of 5e-7 dv, which is an upper bound estimate for the "noise" observed. This impact level is one to two orders of magnitude lower than the smallest result from the CGS two-prong BTB test. This indicates that the CAMx modeling results for the BTB test are valid numerical results, and that the differences between the scenarios (i.e. the Prong 1 and Prong 2 results) are not artifacts of numerical "noise" but represent valid modeled responses to different CGS emissions scenarios.

**Figure 1. Comparison of "Prong1" BTB1 (Baseline minus BTB1) May 15.**



## Analysis of results at Superstition Wilderness on January 13 and Mount Baldy Wilderness on May 15.

To supplement the spatial plots in the next section and to facilitate analysis of the results, this section provides tabulated results at the two most affected Class I areas on days selected for the analysis. Table 4 reports detailed results for Superstition Wilderness on January 13 and Mount Baldy Wilderness on May 15. The table reports delta deciviews for each emissions scenario, as well as CGS sulfate extinction, CGS nitrate extinction, CGS nonhydrogenous extinction (as both absolute extinction and percentage of total extinction), and total CGS extinction. The delta deciview values in Table 4 are comparable to the relevant Class I area total delta deciviews reported in the spatial plots in the next section, for each of the emission scenarios. Note that on January 13 sulfate extinction is much larger than nitrate extinction for all scenarios, and nitrate extinction is a small percentage of total extinction (2.2 % to 6.0 %).

**Table 4. Detailed visibility impacts: delta deciview, sulfate, nitrate, nonhydrogenous (i.e. other) extinction at Superstition Wilderness (January 13) and Mount Baldy Wilderness (May 15) each emission scenario.**

| Scenario | date | bext | delta dv | Back bext | bso4 | bno3 | bnhy | bso4 as % of CGS ext | bno3 as % of CGS ext | bnhy as %e of CGS ext |
|---|---|---|---|---|---|---|---|---|---|---|
| **Superstition Wilderness** | | | | | | | | | | |
| Baseline | 2008013 | 0.2211 | 0.1427 | 15.3829 | 0.0773 | 0.0086 | 0.1352 | 35.0% | 3.9% | 61.1% |
| EPA BART | 2008013 | 0.1979 | 0.1278 | 15.3829 | 0.1064 | 0.0043 | 0.0872 | 53.8% | 2.2% | 44.1% |
| BtB1 | 2008013 | 0.1246 | 0.0807 | 15.3829 | 0.0290 | 0.0069 | 0.0887 | 23.3% | 5.5% | 71.2% |
| BtB2 | 2008013 | 0.1215 | 0.0786 | 15.3829 | 0.0256 | 0.0069 | 0.0889 | 21.1% | 5.7% | 73.2% |
| BtB3 | 2008013 | 0.1152 | 0.0746 | 15.3829 | 0.0190 | 0.0069 | 0.0894 | 16.5% | 6.0% | 77.6% |
| BtB4 | 2008013 | 0.1160 | 0.0751 | 15.3829 | 0.0221 | 0.0067 | 0.0872 | 19.0% | 5.8% | 75.2% |
| **Mount Baldy Wilderness** | | | | | | | | | | |
| Baseline | 2008136 | 0.1357 | 0.0979 | 13.7916 | 0.0566 | 0.0307 | 0.0484 | 41.7% | 22.6% | 35.7% |
| EPA BART | 2008136 | 0.1080 | 0.0780 | 13.7916 | 0.0621 | 0.0129 | 0.0330 | 57.5% | 11.9% | 30.6% |
| BtB1 | 2008136 | 0.1357 | 0.0979 | 13.7916 | 0.0566 | 0.0307 | 0.0484 | 41.7% | 22.6% | 35.7% |
| BtB2 | 2008136 | 0.1297 | 0.0936 | 13.7916 | 0.0504 | 0.0309 | 0.0485 | 38.8% | 23.8% | 37.4% |
| BtB3 | 2008136 | 0.1178 | 0.0851 | 13.7916 | 0.0377 | 0.0313 | 0.0488 | 32.0% | 26.5% | 41.4% |
| BtB4 | 2008136 | 0.1224 | 0.0884 | 13.7916 | 0.0441 | 0.0304 | 0.0479 | 36.0% | 24.8% | 39.1% |

To analyze visibility impacts responses due to changes in emissions for each of the days, refer to Table 1 for emission rates and Table 4 for the visibility impacts due to nitrate, sulfate and “other” visibility-impairing components. Recall that on January 13, CGS unit 1 is shut down for all CGS BTB scenarios and therefore the CGS emissions are from unit 2 only. Refer to the CGS Report (2016), for additional emissions information, including primary $SO_4$ emission rates and other pollutants.

Analysis of January 13 response to emissions reductions at Superstition Wilderness: "Prong 1".

- Reduction in $SO_2$ emissions from baseline to BTB scenarios leads to lower bso4.
- Reduction in NOx emissions from baseline to BTB scenarios leads to lower bno3 (by a small amount)
- Net effect: Lower total bext for BTB scenarios compared to Baseline.

Analysis of January 13 response to emissions reductions at Superstition Wilderness: "Prong 2".

- Reduction in $SO_2$ emissions from EPA BART to BTB scenarios leads to lower bso4.
- Reduction in NOx emissions from EPA BART to BTB scenarios however higher bno3
    - This may be attributable to increased available ammonia for nitrate formation since less ammonia used by sulfur neutralization
- Net effect: Lower total bext for BTB compared to EPA BART. (Note that nitrate is only a small percentage of total extinction on this day).

Analysis of May 15 response to emissions reductions at Mount Baldy Wilderness: "Prong 1".

- Same or lower $SO_2$ emissions from baseline to BTB scenarios leads to same or lower bso4.
- Same or similar NOx emissions from baseline to BTB scenarios leads to similar bno3
- Net effect: Same total bext (~pass for the BTB Prong 1 test since "no worsening" for Prong 1) or lower total bext for BTB compared to Baseline.

Analysis of May 15 response to emissions reductions at Mount Baldy Wilderness: "Prong 2".

- Same or lower $SO_2$ emissions from EPA BART to BTB scenario leads to slightly lower or lower bso4 (recall, EPA BART has additional $SO_4$ emissions compared to BTB cases).
- Increase in NOx emissions from EPA BART to BTB scenario leads to higher bno3
- Net effect: Slightly higher total Bext for BTB compared to EPA BART
    - Note that the BTB Prong 2 test applies to the average of all B20% and W20% days and not a single day as shown in this example. In addition the BTB test also applies to the average of many Class I areas and not a single area as is presented here. See the spatial plots in the next section for this day to observe that some Class I areas have a Prong 2 net improvement on this day and some Class I areas have degradation.

## Spatial plots for January 13 and May 15.

Figure 2, Figure 3, and Figure 4 present spatial plots of CAMx modeled CGS visibility impacts on January 13 for the Baseline, EPA BART, BTB1, BTB2, BTB3, and BTB4 scenarios. The visibility impacts are represented in terms of haze index (i.e. delta deciviews (ddv)). The top panels display delta deciviews based on all CGS aerosol components (standard delta deciview), the middle and bottom panels display delta deciviews based on CGS nitrate and sulfate concentrations only. On January 13, the region with highest visibility impacts is observed generally southwest of the CGS facility. The Class I areas most affected are supe (see corresponding tabulated results in Table 4), sian and moba. Note that close to the CGS source nitrate impacts may be higher than sulfate impacts (since nitrate ddv > 1 dv and sulfate ddv < 0.25 dv, for baseline), but over a broad region sulfate impacts are higher than nitrate impacts (i.e. sulfate ~ 0.025 dv – 0.1 dv and nitrate ~0.001 dv – 0.01, for baseline).

Figure 9, Figure 10, and Figure 11 are the analogous results for May 15, and show a dispersed plume south to southeast of the CGS facility. The most impacted Class I areas are moba (see corresponding tabulated results in Table 4), gila and bosq.

Figure 5 and Figure 6 present the differences between Baseline and BTB scenario delta deciviews for January 13. Blue indicates positive values where Baseline delta deciviews are higher than BTB scenario delta deciviews (i.e. BTB scenarios have a smaller visibility impact than the Baseline scenario) and red indicates the opposite result. The top panels display the differences between total delta deciviews, the middle panels displays the differences between delta deciviews based on sulfate concentrations only and the bottom panels display the difference between delta deciviews based on nitrate concentrations only. These results are similar to the Prong 1 test of the Better-than-BART test, except the actual Prong 1 test uses delta deciview averaged over the B20% days and W20% days instead of a single day (i.e. January 13). These results show predominantly blue results (i.e. lower visibility impacts for CGS BTB scenarios compare to the Baseline scenario) for total delta deciviews, as well as delta deciviews calculated based on nitrate and sulfate concentrations only, for all BTB scenarios. Recall that January 13 is during the shutdown period and emissions from unit 1 are zero for the BTB scenarios and the visibility impacts are due to emissions from unit 2 only.

Figure 12 and Figure 13 present the analogous results for May 15. May 15 is not during the shutdown period for any BTB scenarios. The BTB1 scenario has the same emissions as the baseline scenario so the differences in Figure 12 (left column; Baseline – BTB1scenario) are very small. The other BTB scenarios have lower $SO_2$ emissions than the baseline case, and for each of those BTB scenarios the sulfate delta deciview difference plots are predominantly blue (i.e. lower sulfate visibility impacts for CGS BTB scenarios compare to the Baseline scenario). The nitrate delta deciviews plots for BTB2 – 4 show different results based on the relative reduction of NOx and $SO_2$ emissions but the total delta deciview plots shows lower total visibility impacts for those three BTB scenarios compared to the Baseline case. The results in Figure 12 for the BTB1 case are presented with additional precision in Figure 1.

Figure 7 and Figure 8 present differences between the EPA BART and BTB scenario delta deciviews for January 13. As in Figure 5 and Figure 6, total delta deciview differences are presented in the top panels and sulfate and nitrate derived delta deciview differences are presented in the middle and bottom panels, respectively. These results are similar to Prong 2 of the Better-than-BART test except

the results are for a single day instead of for an average over the B20% and W20% days. These plots all show predominately blue regions for the total and sulfate delta deciview impacts and red regions for the nitrate delta deciview impacts.

Figure 14 and Figure 15 present the analogous results for May 15. On this day, there is more spatial variation across the modeling domain with some regions reporting higher CGS visibility impacts and other regions reporting lower CGS visibility impacts from the BTB scenarios compared to the EPA BART scenario particularly for the total delta deciview metric.

**Figure 2. Baseline and EPA BART delta deciviews: tot, so4, no3. January 13.**

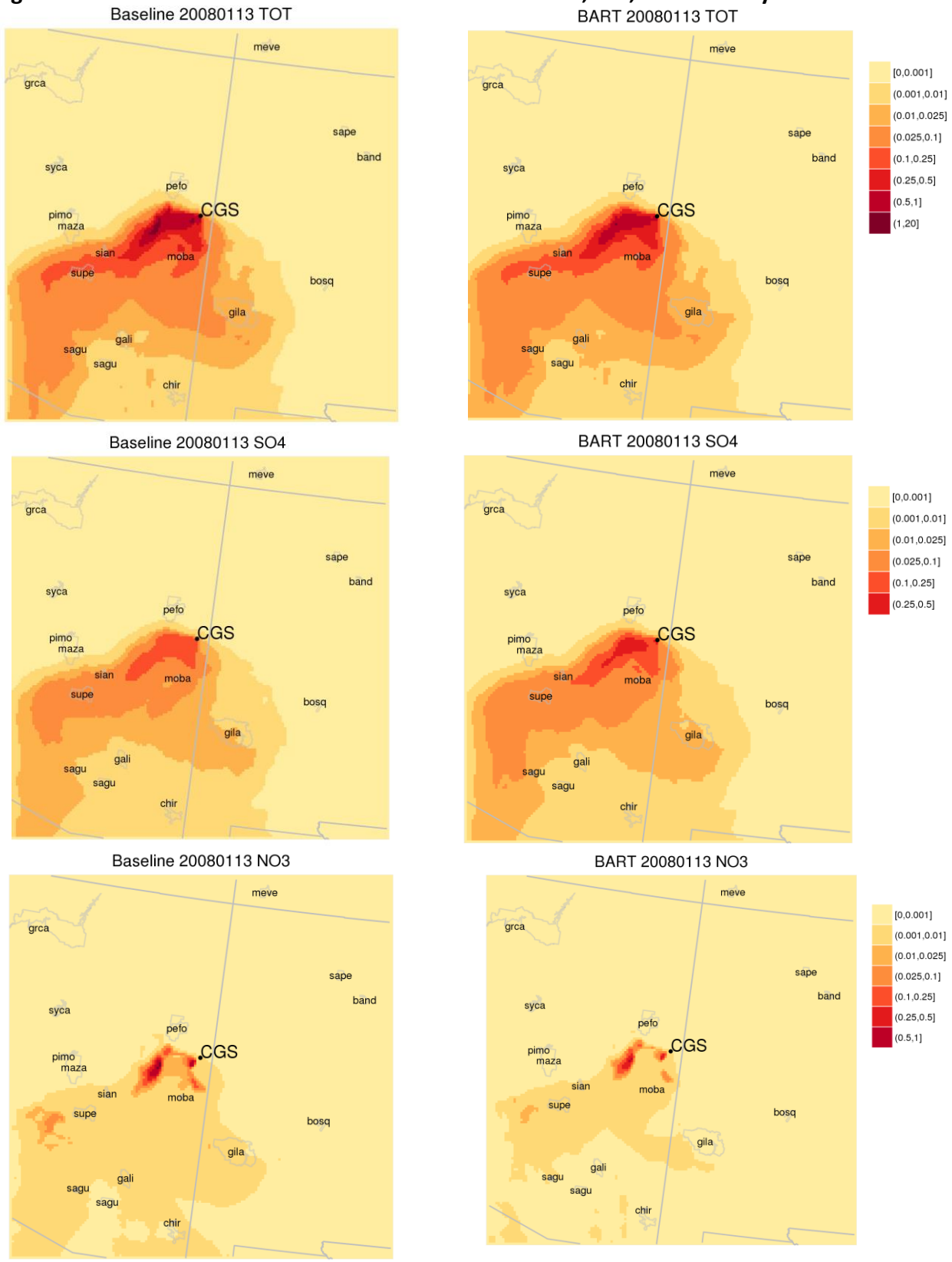



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**Figure 3. BTB1 and BTB2 delta deciviews: tot, so4, no3. January 13.**

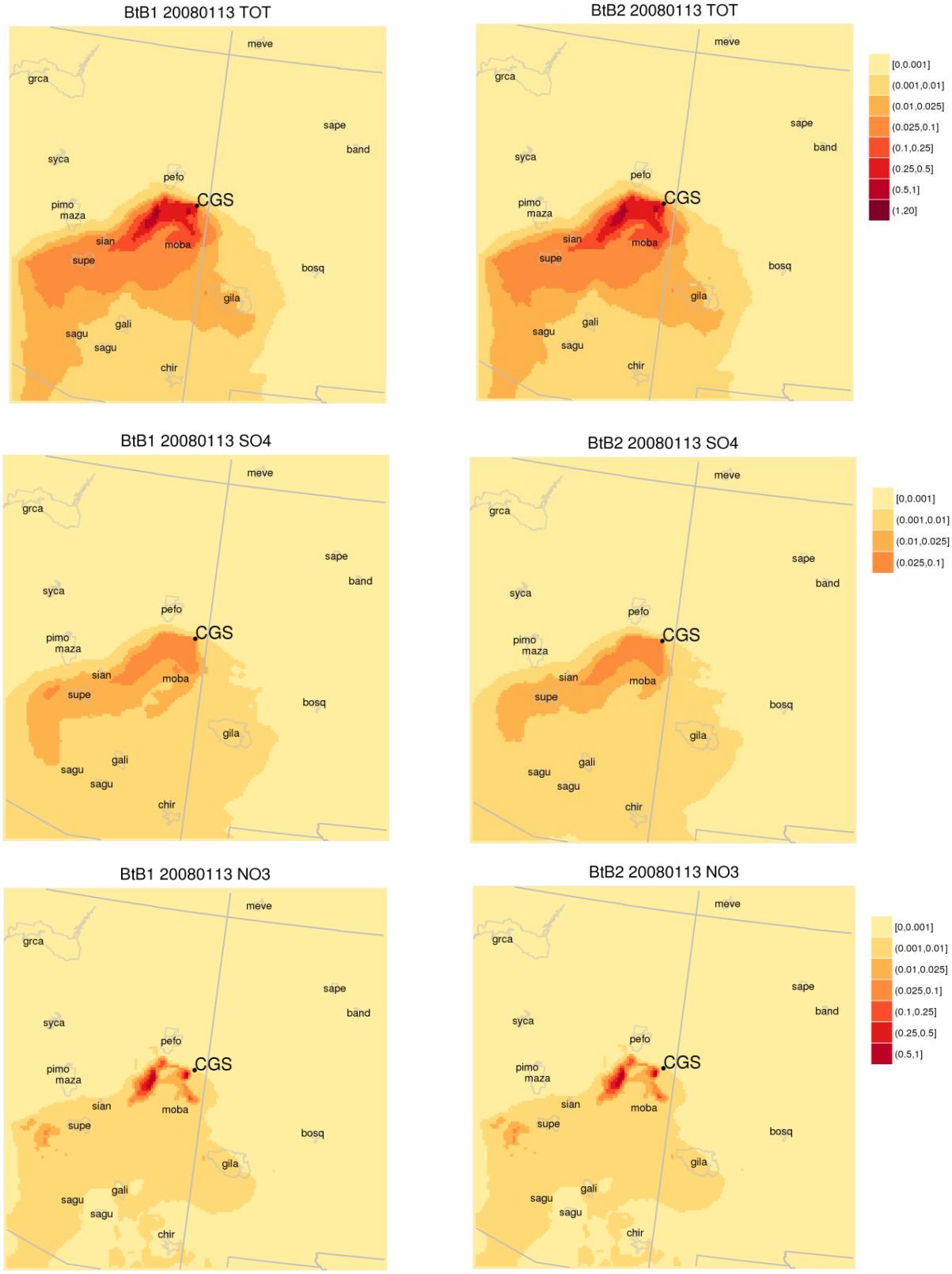


**Figure 4. BTB3 and BTB4 delta deciviews: tot, so4, no3. January 13.**

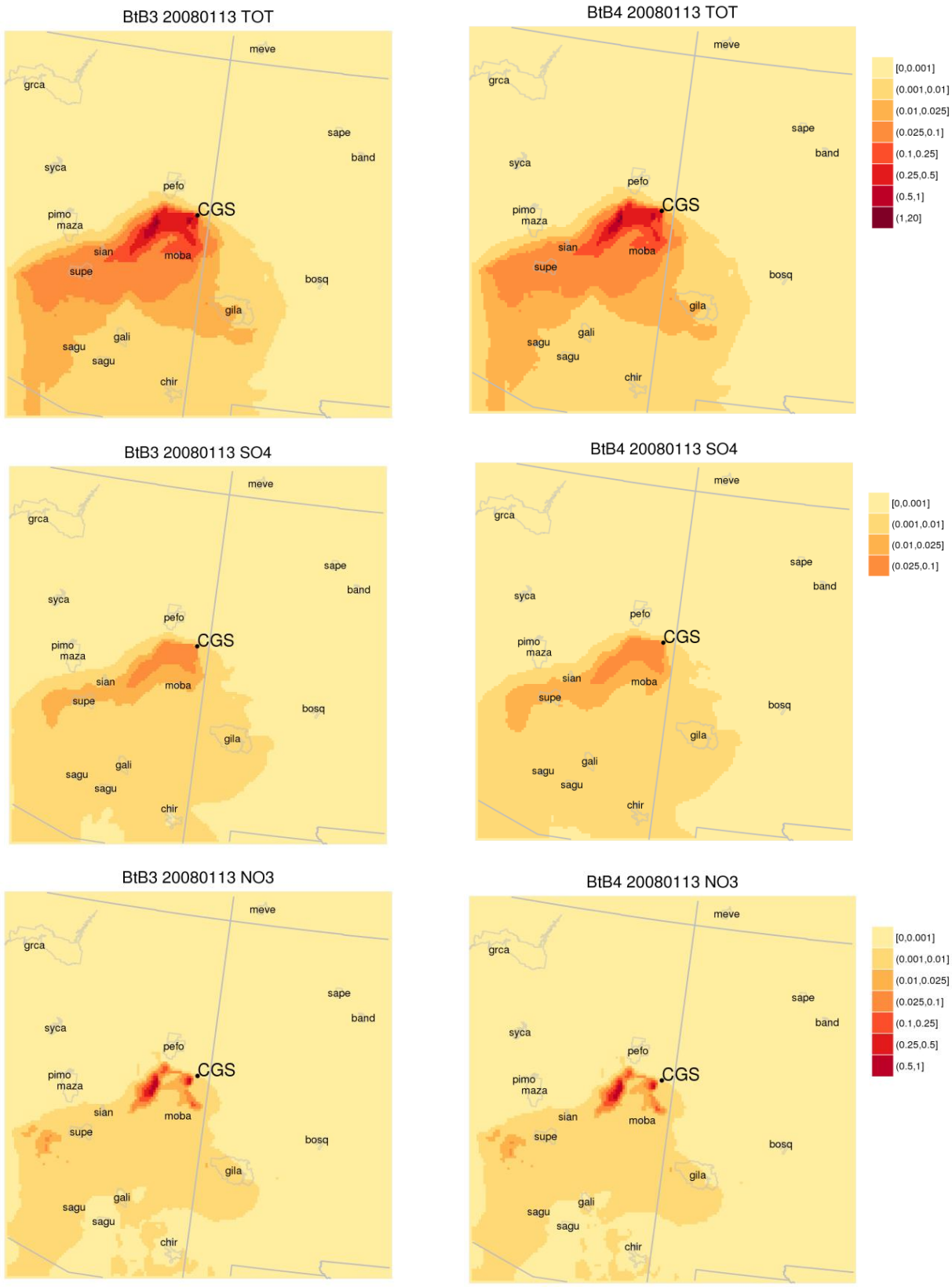


**Figure 5. "Prong 1" for single day and by pollutant: BTB1 and BTB2. January 13.**

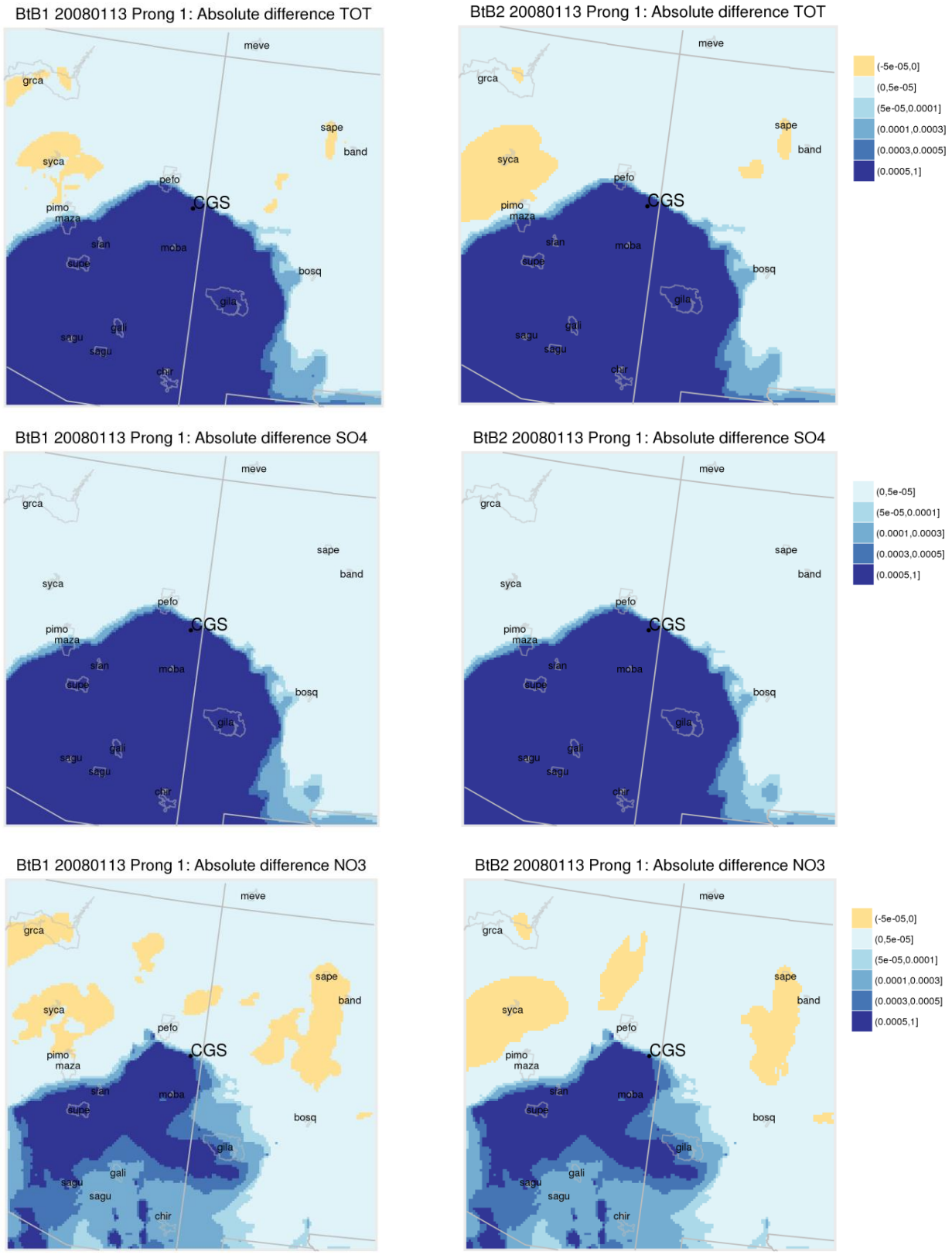


**Figure 6. "Prong 1" for single day and by pollutant: BTB3 and BTB4. January 13.**

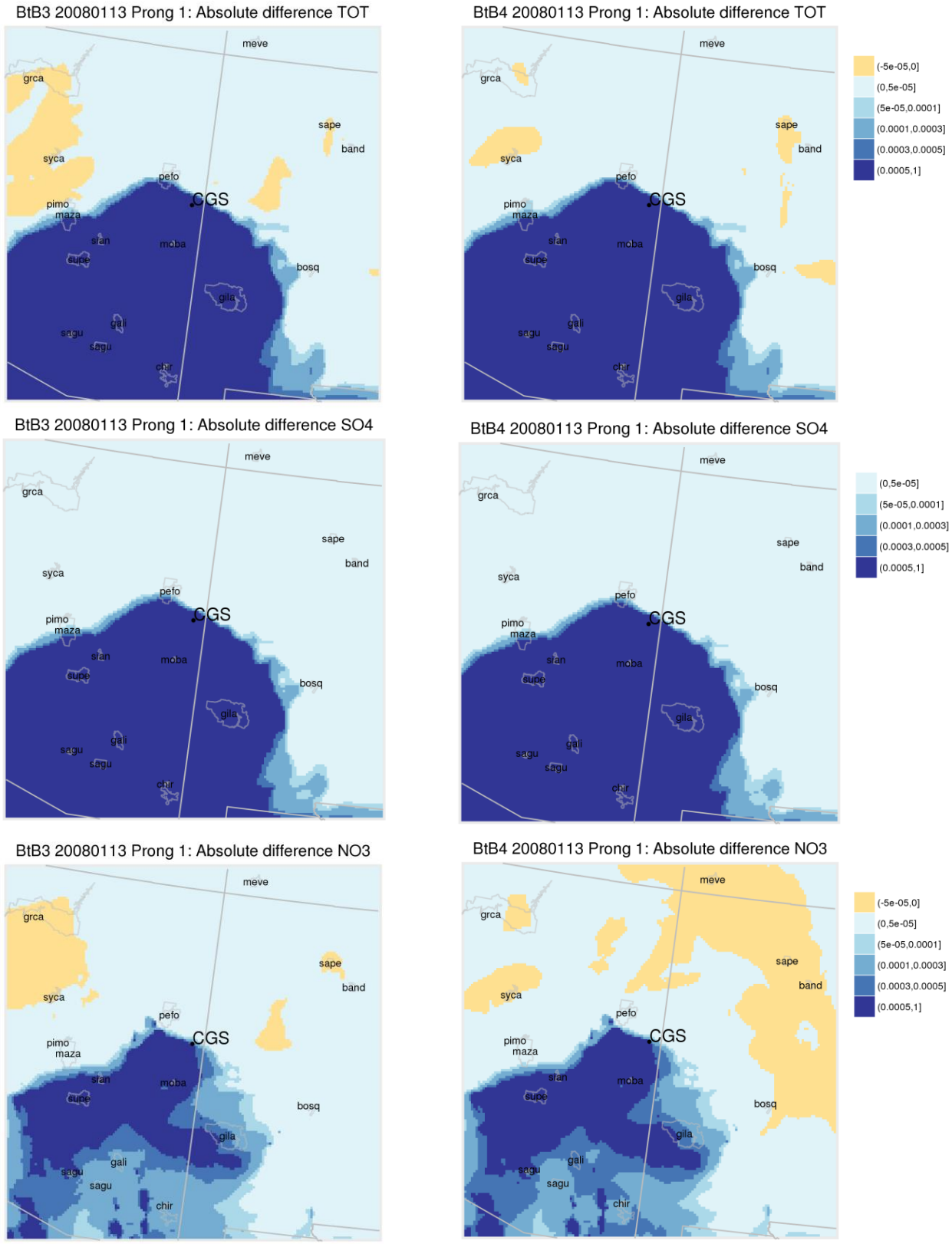


**Figure 7. "Prong 2" for single day and by pollutant: BTB1 and BTB2. January 13.**

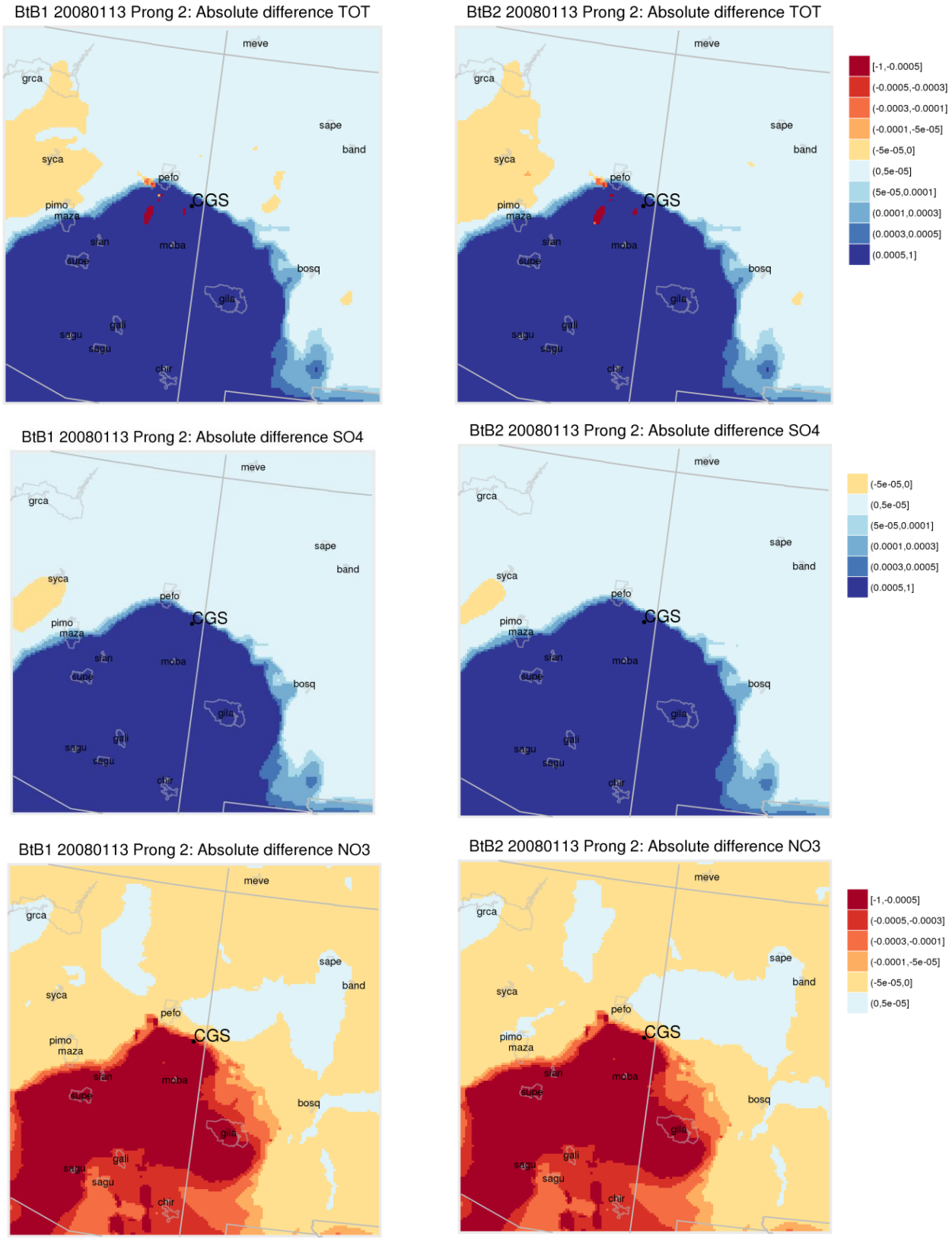


**Figure 8. "Prong 2" for single day and by pollutant: BTB3 and BTB4. January 13.**

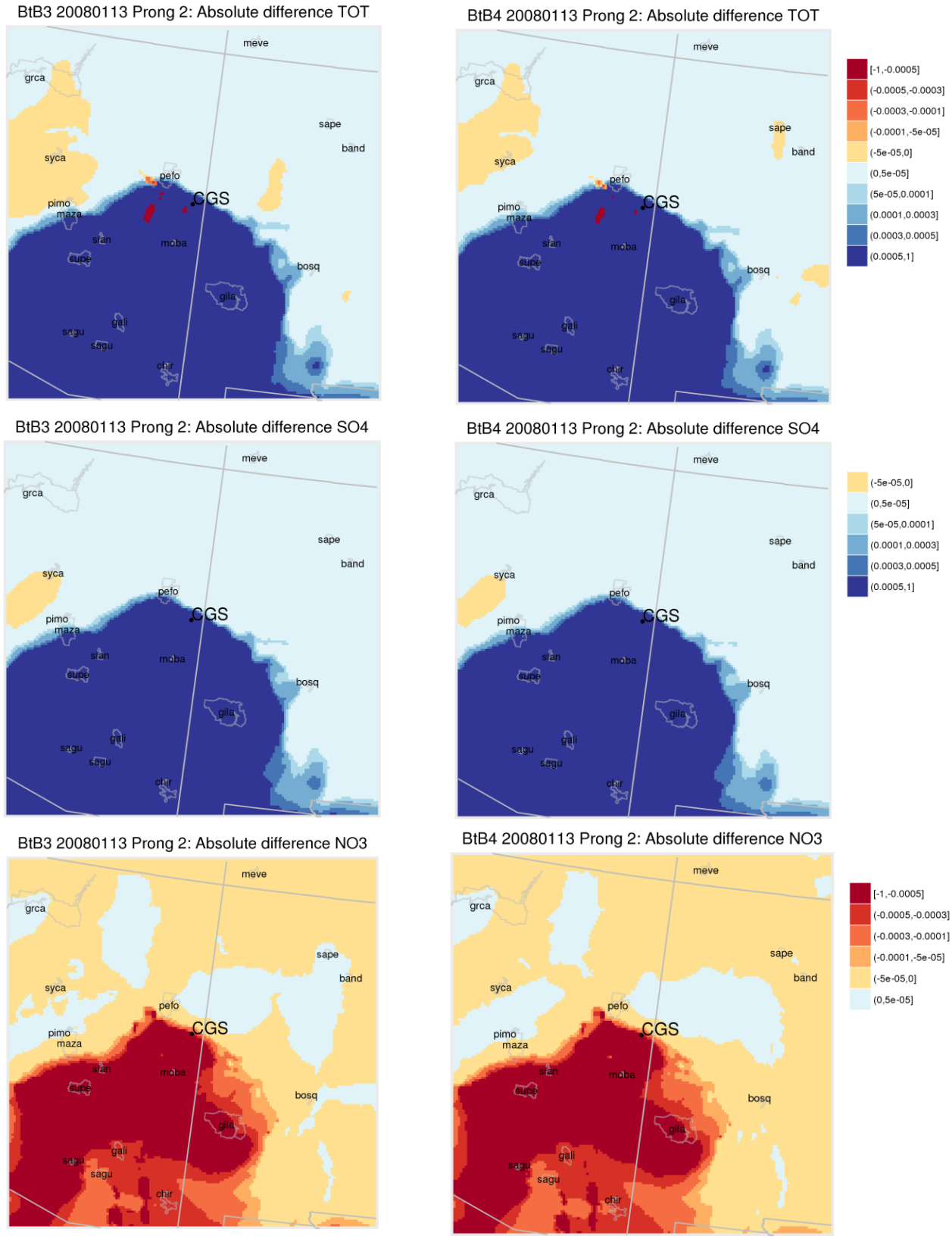


**Figure 9. Baseline and EPA BART delta deciviews: tot, so4, no3. May15.**

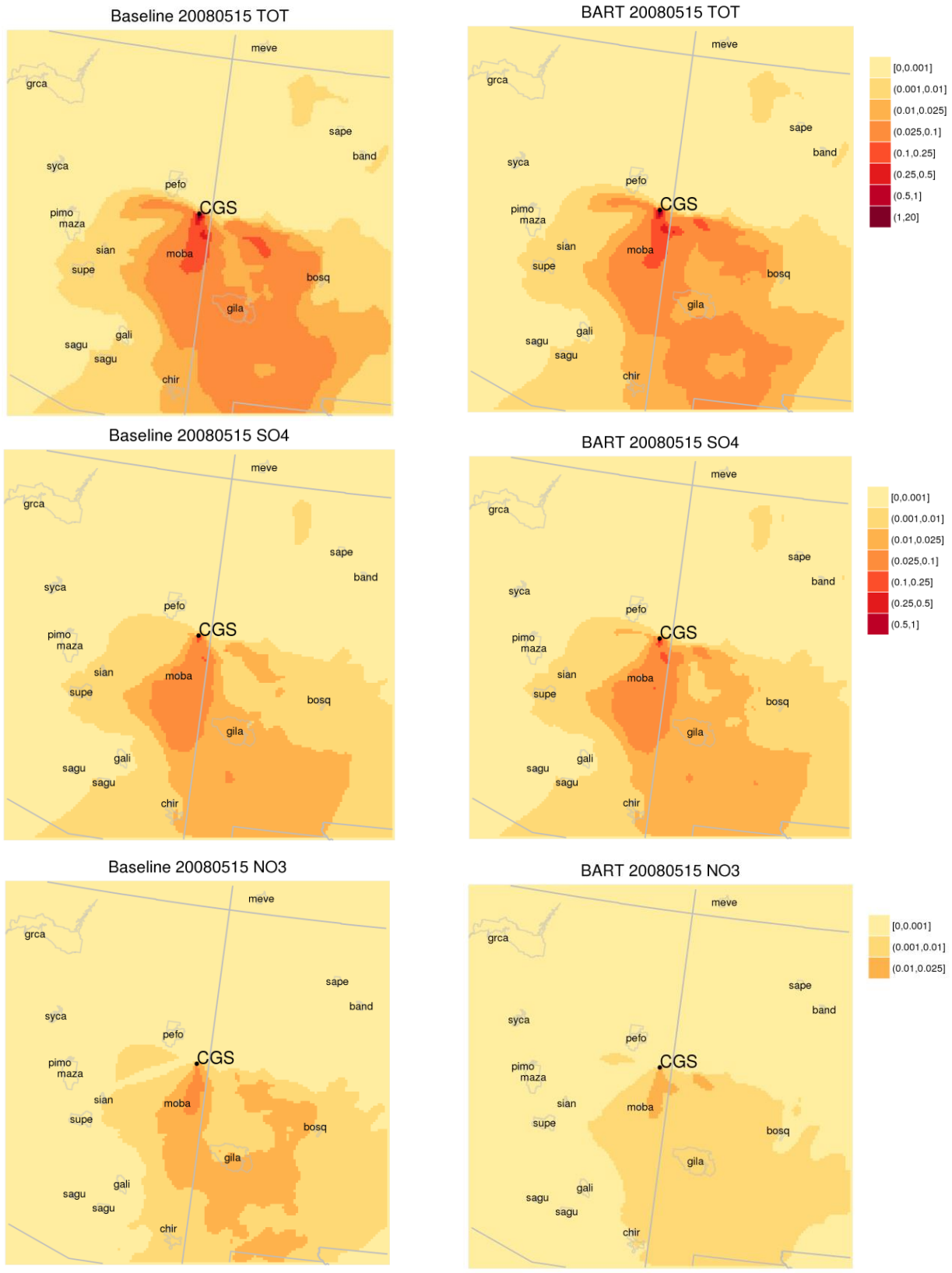


**Figure 10. BTB1 and BTB2 delta deciviews: tot, so4, no3. May 15.**

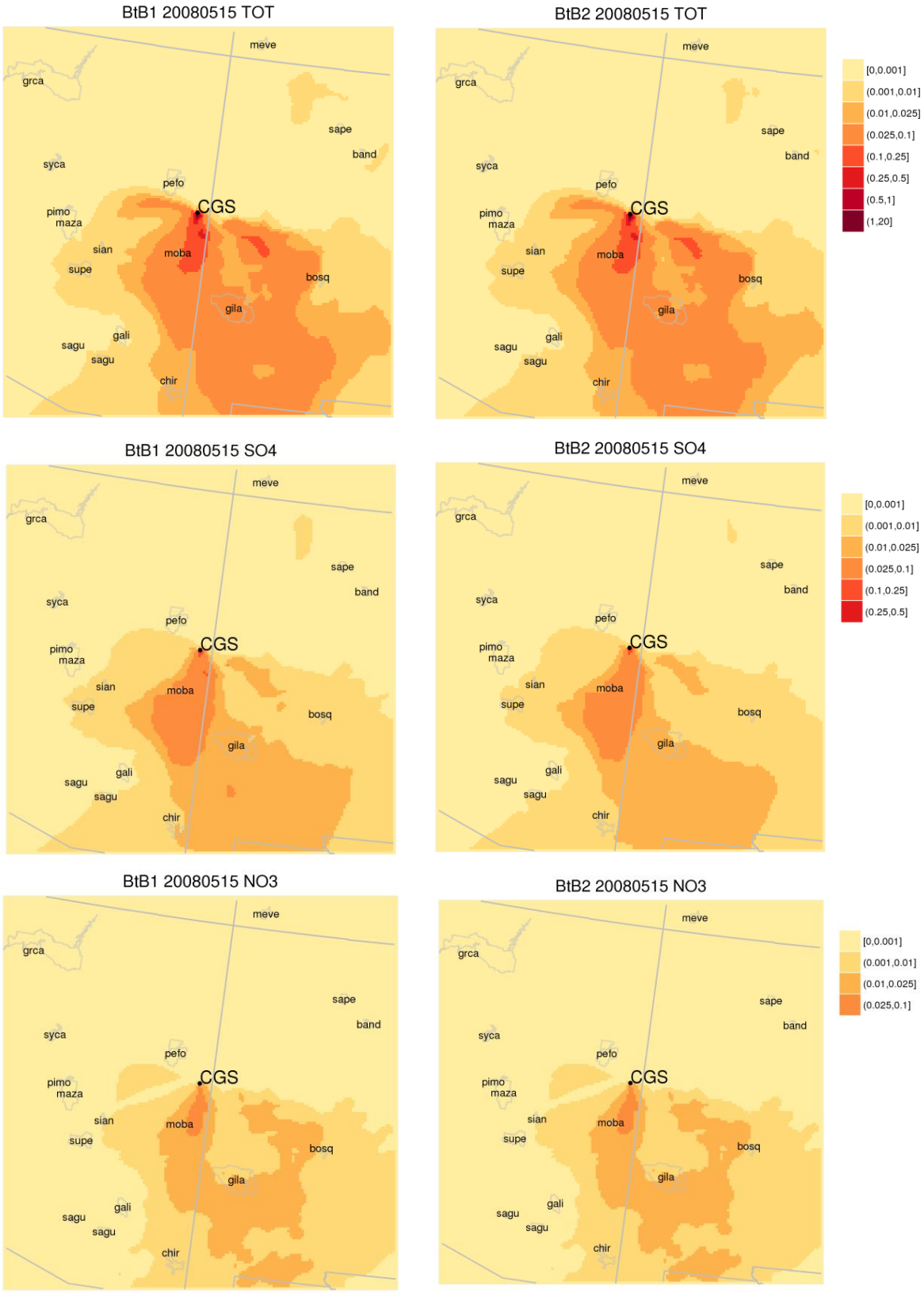


**Figure 11. BTB3 and BTB4 delta deciviews: tot, so4, no3. May 15.**

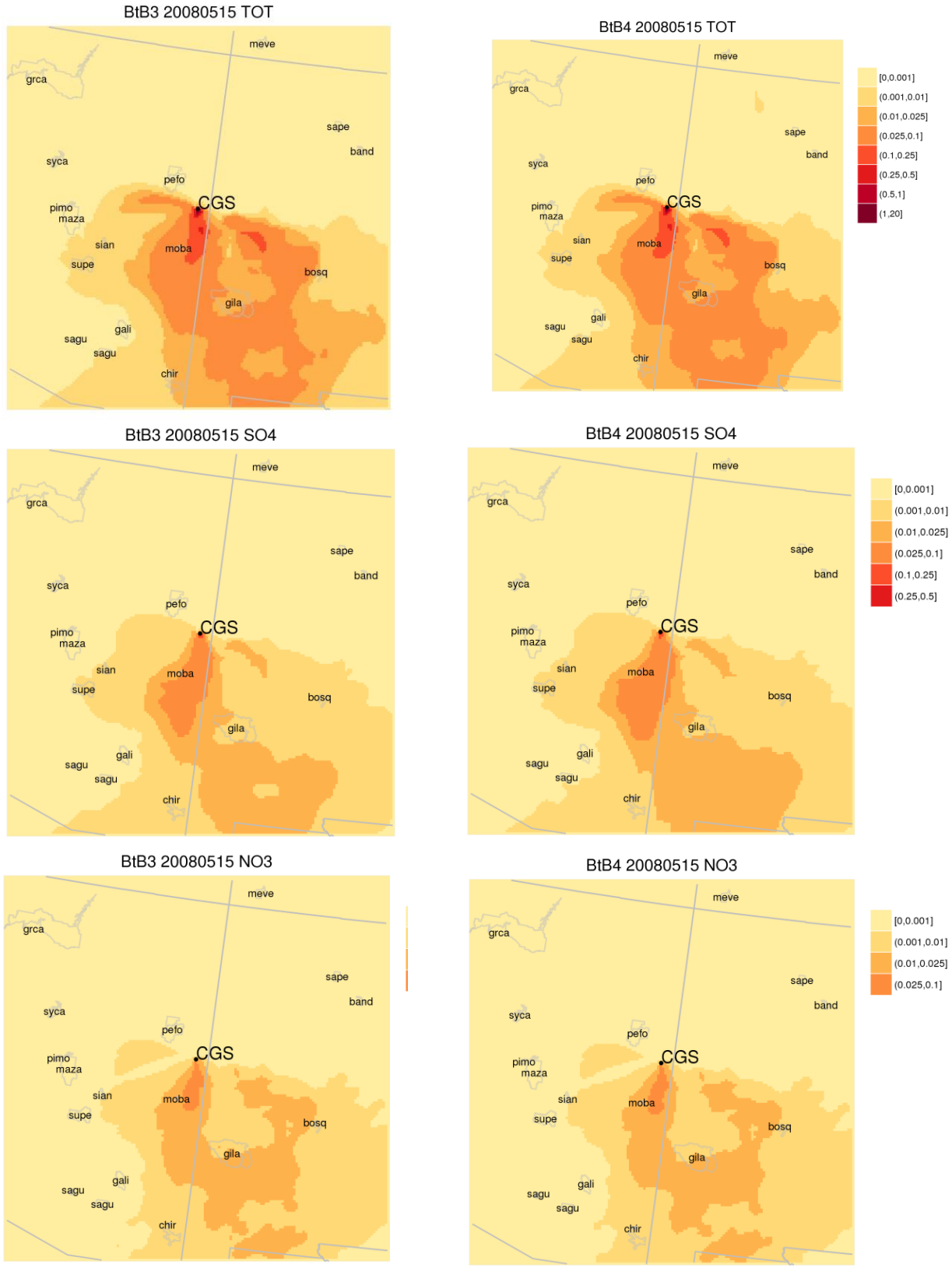


**Figure 12. "Prong 1" for single day and by pollutant: BTB1 and BTB2. May 15.**

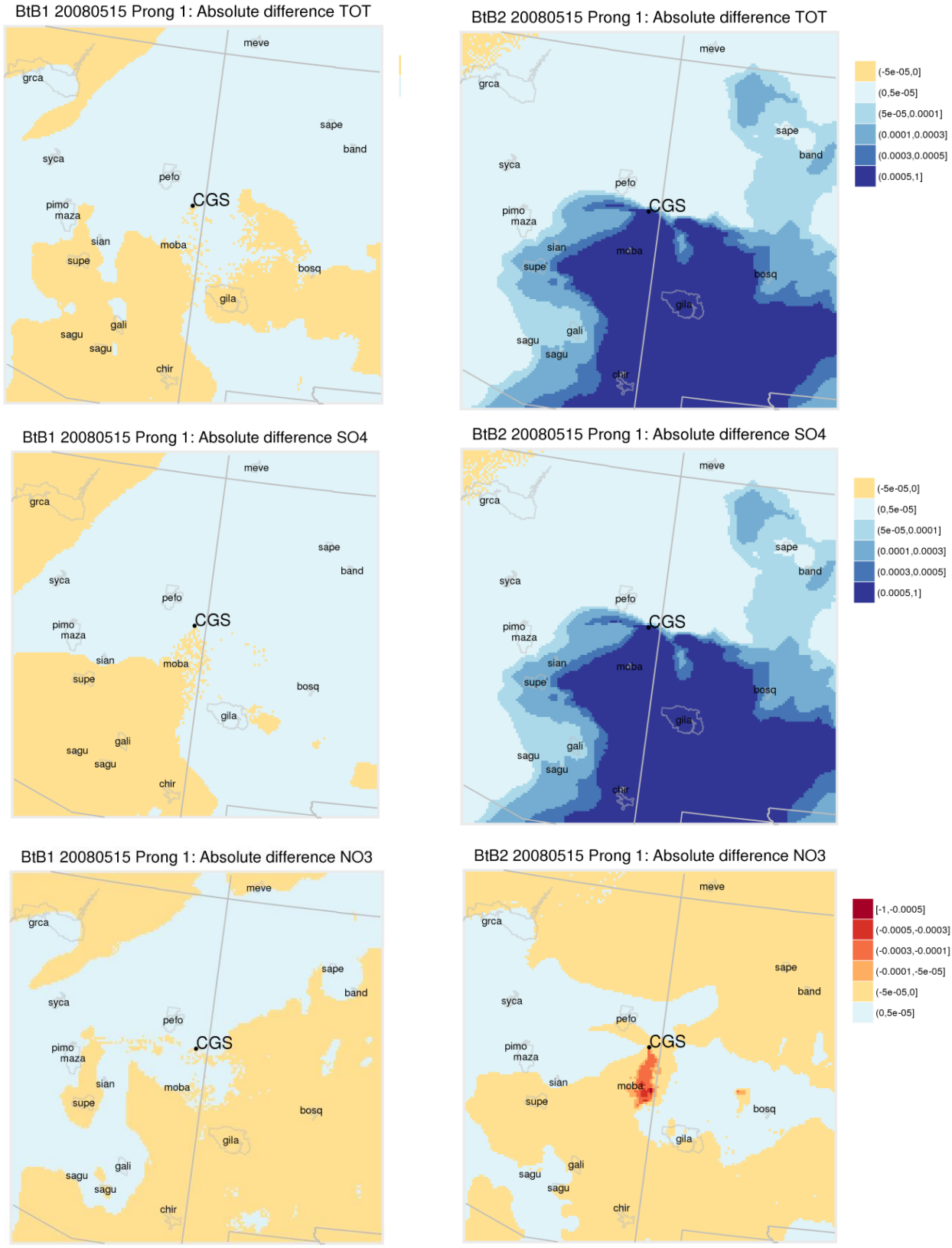


**Figure 13. "Prong 1" for single day and by pollutant: BTB3 and BTB4. May 15.**

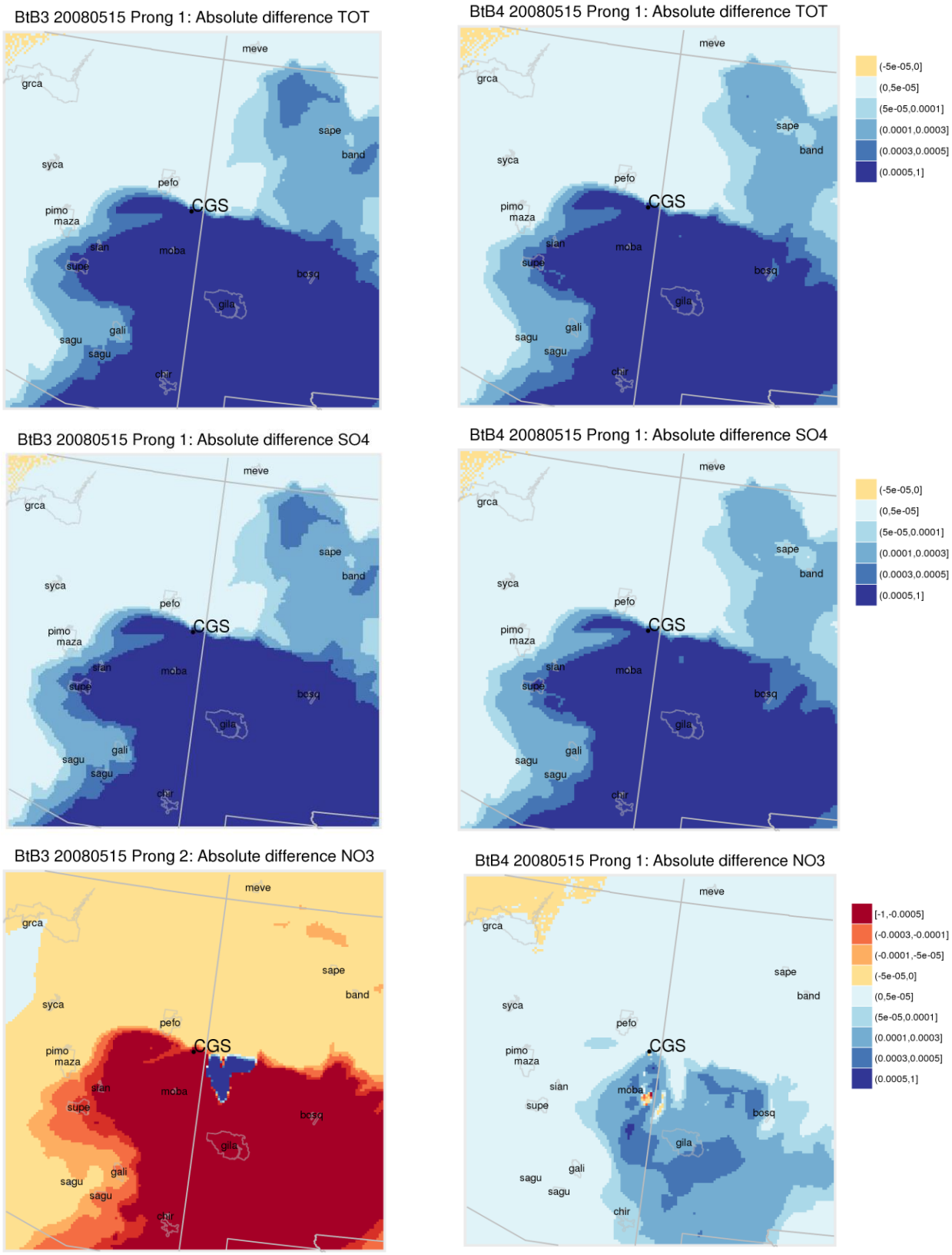


**Figure 14. "Prong 2" for single day and by pollutant: BTB1 and BTB2. May 15.**

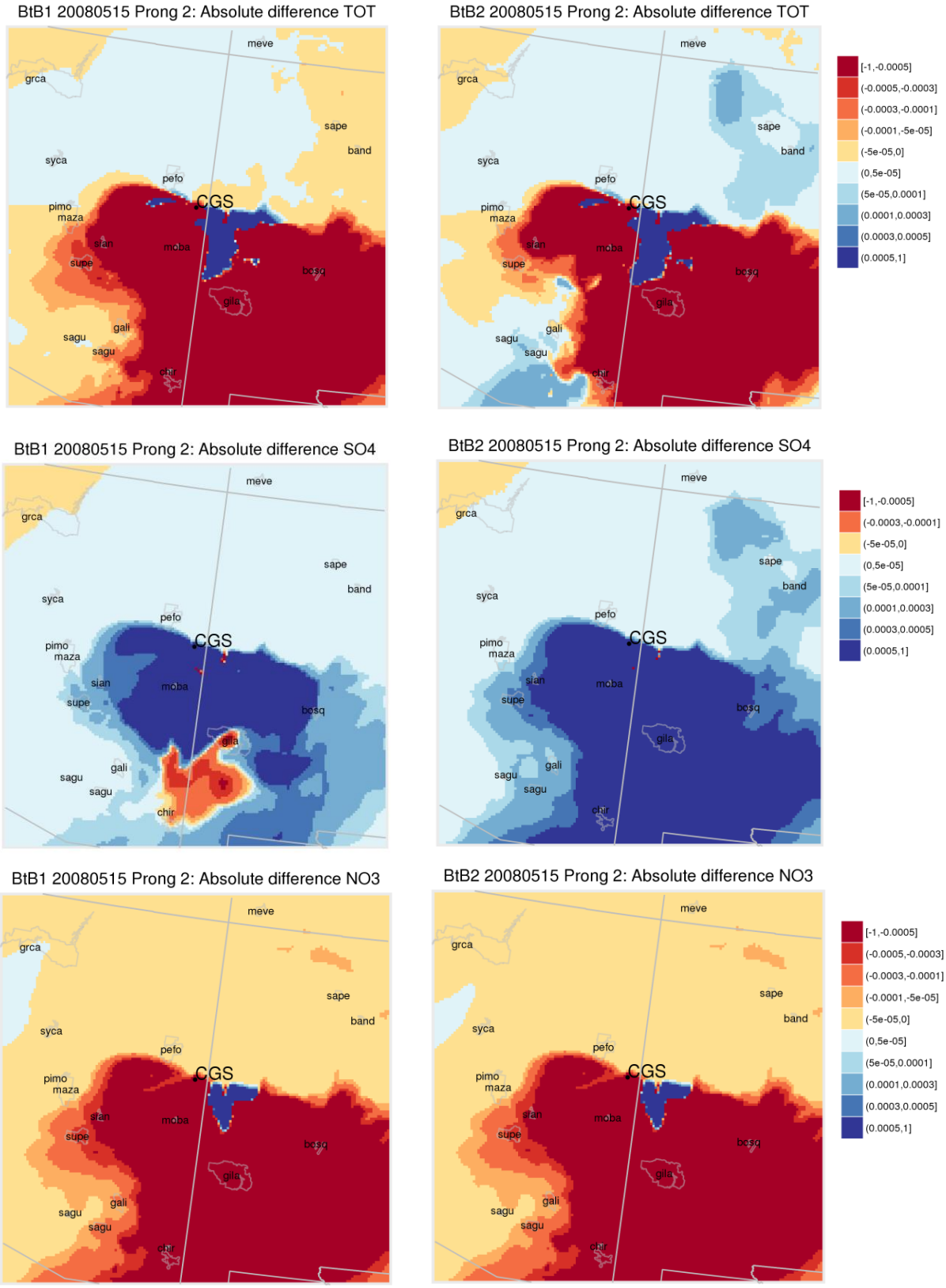
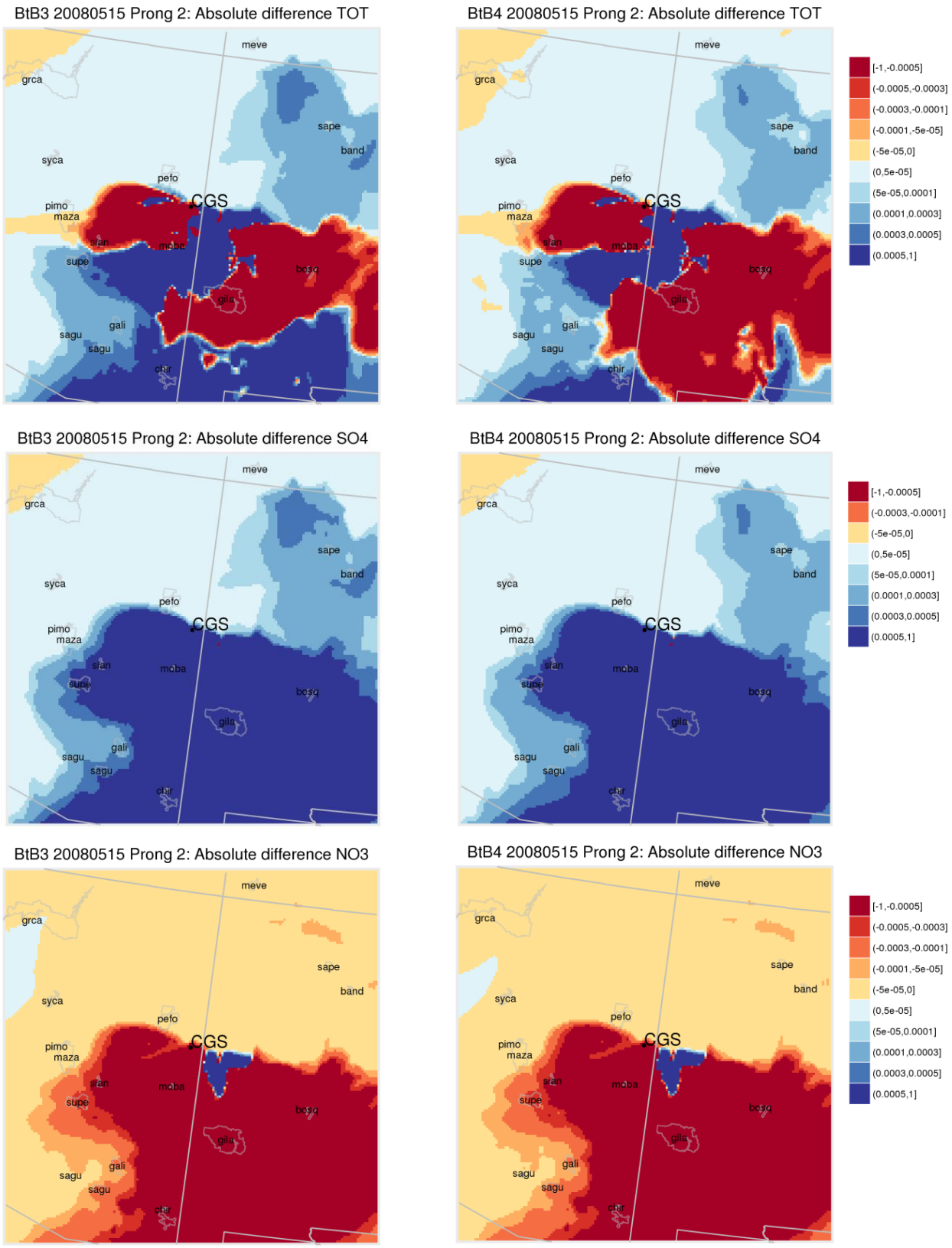


**Figure 15. "Prong 2" for single day and by pollutant: BTB3 and BTB4. May 15.**



## Conclusions

Individual day CAMx modeling results for total delta deciviews and delta deciviews based on CGS sulfate and nitrate concentrations alone, show CGS impacts above 0.025 dv for all cases at some location throughout the domain. In addition, higher delta deciview values are generally observed closest to the CGS source and the spatial pattern of delta deciviews is of a dispersed plume. There is no pixelated pattern indicative of numerical "noise" in these plots. Likewise, the "Prong 1" and "Prong 2" plots show delta deciview differences that may be above 0.0005 dv and below -0.0005 dv over wide regions of the modeling domain along with generally smooth transitions in delta deciview differences across the domain. The "Prong 1" BTB1 case for May 15 (Figure 1) compares scenarios with identical emissions (Baseline and BTB1) and therefore the reported differences are essentially zero, in these plots some pixilation occurs at values of ± 0.0000005 dv, which is an indication of numerical "noise". This is one to two orders of magnitude lower than the smallest result from the CGS two-prong BTB test.

In summary, the CAMx modeling results for the BTB test are valid numerical results, the differences between the scenarios (i.e. the "Prong 1" and "Prong 2" on individual days) are small (~ ±0.0005 dv) but are not artifacts of numerical "noise" but represent valid modeled responses to different CGS emissions scenarios.

## References

EPA Comment*:*

*We recommend including certain additional plots of photochemical modeling results. We appreciate your efforts in addressing the majority of our concerns regarding the Better-than-BART (BtB) photochemical modeling. The account by Environ' includes several spatial plots aimed at addressing the issue of whether the small differences between modeled scenarios represent actual visibility benefits, as opposed to numerical "noise." However, because these plots (Figs. 4-9 through 4-16, for BtB scenarios 1 -4, both Prong 1 and Prong 2) appear to be of annual averages, they would necessarily smooth over any numerical artifacts that are of concern in the "noise" issue. We recommend that additional plots be prepared for nitrate differences and for sulfate differences. The plots would be of daily averages on individual days, for the subset of days for which CGS has a contribution at the most affected nearby Class I areas. Such plots would be more useful in discerning whether differences used in the Prong l and Prong 2 visibility metrics behave as expected.*

Report 2016, Revised Better-than-BART Analysis for the Coronado Generating Station using the CAMx Photochemical Grid Model, June 2016 Ramboll ENVIRON